BEYOND ALL LIMITS CONGRESS 2018

International Congress on Sustainability in Architecture, Planning, and Design

Proceedings Book of The Extended Abstracts

ÇANKAYA UNIVERSITY

UNIVERSITY OF PLYMOUTH

October
17-18-19
Ankara, Turkey

Proceedings Book of Extended Abstracts

BEYOND ALL LIMITS / 2018

International Congress on Sustainability

in Architecture, Planning, and Design

ÇANKAYA UNIVERSITY
MAIN CAMPUS

October 17-18-19, 2018

GCRIS

ÇANKAYA UNIVERSITY

UNIVERSITY OF
PLYMOUTH

Publishing Board: Rabia Çiğdem ÇAVDAR
Papatya Nur DÖKMECİ YÖRÜKOĞLU
Leyla ETYEMEZ ÇIPLAK
Timuçin HARPUTLUGİL
Zerrin Ezgi KAHRAMAN
Ezgi ORHAN
Ayça ÖZMEN
Şafak SAKÇAK
Özge SÜZER

Cover Design: Çetin TÜNGER
Printed in: October, 2018
Printed by: Teknoart Digital Ofset Reklamcılık Matbaacılık İth. İhr. San. ve Tic. Ltd. Şti.
Cevizlidere Mah. 1288 Sok. No:1/1
Çankaya | Ankara | Turkey
+90 312 473 92 97 | info@printandsmile.com.tr

ISBN: 978-975-6734-20-9

Copyright © 2018 by Çankaya University Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by Çankaya University.

In any case regarding the extended abstract/manuscript, the publisher/Çankaya University will not be responsible for handling any claims relating to authorship. The author(s) will have full responsibility for the contents of their extended abstract.

ÇANKAYA UNIVERSITY

Main Campus : Yukarıyurtçu Mahallesi Mimar Sinan Caddesi
No:4 06790, Etimesgut/ANKARA, +90 312 233 10 00
Balgat Campus: Çukurambar Mah. Öğretmenler Cad.
No: 14, 06530 Çankaya/ANKARA +90 312 284 45 00
http://www.cankaya.edu.tr/

Viale Abramo Lincoln n. 5, 81100 Caserta
P.IVA: 02044190615
protocollo@pec.unicampania.it
https://www.unicampania.it/

Drake Circus, Plymouth
Devon PL4 8AA, United Kingdom
+44 1752 600600
https://www.plymouth.ac.uk/

GCRIS

COMMITTEES

Honorary Committee

Sıtkı ALP	Founder of Çankaya University
Dr. Hamdi MOLLAMAHMUTOĞLU, Prof.	Rector at Çankaya University
Dr. Giuseppe PAOLISSO, Prof.	Rector at Università degli Studi della Campania “Luigi Vanvitelli”
Dr. Kenan TAŞ, Prof.	Vice Rector at Çankaya University
Dr. Hüseyin Selçuk GEÇİM, Prof.	Vice Rector at Çankaya University
Dr. G. Francesco NICOLETTI, Prof.	Vice Rector at Università degli Studi della Campania “Luigi Vanvitelli”
Dr. Mario SPASIANO, Prof.	Vice Rector at Università degli Studi della Campania “Luigi Vanvitelli”

Scientific Committee

Dr. Yasemin AFACAN, Assoc. Prof.	Bilkent University
Dr. Saadet AKBAY YENİGÜL, Asst. Prof.	Çankaya University
Dr. Deniz ALTAY KAYA, Asst. Prof.	Çankaya University
Dr. Stefano ANDREANI, Lecturer	Harvard University
Dr. Shady ATTIA, Prof.	University of Liège
Dr. Alessandro AURIGI, Prof.	University of Plymouth
Dr. Gülşah BAŞOK	Çankaya University
Dr. Mehmet Harun BATIRBAYGİL, Prof.	Çankaya University
Dr. Çiğdem BERDİ GÖKHAN, Assoc. Prof.	Çankaya University
Dr. Lorenzo CAPOBIANCO, Assoc. Prof	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Flaviano CELASCHI, Prof.	Alma Mater Studiorum Università di Bologna
Dr. Chi Kwan CHAU, Assoc. Prof.	The Hong Kong Polytechnic University
Dr. Kalliopi CHOURMOUZIADOU, Lecturer	Hellenic Open Unıversıty
Dr. Medardo CHIAPPONI, Prof.	Università IUAV di Venezia
Dr. Alessandra CIRAFICI, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Rabia Çiğdem ÇAVDAR	Çankaya University
Dr. Gülser ÇELEBİ, Prof.	Çankaya University
Dr. Arturo DELL'ACQUA BELLAVITIS, Prof.	Politecnico di Milano
Dr. Gianfranco DE MATTEIS, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Özgen Osman DEMİRBAŞ, Assoc. Prof.	İzmir University of Economics

Dr. Halime DEMİRKAN, Prof.	Bilkent University
Dr. Pınar DİNÇ KALAYCI, Prof.	Gazi University
Dr. Papatya Nur DÖKMECİ YÖRÜKOĞLU, Asst. Prof.	Çankaya University
Dr. Hossam Eldin ELBOROMBOLY, Prof.	Ain Shams University
Dr. Cüneyt ELKER, Prof.	Çankaya University
Dr. Alpay ER, Prof.	Ozyegin University
Dr. Leyla ETYEMEZ ÇIPLAK	Çankaya University
Dr. Fabiana FORTE, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Rossella FRANCHINO, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Adriana GALDERISI, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Claudio GAMBARDELLA, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Claudio GERMAK, Prof.	Politecnico di Torino
Dr. Luigi GUERRIERO, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Arzuhan Burcu GÜLTEKİN, Assoc. Prof.	Ankara University
Dr. Timuçin HARPUTLUGİL, Asst. Prof.	Çankaya University
Dr. Jan HENSEN, Prof.	Eindhoven University of Technology
Dr. Zerrin Ezgi KAHRAMAN, Assoc. Prof.	Çankaya University
Dr. Jian KANG, Prof.	University College London
Dr. Ceren KATİPOĞLU, Asst. Prof.	Çankaya University
Dr. Kıvanç KİTAPÇI	Çankaya University
Dr. Gül KOÇLAR URAL, Prof.	İstanbul Technical University
Dr. Satish Basavapatna KUMURA	University of Plymouth

Dr. Cüneyt KURTAY, Prof.	Gazi University
Dr. Shuli LIU, Prof.	Coventry University
Dr. Luigi MAFFEI, Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Elena MANZO, Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. İpek MEMİKOĞLU, Asst. Prof.	Çankaya University
Dr. Francesca MUZZILLO, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Gülru MUTLU TUNCA, Asst. Prof.	Çankaya University
Dr. Ezgi ORHAN, Asst. Prof	Çankaya University
Dr. Mustafa ÖNGE, Asst. Prof.	Çankaya University
Dr. Zühal ÖZCAN, Prof.	Çankaya University
Dr. Simge ÖZDAL OKTAY	Çankaya University
Dr. Suna Senem ÖZDEMİR, Asst. Prof.	Çankaya University
Dr. Ayça ÖZMEN	Çankaya University
Dr. Cengiz ÖZMEN, Assoc. Prof.	Çankaya University
Dr. Fatma Gül ÖZTÜRK, Assoc. Prof	Çankaya University
Dr. Nicola PISACANE, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Daniela PISCITELLI, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Matthijs PRINS, Assoc. Prof.	Delft University of Technology
Dr. Patrizia RANZO, Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Ahmed RASHED, Prof.	British University in Egypt
Dr. Antonio ROSATO, Assoc. Prof.	Università degli Studi della Campania "Luigi Vanvitelli"

Dr. Silvana SEGAPELI, Assoc. Prof.	Ecole Nationale Supérieure d'Architecture de Saint Etienne
Dr. Sergio SIBILIO, Prof.	Università degli Studi della Campania "Luigi Vanvitelli"
Dr. Ashish SHUKLA	Coventry University
Dr. Benedetta SPADOLINI, Prof.	Università degli Studi di Genova
Dr. Özge SÜZER, Asst. Prof.	Çankaya University
Dr. Mehmet TUNÇER, Prof.	Çankaya University
Dr. Ali TÜREL, Prof.	Çankaya University
Dr. Gülsu ULUKAVAK HARPUTLUGİL, Assoc. Prof.	Çankaya University
Dr. Zeynep UYSAL ÜREY, Asst. Prof	Çankaya University
Dr. Shaonong WEI, Prof.	East China Normal University
Dr. Pieter de WILDE, Prof.	University of Plymouth
Dr. Ornella ZERLENGA, Prof.	Università degli Studi della Campania "Luigi Vanvitelli"

GCRIS

Organizing Committee

Dr. Alessandro AURIGI, Prof.	Congress President
Dr. Mehmet Harun BATIRBAYGİL, Prof.	Congress President
Dr. Luigi MAFFEI, Prof.	Congress President
Dr. Claudio GAMBARDELLA, Assoc. Prof.	Congress Chair
Dr. Timuçin HARPUTLUGİL, Asst. Prof.	Congress Chair
Dr. Pieter de WILDE, Prof.	Congress Chair

Dr. Pasquale ARGENZIANO, Researcher

Dr. Alessandra AVELLA, Researcher

Dr. Francesca CASTANÒ, Assoc. Prof.

Dr. Rabia Çiğdem ÇAVDAR

Dr. Claudia CENNAMO, Researcher

Dr. Gianluca CIOFFI, Contract Professor

Dr. Ornella CIRILLO, Researcher

Dr. Claudia DE BIASE, Resarcher

Dr. Marina D'APRILE, Researcher

Dr. Papatya Nur DÖKMECİ YÖRÜKOĞLU, Asst. Prof.

Dr. Leyla ETYEMEZ ÇIPLAK

Dr. Caterina FIORENTINO, Researcher

Dr. Caterina FRETTOLOSO, Researcher

Dr. Zerrin Ezgi KAHRAMAN, Assoc. Prof.

Dr. Ceren KATİPOĞLU, Asst. Prof.

Dr. Satish Basavapatna KUMURA

Dr. Massimiliano MASULLO, Assoc. Prof.

Dr. İpek MEMİKOĞLU, Asst. Prof.

Dr. Ezgi ORHAN, Asst. Prof.

Dr. Ayça ÖZMEN

Dr. Cengiz ÖZMEN, Assoc. Prof.

Dr. Fatma Gül ÖZTÜRK, Assoc. Prof.

Dr. Özge SÜZER, Asst. Prof.

Dr. Antonella VIOLANO, Assoc. Prof.

Çetin TÜNGER, Full Time Instr.	Webmaster
Elif AKSEL, Res. Asst.	Organizing Secretary
Feride Nazda GÜNGÖRDÜ, Res. Asst.	Organizing Secretary

GCRIS

GCRIS

FOREWORD

It is our great pleasure to welcome you to BEYOND ALL LIMITS 2018 - International Congress on Sustainability in Architecture, Planning, and Design, a joint collaboration of Çankaya University (Ankara-Turkey), Università degli Studi della Campania "Luigi Vanvitelli" (Caserta-Italy) and University of Plymouth (Plymouth-United Kingdom). The congress takes place in the Congress Hall of Çankaya University, Ankara, Turkey, on October 17-18-19, 2018 and supported by SID "Società Italiana Design", SITdA "Società Italiana della Tecnologia dell'Architettura", LeNS "The Learning Network on Sustainability" and GRID "Architecture, Planning and Design Journal".

The congress aims to discuss and redefine the term sustainability with its all dimensions such as environmental, economic and sociocultural in various disciplines including architecture, planning and design, to extend the term's boundaries through fulfilling it with scientific, genuine, innovative and inspiring studies and to foster cooperation within and between different disciplines at international level. Besides, workshops and special sessions are organized.

The scientific program consists of keynote speeches, plenary and parallel sessions of presentations and workshops. The 3-day congress has more than 200 contributing academicians, experts, researchers and professionals attending from several countries of the world. More than 100 presentations are planned in 28 sessions in 2 days. The third day is devoted to workshops which are organized by 8 different groups of academicians and professionals from related various fields. In addition to the contributed presentations and workshops, two invited keynote speeches are given: by Prof. Dr. Susan ROAF, Heriot Watt University's Emeritus Professor of Architectural Engineering and Prof. Dr. Birol KILKIŞ, Başkent University's Professor of Energy Engineering.

This proceedings book of extended abstracts comprises written contributions of the presentations, keynote speeches and workshops contents. Before the congress, all participants were expected to submit extended abstracts of their presentations in a format formed by a short abstract with keywords, introduction, methods, findings and discussion, conclusion and references, not exceeding 1500 words. All submitted extended abstracts were blind peer reviewed and accepted ones now take part in this book.

As being Congress Organization Committee, we would like to express our gratitude to all contributing members of Çankaya University, Università degli Studi della Campania "Luigi Vanvitelli" and the University of Plymouth for their superior efforts and enormous support. Furthermore, we would like to thank all participants of the congress for their outstanding contributions for sharing their knowledge, expertise and vision.

Congress Organization Committee

GCRIS

TABLE OF CONTENTS

COMMITTEES 1

Honorary Committee 1
Scientific Committee 2
Organizing Committee 6

FOREWORD 9

KEYNOTE SPEAKERS 21

How to Design a Comfortable Building 22
Susan Roaf

`Sustainable` Systems and Equipment in Green Buildings-How Sustainable Are They? An Exergy Perspective 38
Birol Kılkış

EXTENDED ABSTRACTS 41

The Use of Multi-Criteria Assessment Techniques in Defining Sustainable Transport Systems for Different Sized Cities Ankara and Rize Example 43
Furkan Akdemir, Hayri Ulvi, Aslınur Ekiz, Saime Yılmaz

Courtyards thermal efficiency during hot regions' typical winter 50
Omar Al-Hafith, Satish B. K., Pieter de Wilde

Resilience planning from theory to practice 55
Deniz Altay Kaya

Why in-between spaces are important to everyday architecture? 59
Susana Alves

Meaning in Cultural Sustainability 64
Gökçe Atakan, Saadet Akbay

An Assessment of the Energy Performance Evaluation within the Form Conception Process 70
Cem Ataman, İpek Gürsel Dino

The Computation of Performative Architecture within Integrated Design 76
Cem Ataman, İpek Gürsel Dino

The Evaluation of Urban Mobility In Terms of Space and Equality, Case Study of Yozgat 81
İlker Atmaca, Seçil Gül Meydan Yıldız, Hazal Ilgın Bahçeci

Remote sensing and sustainability. Case studies in Campania 91
Alessandra Avella, Pasquale Argenziano, Nicola Pisacane

Bibliographic Evaluation of the Concept of Sustainability in the Postgraduate Theses of Architecture in Turkey 99
Özlem Aydın

Analysis of Kızılcasar Village in terms of Vernacular Architecture 105
Filiz Bal Koçyiğit, Nazlı Nazende Yıldırım, Papatya Nur Dökmeci Yörükoğlu

Dimensions of War Destruction in the City of Benghazi 111
Abdelhamed Barani, Zerrin Ezgi Kahraman

The Evaluation of Early Republican Industrial Buildings in Antalya in the Context of Cultural Sustainability 118
Emine Barbaros Akay, Yaren Şekerci, Hilal Tuğba Örmecioğlu

Evaluation of Sustainability of Housing Transformations in Copenhagen 123
Nezih Burak Bican

Sustainability Beyond Architecture: Beyond Concepts, Beyond Scale and Beyond Time 133
Ebru Bingöl

The Role of Participation in Identification and Sustainability of Heritage; the case of the Windmill of Heybeliada 137
Burcu Büken Cantimur, A. Binnur Kıraç, Gülce G. Okyay

Importance of the Sustainable Planning in Campus Settlement – A Negative Example: Aleaddin Keykubat Campus - Turkey 142
Süheyla Büyükşahin Sıramkaya, Dicle Aydın, Esra Yaldız

Sustainable methodologies for stability assessment of masonry vaulted structures 148
Daniela Cacace, Claudia Cennamo, Concetta Cusano, Gianfranco De Matteis

Designed sustainability in Neapolitan Cultural Heritage. Some examples of argot design 153
Saverio Carillo, Pasquale Argenziano, Carolina Campone

Libya, colonial architecture and tourist propaganda in the fascist rhetoric 161
Marco Carusone, Michela Russo, Roberta Bellucci

Campania Felix from rural landscapes to smart lands 167
Francesca Castanò

Adaptive reuse in sustainable development: the case study of Ercolano (Italy) 174
Francesca Ciampa, Martina Bosone

Weaving the contemporary, Actuality in the use of raw materials in the production chain of the fashion industry 180
Elisabetta Cianfanelli, Renato Stasi, Margherita Tufarelli

Towards an Idea of Countryside 184
Gianluca Cioffi

Design as a critical interpretation of the world 190
Alessandra Cirafici, Fabrizia Ippolito, Caterina Fiorentino

Social & cultural sustainability: Street Art In Italy 195
Vincenzo Cirillo

Continuity and discontinuity in the drawing for the protection of religious heritage in the Balkans 201
Luigi Corniello, Andrea Maliqari, Carla Mottola, Enrico Mirra

In terms of structure and expression. The possibilities of re-composition project 207
Francesco Costanzo

Design research models for territories: local resources for social inclusion 215
Vincenzo Cristallo, Ivo Caruso

Impacts of Recently Developed Squatter Settlements Transformation Projects on Urban Heat Islands: A Comparative Study in the City of Ankara 220
Ayşem Berrin, Funda Baş Bütüner

An investigation on indoor soundscape in high school environment 226
Sıla Çankaya Topak

From Badlands of Plastics to "Up-cycled" Objects: "Tertium Non Data" 232
Rabia Çiğdem Çavdar

The Energy Effectiveness and Daylight Performance of Office Venetian Blinds 236
N. Mine Çelebi Yazıcıoğlu

The Functional Continuity of Historic Cumhuriyet Square – Ayaş 247
Gülşah Çelik Başok

Multiple Configurations of a Kinetic Shading System to Test Daylight Illuminance and Uniformity 253
Aslıhan Çevik Tuğçe Kazanasmaz

Evaluating the Adaptation of Historic Buildings to New Functions in Terms of Sustainability: Afyonkarahisar Mihrioğlu Mansion 260
Gamze Çoban Pınar Dinç Kalaycı

Sustainability and Built Heritage Conservation in today's Italy: an appraisal between theory, method and practice 269
Marina D'Aprile

The challenge of preserving heritage: A Neighbourhood case in Ardabil, Iran 275
Yousef Daneshvar Rouyandozagh, Ece Kumkale Acikgoz

Urban Sustainable Innovative Actions: The I.Re.Ne. Project 282
Claudia De Biase, Michela Monaco, Maria Antonietta Sbordone

The ecological and social role of open spaces in urban regeneration processes 287
Raffaela De Martino, Barbara di Vico

Conservation state and structural deficiencies of typical Italian bridges 292
Gianfranco De Matteis, Mattia Zizi, Antonino Del Prete

Influence of structural typologies on architectural style of high-rise steel buildings 298
Gianfranco De Matteis, Valentina Corlito, Graziella Soleti

Beyond the limits of Building Performance Analysis 306
Pieter de Wilde

Wind energy: differentiating perspectives 310
Başak Demir

Adaptive Re-Use, Sustainability and the Modern Movement 315
Huriye Armağan Doğan

Authenticity and Sustainability 319
Rui Duarte

An Ecotourism-oriented Proposal in the Context of Sustainability: The Case of Rize Küşüve Village 324
Derya Elmalı Şen, Evşen Yetim, Elif Öztürk

Effects of Architectural and Behavioural Factors on Indoor Air Quality in Residential Apartments 331
Ehab Ali Eshtiwi, Papatya Nur Dokmeci Yorukoglu

Assessing the Sustainability of Historical Continuity in Multi-Layared Historic Towns: The Case of Amasya, Turkey 336
Leyla Etyemez Çıplak

Room Impulse Response in Game Engines 344
Hasan Baran Fırat, Massimiliano Masullo, Luigi Maffei

The influence of early Christian basilicas in the Byzantine East 349
Raffaela Fiorillo

Large-scale ecosystems regeneration: enabling the transition to a circular economy in the Vesuvius coastal area 356
Rossella Franchino, Serena Viola

BIM Technology and Material Innovation: From Efficiency to Environmental Compatibility 362
Rossella Franchino, Caterina Frettoloso, Nicola Pisacane

Cities seek resilience: a network for a revalue urban identity 367
Caterina Frettoloso, Paola Gallo

Energy Efficiencies of Cultural Heritage Through Recovery of Damages by Natural Event: The Case of The Gallery of Nations Inside the Church of Michelucci In Florence 372
Paola Gallo, Leonardo Boganini

A museum system of design/craft for sustainable development in southern Italy 379
Claudio Gambardella, Dario Russo

The Charterhouses in Campania: San Martino, a case to be reconsidered 384
María Fernanda, García Marino

Sensory spatial appraisal of the Child Medical Unit of Mustapha Pacha hospital in Algiers 390
Nassila Ghida, K. Boussora

Cultural Routes in South Italy: methods and projects 398
Anna Gianetti, Elena Manzo

Giovan Battista Piranesi: the drawing of the vernacular in the representation of the solidity of the eighteenth century 403
Paolo Giordano

Determining the Attitude-Behavior Gap Towards Sustainable Communities 408
Can Gölgelioğlu, Simge Özdal Oktay

Spolia Reconsidered in Terms of Sustainability 417
Hale Gönül

Bell towers: Structural types and seismic safety 423
Mariateresa Guadagnuolo, Marianna Aurilio, Anna Tafuro, Giuseppe Faella

Integrated approaches and strategies for enhancing sustainable development of Italian small villages in the South of Italy 428
Giuseppe Guida, Claudia de Biase, Fabiana Forte, Adriana Galderisi

Accommodation strategies of Syrians in Turkey 433
Dilşa Günaydın Temel, Z. Ezgi Haliloğlu Kahraman

Built environment heritage as political negotiation in Famagusta, Cyprus 439
Ceren Hamiloğlu

Conceptual framework for developing next generation of Energy Performance Certification (EPC) systems 443
Timuçin Harputlugil

Triconch chapels in the early Christian and Byzantyne architectural tradition 449
Danila Jacazzi

Comparison of Design Criteria about Energy in Healthcare Building According to BREEAM and LEED Certification Systems 456
Sevil Jahed, Cüneyt Kurtay

Sustaining Cultural Heritage Sites through Interpretation and Presentation Methods: The Case of Magnesia on the Meander 463
Başak Kalfa Ataklı, Nimet Özgönül

Sustainability of Architectural Cultural Heritage in the Roman Imperial Period 469
Aygün Kalınbayrak Ercan

Green Design; An Environmental Concern or An Aesthetic Approach 474
Aliye Rahşan Karabetça

Occupants' Behaviour for Sense of Security and Well Being Concerns in Their Residences: 100. Yıl Case 479
Özge Karaman

Using Spolia in Ottoman Architecture: Searching for Continuity on an Architectural Symbol of Power through Re-use of Materials 485
Ceren Katipoğlu Özmen

Analysis of Building Stock and Development of Building Typologies in Turkey 489
N. Cihan Kayaçetin, Gülsu Ulukavak Harputlugil, A. M. Husaunndee, M. S. Dizdaroğlu

From Design to construction in Architecture A critical phase that redefines the role of the architect in the profession 496
Karen Boujaoudeh Khoury

The room acoustic analysis of TED high school main lecture hall 502
Kivanc Kitapci

Application of a multiple regression model for estimating the performance of a prismatic panel in varying room and window sizes 510
Büşra Köse, Tuğçe Kazanasmaz

Hybrid biomimetic design for sustainable development through multiple perspectives 515
Carla Langella, Valentina Perricone

Fashion eco design lab: capsule collections bio 520
Roberto Liberti, Patrzia Ranzo

Historical thermal baths in Europe: a research methodology for restoration and preservation 525
Elena Manzo, Ilaria Pontillo

The design from autarky to the circular economy 529
Angela Pecorario Martucci

Medical retrofitting design 534
Sabina Martusciello, Massimiliano Masullo, Geremia Nappo, Alessandro Tessitore, Rosa De Micco, Antonio De Mase, Antonio Garofalo, Antonio Cennamo

Wayfinding as an Aspect of Social Sustainability 538
İpek Memikoğlu, Hetham F. Layas

Achieving Socially Sustainable Environments through Empathic Modelling 543
İpek Memikoğlu

How can we make sustainable design? 548
Maria Dolores Morelli

Design Strategies for Natural Ventilation 553
Francesca Muzzillo

Blockchain technology: opportunities for sustainability of construction sector 558
Nadia Netti, Monica Cannaviello

The actuality of MAT-Building or the deployed hub in the suburban contemporary territory 563
Gaspare Oliva

Business continuity of lodging industry in the face of disasters: A case study from Turkey 572
Ezgi Orhan

Sustainability of Heritage Conservation Council System in Turkey 576
Mustafa Önge

Vernacular Techniques as Key to Sustainable Vernacular Architecture: The Case of Wattle and Daub Construction in Mediterranean Region 581
Hilal Tuğba Örmecioğlu

A step towards understanding industrial hemp: From hidden industry to a material in architecture 587
Esen Gökçe Özdamar

Eco-industrial Parks and Sustainability: A Case of Green Organized Industrial Zone from Turkey 593
Suna S. Özdemir

Environmental Problems and Policy in Australia 600
H. Nur Özkan Öztürk

Defining Cittaslow requirements in the context of sustainability 605
Ayça Özmen

Creating a start point for continuity of new educational approach by using design 612
Ahsen Özturk

Prediction of heat cost indicator in a home office using artificial neural network and genetic algorithm models 617
Yasemin Öztürk, Tuğçe Kazanasmaz, Gökmen Tayfur

Comparison of material alternatives in a classroom in terms of daylight distribution and visual comfort survey 623
Yasemin Öztürk, Tuğçe Kazanasmaz, Arzu Cılasun Kunduracı

“Reconstructing” Traditional Settlements in Cappadocia: Questions of Sustainability 629
Fatma Gül Öztürk Büke

Sustainable Architectural Rehabilitation: the Palm tree Manor in Portugal 634
Ana Paula Pinheiro

Energy, environmental and economic performance of an innovative solar heating network serving a small-scale Italian district 640
Antonio Rosato, Antonio Ciervo, Giovanni Ciampi, Michelangelo Scorpio, Sergio Sibilio, Luigi Maffei

Sustainable Innovation: Design and New Technologies 648
Valentina Sapio

The Change of Cultural Memory on an Iconic Historic Structure: Narmanlı Han 652
Sedef Sav

The value of the scrap objects in design: which actions to promote it? 660
Francesca La Rocca, Chiara Scarpitti

Suggestions for Refurbishment of Existing K-12 Schools in The Light of Sustainable Criteria 668
Hafize Nur Sılay Emir

Opaque and transparent innovative systems for a smart second skin building envelope 678
Sergio Sibilio, Antonio Rosato, Michelangelo Scorpio, Giovanni Ciampi, Giuseppina Iuliano, Yorgos Spanodimitriou

Sustainable Urban Planning: Analysis of Open Public Spaces in Post-Soviet Districts of Lithuanian Cities 686
Jolita Sinkienė Kęstutis Zaleckis, Indrė Gražulevičiūtė-Vileniškė, Jurga Vitkuvienė, Brigita Tranavičiūtė, Huriye Armağan Doğan, Tomas Grunskis

An analysis on mixed-use high-rise residential complexes in Istanbul as to their prioritization of evaluation categories in LEED 690
Özge Süzer, Meltem Yılmaz

A Conservation Process of Cultural Heritage: Ankara Saraçoğlu Quarter 698
Gülşah Şenocak

Learning from Cohousing: Social Contact Design Patterns for Cohesion and Sustainability 703
Şule Taşlı Pektaş

Urban transformation in Turkey; which aims disaster preventive and sustainable development or else? 707
Binali Tercan

The sound as factor of reuse of Cultural Heritage in a modern key 710
Roxana Adina Toma, Massimiliano Masullo, Luigi Maffei

Urban Conservation in Ankara is Sustainable ? Implementations in Ulus and Haci Bayram Mosque Environs Since 30 Years 715
Mehmet Tunçer

Sustainable Conservation of Cultural Landscape and Changing Values Around Hacıbayram Mosque and Augustus Temple 721
Mehmet Tunçer, Öznur Aytekin

Evaluation of environmental factors in office environments with green intent in terms of user satisfaction: indoor air quality 728
Çetin Tünger, Zeynep Öktem, Ayça Turgay

Environmental sustainability of being the leading building producer in Europe: developing valuable agricultural land for building construction in Turkey 735
Ali Türel

The Social Role of Architectural Types: Cultural Sustainability in Architecture and the Possibility of Convention 742
Zeynep Çiğdem Uysal Ürey

User Perception and Orientation in the Museum Designed by Re-Functioning: Erimtan Archeology and Art Museum Example 747
Şükran Büşra Ümütlü

Collaborative and participative actions in design practices 751
Rosanna Veneziano

Crisis of creative class: Hamburg and Naples right to the creative city 755
Federica Vingelli, Giuseppe Guida

A bio-based grown material for living buildings 762
Antonella Violano, Salvatore Del Prete

Ideology of Sustainable Architecture: A Critique 769
Onur Lami Yalman

Sustainability of Rural Identity: Learning from Kıyıkışlacık's Self-Generated Experience 773
Damla Yeşilbağ

Use-share service cases from Turkey: The impact of cultural traits 780
Can Uçkan Yüksel, Cigdem Kaya Pazarbasi

Social & cultural sustainability: street art in Naples 785
Ornella Zerlenga

WORKSHOPS 791

Workshop 1. Academic Research Design in Planning Studies: Migration and Sustainable Communities 792
Workshop 2. Building Performance Simulation: How Useful is It? 793
Workshop 3. Future Search Conference 794
Workshop 4. Resilient Building Design 795
Workshop 5. Sustainability and Resilience: how do we relate these concepts in planning debate and practices? 796
Workshop 6. Multisensorial Perception and Cultural Heritage Sites 797
Workshop 7. Urban art as Social & Cultural Sustainability 798
Workshop 8. Building with Earth 799

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

SUPPORTING ORGANIZATIONS 801

GRID “Architecture, Planning and Design Journal” 802

SID “Società Italiana Design”, 803

SITdA “Società Italiana della Tecnologia dell'Architettura” 804

LeNS “The Learning Network On Sustainability”; A New “Design Hope”: The Open And Distributed Lens, The Learning Network On Sustainability 805

Carlo Vezzoli, Cenk Basbolat

INDEX 811

GCRIS

KEYNOTE SPEAKERS

Prof. Dr. Susan ROAF

Sue Roaf (B.A.Hons, A.A. Dipl., PhD, ARB, FRIAS) is Heriot Watt University's Emeritus Professor of Architectural Engineering and currently sits on the UK Architects Registration Board. An award winning architect, author and teacher she believes many modern buildings are very poorly designed for their climates and the only truly sustainable buildings are those run largely with natural energy. Subjects covered in her books include Ecohouse design. Adapting Buildings and Cities for Climate Change and Adaptive Thermal Comfort. She was Chair of the Passive Low Energy Architecture conference (www.plea2017.net) and is Co-Chair of the Windsor 2018 Conference on Comfort (www.windsorconference.com).

Prof. Dr. Birol KILKIŞ

Dr. Kilkis received his Ph.D. degree in Mechanical Engineering with high honors from Middle East Technical University. He graduated in 1972 with an honors degree from von Karman Institute for Fluid Dynamics in Belgium. He is a founder member of the Turkish Wind Energy Association, Turkish Solar Energy Association, and the past Country Coordinator of Wind Energy for CENTO. He taught graduate and undergraduate courses at several universities like Gannon University (full time), University of Missouri Rolla (adjunct) and Middle East Technical University (full time) since 1972. Currently, he is the head of Energy Engineering Graduate Program and a full-time professor at Baskent University. In total, he has published more than 500 papers in several journals and proceedings on a large variety of topics, and has several patents pending on green buildings, solar trigeneration, heat pump coupled cogeneration, and low-exergy HVAC systems. He is the North America Liaison of the Low-Exergy Buildings International Network and the founder of Exergy Analysis for Sustainable Buildings Technical Committeer in ASHRAE.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

How to Design a Comfortable Building

Susan Roaf[1]

[1] *Emeritus Professor of Architectural Engineering, Heriot Watt University, Edinburgh, s.roaf@hw.ac.uk*

What is Comfort?

There are a wide number of different meanings for the simple word *comfort*. The term 'comforting words' implies soothing, providing comfort, solace and sympathy, and an easing of grief or distress. The notion of thermal delight moves us to a different psychological zone of heightened sensual pleasure rather than these more everyday words that deal with the experience of emotional feelings of contentment, happiness and safety. Typically, architectural and engineering interpretations of the word comfort are far more pragmatic: eg. *a state of physical ease, free from pain, distress or constraint*. Baruch Givoni's definition[2] was '*The range of climatic conditions that people find to be comfortable and acceptable inside buildings'* (Givoni, 1998).

We all instinctively know a lot about thermal comfort already, for instance we know that different people can be thermally comfortable at very different temperatures because of the context of their expectations. We may know people who live in very cold or hot temperatures because they cannot afford the cost of the energy to avoid what we might consider to be unacceptable conditions or they simply like those temperatures. When people share spaces

[2] Givoni, B. (1998). Climate considerations in building and urban design, Van Nostran Reinholt, New York, p.3.

comfort temperatures have to be a negotiated condition, dictated by social and economic priorities tacitly accepted within a society, family or a building. Cheaply available energy over the past century meant such negotiations have run fairly smoothly but as energy prices soar, the cost of living rises and standards of living and relative incomes fall such discussions may become more heated. "We cant afford this office because the running costs are too high" or "you will have to choose – keeping the heating up in winter or a summer holiday this year".

We also know that different cultures are comfortable at different temperatures. For instance, the Scots are a hardier race than the English, better able to withstand cold buildings than the English. It is probably the case for Ankara and Istanbul as Ankara winters are much colder. People adapt to those conditions they normally occupy, and if they are un comfortable they change themselves or their environment, put on a jumper or lower a shade or change rooms.

Comfort in Traditional Buildings

In traditional buildings in Britain people were, and are, accustomed to living in cooler or hotter background conditions in which comfort is generally provided by local radiant point sources of heat from a fire, stove, oven, radiator or a local heater that is continuously, regularly or intermittently used (Humphreys, Nicol, Roaf, 2011) [3]. People in cooler buildings are able to maintain comfort in a range of different ways by modifying their activity, clothing, behaviours, consumption of hot or cold food and drinks, and by changing their location in relation to the

[3] Humphreys, M., Nicol, F. and S. Roaf (2011). Keeping Warm in a Cool House, Historic Scotland Technical Paper 14, Edinburgh. http://www.historic-scotland.gov.uk/technicalpaper14.pdf

thermal landscapes in and around the building. In recent decades there has been a great growth in use of supplementary electric heating or cooling equipment favoured over the less flexible and more cumbersome gas, or paraffin, appliances. In traditional buildings fuel could be scarce, dirty, expensive, cumbersome and polluting to deliver and burn be it logs, coal or early gas lights and heaters. Rooms themselves were typically draughty and poorly insulated with cold internal surfaces to the external walls. Wealthier homes compensated for larger rooms with higher ceilings by burning lots of fuel. Today the fuel rich can simply flick a switch or turn a dial to control invisible and apparently clean, easy comfort conditioning systems, while for the fuel poor comfort is still a luxury but more widely available across the board. An excellent description of the history of comfort in traditional buildings called *heating people not spaces* can be found in the on-line Low Tech Magazine [4] with a description of how different radiant approaches and technologies are applied to provide comfort to people radiantly then and in contemporary examples as well. [5] In the 18th and 19th century huge technical leaps were made in the science of heating larger buildings and new systems emerged driven by water, steam, ice and air to provide comfort and fresh air to occupants (Lerum, 2016) [6].

More recent developments in designing for comfort

In the UK it was not until the late nineteen seventies, eighties and nineties did most homes get central heating, and often despite the fact that their actual construction was still

[4] http://www.lowtechmagazine.com/2015/02/heating-people-not-spaces.html

[5] http://www.lowtechmagazine.com/2015/03/radiant-and-conductive-heating-systems.html

[6] Lerum, V. (2016). Sustainable Building Design: Learning from Nineteenth century Innovations, Routledge.

poorly insulated and draughty. In Turkey it is only in the last decades that new buildings began to systematically install air conditioning. By the 1990s the emphasis was primarily on improvements in construction performance, as promoted firstly in the 'improved fabric' drive. Secondly came improvements to the 'energy efficiency' of heating and cooling systems, evidenced by the promotion of gas condensing boilers. In the naughties (2000 – 2010) these fabric improvements were strongly pushed but with the growing assumption that efficient mechanical systems were essential to solving the low carbon comfort problem particularly with heat pumps and heat recovery systems. By 2008 global economies were faltering, unemployment increased, the UK government's austerity agenda meant the luxury of heat began to be rationed for the poor, and even in the larger corporate sector for whom first class travel and rampant taxi use became a thing of the past the running costs of premises began to drive building choices7. If you go out today and measure the temperatures that people actually live and work in then you may be very surprised. Fergus Nicol has looked at data of temperatures occupied in ordinary homes not only in the UK but around the world and found people apparently happily occupying a typical range of between 100C – 250C in winter in Japan as well as England. In summer homeowners appear to be happy in temperatures between 200C – 350C in Europe, Japan and the Gulf.

Such ranges of occupied temperatures vary considerable from what we are told are 'comfortable temperatures' by a generation of heating and ventilating engineers, a profession built largely on the premise that comfort is a product generated and delivered by machines and their supporting supply, distribution and control systems and paid for by the kWh. The sizing

[7] Gensler (2005). Faulty Towers: Is the British Office Sustainable? www.gensler.com/doc/survey-faulty-towers

of the systems required in any building is often fairly crudely done and relies for its calculation on the assumptions of a steady state calculation method used by engineers.

It is important to understand that there are two very different approaches used by designers to assess what is a comfortable design temperature:

The Adaptive Thermal Comfort Model used largely by designers of Low Energy and naturally ventilated buildings.

Heat Balance Model used largely by Heating Ventilating and Air-conditioning (HVAC) Engineers and building modellers for buildings that rely on comfort being provided by machines in typically higher energy buildings.

Comfort Models: Adaptive Thermal Comfort[8]

The American Society of Heating, Refrigeration and Air-Conditioning Engineer's (ASHRAE) definition of comfort is:

'That state of mind which expresses satisfaction with the thermal environment'.

This definition assumes that the individual person provides the ultimate measure of what is, or is not, a comfortable place to be in but does imply that people are passive recipients of the *comfort system* they occupy. In reality people are actively engaged in, and constantly working to keep themselves comfortable in all buildings, whether they are naturally ventilated or air-conditioned. Fundamental to the *Adaptive Comfort* approach is the idea that:

'People adapt to the conditions they normally occupy and if they are not comfortable in them, they act to change them'.

[8] Nicol, F., M. Humphreys and S. Roaf (2012). *Adaptive Thermal Comfort: Principles and Practice*, Routledge.

People adapt in a variety of ways:

Physiologically the body is constantly making subconscious adaptations to maintain its core body temperature of 37^0C. When cold, people shiver and their blood vessels constrict into the body to reduce heat loss from the skin (vaso-constriction) causing them to go blue with cold. When hot, blood vessels expand and come closer to the skin to speed up heat loss from the body (vaso-contraction), people sweat, do less and eating less food to reduce heat producing metabolic activity.

Behavioural adaptations to discomfort can be conscious, semi-conscious or sub-conscious. In the cold people may increase activity to generate metabolic heat, change clothing, close up posture, cuddling up, turn up heating, find a warmer place, close windows, avoid draughts, modify the building, or even go on holiday or emigrate. In the heat people may reduce activity and clothing, adopting an open posture, turn on the cooling, move to a cooler place, open a window, use a fan and modify the building in many different ways with curtains, shutters, shades, blinds and planting.

Psychological adaptations are not yet well defined or documented, but they may include issues of expectations including those related to the cost of energy, fashion, status and self-image, ethical standards and moral stances, thermal histories and sensual proclivities, health, age and acceptance of responsibility for control. Who wears the pants of control when heating a home will have a lot to do with the temperatures inside it. Simply by giving this element of control to occupants has been found in numerous studies to provide a much more popular way of

providing comfort as a *goal* to be negotiated and achieved in buildings with a high Forgiveness Factor that improves the feeling of being comfortable[9].

Adaptive comfort is measured in field surveys by asking people in buildings how comfortable they are on a scale such as the ASHRAE or the Bedford scales below and measuring the temperature locally at the time of their response.

Comfort Models: The Heat Balance Approach

Heat-balance models rely on heat flows between the body and the environment and such models these include only around six factors to build a model based on physics and physiology.

The best known of Heat Balance models is the Predicted Mean Vote (PMV) developed by Ole Fanger in Denmark[10]. The PMV model is particularly important because it forms the basis for most commonly used national and international comfort standards and it provides a simple and easy to use method to calculate size heating and ventilating equipment, albeit rather crudely.

Despite comfort being defined as a 'state of mind', PMV is based on calculating the balance between the heat gained and produced by the body and the heat lost from it. Research funded by the HVAC industry promotes the benefits of a uniform thermal environment that favours the idea that a room is a box that is filled up with air, delivered down ducts from a machine and through vents in the wall, floor or ceiling. It attempts to avoid solutions where different parts of a person may be at different temperatures, despite the fact that the whole body

[9] See the work of Bill Bordass and Adrian Leaman at: www.usablebuildings.co.uk

[10] Fanger, P.O. 1970. *Thermal Comfort*. Danish Technical Press, Copenhagen.

may be in thermal balance for a person with warm feet and a cool head, as is often the case with thermal conditions supplied by radiant heating systems[11].

The Heat Balance model enables engineers to estimate, for comfort levels, the Predicted Mean Vote (PMV) and in turn the Predicted Proportion Dissatisfied (PPD) with the occupied environment. Dissatisfaction was defined in terms of the comfort vote. Those who voted outside the central three points on the ASHRAE scale (votes +3, +2, -2 and -3 in table 2.1) were counted as dissatisfied. PPD expresses this as a percentage and its value is calculated from the value of PMV. Although PPD suggests the likely distribution of thermal sensation in a group of people for any value of PMV, the distribution of PPD is based on observations from climate chamber experiments and not from measurements in real circumstances. Work based on field studies suggests that PPD is rather unreliable in predicting discomfort caused by deviations from the comfort temperature across the board, particularly in colder or warmer environments.

Architects are not usually au fait with comfort standards but it is hugely important to understand which standards are most suited to the type of building one wants to design and for an overview of the main ISO (International Standards Organisation) standards ISO 7730 sets out the heat balance comfort calculation and use of the PMV/PPD index, and also includes some criteria for local comfort. The standard is suitable for use in buildings with highly mechanised climate conditioning systems with non-opening windows.

American Adaptive Standard: ASHRAE 55

The American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE) control and sponsor ASHRAE Standard 55. Because the Society has numerous

[11] 2015 Humphreys M., F.Nicol and S,Roaf. *Adaptive Thermal Comfort: Foundations and Analysis,* Routledge, London.

branches outside the USA, and because the US air conditioning industry is dominant in the international market for mechanical cooling, the ASHRAE standard is in effect an international standard. Though the standard is co-sponsored by the American National Standards Institution (ANSI) it reflects the thinking and interests of the HVAC industry, which largely constitutes its drafting committee. It similar to ISO 7730 in being based on PMV. The ASHRAE standard was nonetheless the first international standard to include an adaptive component that was included to apply only to *naturally conditioned* buildings in which the principal means of control of indoor temperature is the use of windows. The standard defines zones within which 80 per cent or 90 per cent of building occupants might expect to find the conditions acceptable.

European Standards: EN15251

Standard EN 15251 was developed by the Comité Européen de Normalisation (CEN) in response to calls from the European Union for standards to back up the Energy Performance of Buildings Directive (EPBD). The standard includes consideration of other aspects of the environment such as indoor air quality, lighting and acoustics as they impinge on the energy use of a building. The major thrust of the standard is the definition of the thermal environment, the sections on other factors confining themselves largely to references to other standards. The standard follows the general lines of the ASHRAE standard having, as well as a consideration of mechanically cooled buildings which uses PMV, an adaptive standard to be used for assessing buildings in the free running mode.

Thermo-neutral Zone

When do high or low temperatures actually threaten our health and mortality? Some really interesting work being done shows that our thermal senses alert us to environments that

will require us to use more energy than necessary to maintain our core temperature (37^0C), and further alert us to periods when we may be entering thermally challenging and/or dangerous conditions. It obviously enhances the survival chances of any species to do its necessary work using as little energy (calories) as possible, particularly in periods of scarcity. A biological concept related to this is the premise of the thermoneutral zone (TNZ)

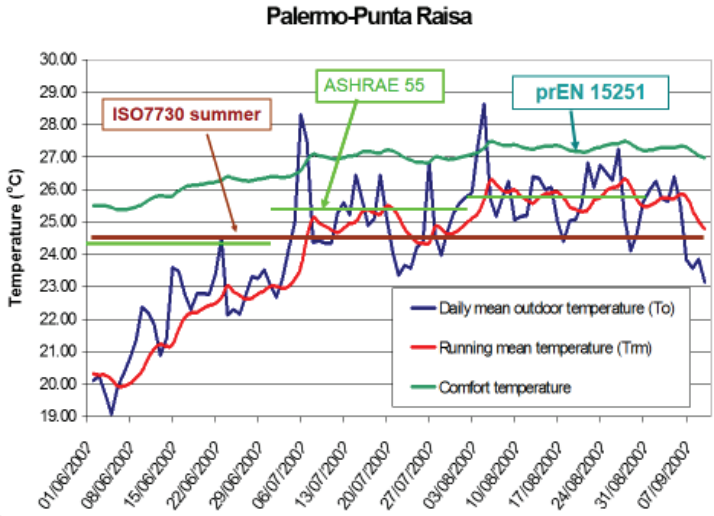


Figure 1. Showing the difference in set point temperatures accruing to the three different comfort standards set against outdoor temperatures during June to September in Palemo-Punta Raisa in Brazil (Source: Fergus Nicol).

encompassing those maximum efficiencies temperatures and different states of hydration of the body. The centre of the TNZ can be regarded as the safest state for an animal to be in and roughly conforms to ranges of average skin temperatures between 28^0C and $33/34^0$C. This of course is highly dependent on many variables ranging from body mass index, fat levels, level of adaptation to local conditions and on to even personality type and attitudes.

Kingma is experimenting with ideas that humans claim to be thermally neutral near the centre of their TNZ which is being borne out by his experiments[12].

Thermal Delight

In fact, as a species we are physiologically adapted to temperatures similar to those experienced today in regions where Homo Sapiens evolved more than two million years ago in the Savannah lands of Central Africa. Can you remember a warm holiday in Spain. Italy or Greece when you felt very hot getting off the plane but three or four days later, sitting by the pool in your costume with a cool drink and breeze you thought 'this is heaven' and a sense of delight and well-being sets in[13]? Well you were probably in your TNZ then. Much hotter and the discomfort feeling sinks in, much cooler and you reach to put on more clothing.

The advantage of living in cooler climates is that when temperatures fall below the TNZ you can put on more clothing or turn on the heating. As temperatures rise above the TNZ it is more problematic as you cannot take off more clothing and the body relies then on more sweating for evaporative cooling or increased local wind speed from an open window, a fan or a cooling systems to achieve comfort. At both ends of the spectrum the buildings provides protection from the climate and the further away from the TNZ you get the better the building has to be to provide safe shelter for its occupants.

Comfort is also *sensual delight* and the body rewards itself with feelings of pleasure for taking actions to move back towards the TNZ from conditions that are becoming too hot, a

[12] Kingma, B. (2017). Exploring a biophysical model to understand thermal sensation, *Building Research and Information* xx (1).

[13] Heschong, L. (1979). *Thermal Delight in Architecture*. Cambridge Mass., MIT Press.

process described by some researchers as that of Allesthesia[14]. Sensors in the skin alert the brain that action needs to be taken and both conscious and unconscious actions may be triggered to maintain the homeostasis in the body, represented here by its stable core temperature.

Why is Comfort so important?

There are enormous energy penalties associated with shutting a building off from the climate around it and relying solely on machines to create a comfortable indoor environment. When comfort can be simply provided by opening a window for part of the day or the year huge carbon emission reductions are possible. Huge energy savings are possible by not allowing mechanical systems to kick in between 18^0C – 28^0C. Within the current Dutch Comfort Standard there is no onus on using comfort heating or cooling as a basic requirement between these temperatures[15] and can save up 40% of the annual running costs of buildings[16].

Perhaps more importantly we live at a time in history when the costs of comfort to our planet, our societies, economies, businesses and selves are becoming critical and we simply cannot afford to continue with our business as usual path forwards. Brexit and Trump did not happen for nothing and ever since the global economic crisis of 2008-2012 phenomena such as

[14] Cabanac, M. (2013). Sensory pleasure and homeostasis, *Beyond Environmental Comfort*, edited by Boon Lay Ong, Routledge, pp.18-35.

[15] Balvers, J., R. Bogers, R.Jongeneel, A. Boerstra and F. van Dijken (2015). Mechanical ventilation in recently built Dutch homes: technical shortcomings, possibilities for improvement, perceived indoor environment and health effects, in Designing for Comfort at High Temperatures, *Architectural Science Review (Eds. S.Roaf, F.Nicol, H.Rijal)*, 58.1.

[16] Hoyt, T., H.L. Kwang, H. Zhang, E. Arens, T. Webster, 2009, "Energy savings from extended air temperature setpoints and reductions in room air mixing." *International Conference on Environmental Ergonomics* 2009.

those of the *disappearing middle classes* and growth of fuel poverty across the classes and countries escalate.

How to Design a Comfortable Building

In the 1990s designers and researchers were concerned with *Energy Efficiency* in their designs[17] that required several simple steps to be taken to reduce energy consumption in homes including: More Insulation; Good Windows; Air Tight construction; Removal of Cold Bridges and in the Passive House movement dating from the 1990s also Heat Recovery. Unfortunately. large areas of glazing are still advocated in such standards and in the worst cases West facing glazed walls are included along with no opening windows to allow cooling. The rise of such 'hot boxes' have rather underpinned the alarming growth of over-heating experienced in too many modern buildings.

Then in the 2000s came the rise of concerns of the broader subject of *Sustainability*[18] and many sustainability rating tools were developed, many promoting particular products. For instance to obtain a LEED Platinum rating for an office building (at a typical add on cost in the US of around $350k) you originally had to have a full central air-conditioning system installed to qualify for it. In Denmark the Active House group rose to the challenge the simplistic PH approach and had a model that included a wider range of design features including: thermal storage; natural ventilation, adaptive envelope design and renewable energy. But like the PH

[17] Roaf S. and M Hancock (Eds) (1993). *Energy Efficient Building: a Design Guide*, Blackwell Scientific Publications, Oxford.

[18] Roaf, S., A.Horsley and R.Gupta (2004). *Closing the Loop: Benchmarks for Sustainable Buildings*, RIBA Publications, London.

groups before them they did not confront issues of overheating or design for more extreme weather events.

In the teens – from around 2010 onwards at least we are beginning to understand that we now need to produce resilient designs for a warming world that will retain their value over the coming decades is an increasingly critical issue. Poor construction standards that dog many new housing developments will cause even higher levels of failures in extreme weather events. From the beginning of the Ecohouse movement[19] in the early 1990s however did understand that buildings must, and will increasingly have to be, design not only to minimise their impacts on climate change but also to adapt to provide comfort in a rapidly heating world[20]. This Design Note on designing for thermal Comfort is predicated on this need to now design buildings that from now on must be: Climate Ready & Future-Proofed, to withstand extreme heat, cold, winds and rain; possible to run on solar / renewable energy with storage of heat and coolth within them; include a wide range of adaptive opportunities and asily usable controls and design to make behaviours as part of the solution – not a performance problem.

In my keynote talk I would outline a simple three stage process that enables designers to create thermally stable and mentally satisfying, comfortable buildings but here the underlying new trends in designing for comfort are touched on.

The basic tools for comfort designers include:

---

[19] Roaf, S., M. Fuentes and S. Thomas (2012). Ecohouse: A Design Guide, 4th Edition, Earthscan, London.

[20] Roaf, S., D. Crichton and F. Nicol (2009). *Adapting Buildings and Cities for Climate Change*, Architectural Press. 2nd Edition.

1) *An active 'Thermal Sense',* a heightened awareness of what is warm, cool, hot or cold in a building that will enable you to continually learn about what to do and not do thermally in buildings.
2) *A conscious understanding of how heat flows in and around* buildings and where it is stored and when it is charged and discharged.
3) *A good understanding of the solar geometry* of a site to understand when and where to access or avoid the valuable solar resource around a building.
4) *A pencil, paper and rubber* because you will never design a thermally good building using just a computer.

You may find emerging trends in comfort useful when designing your next building[21,22]*:*

1) **From Active to Passive:** Only heat / cool buildings when absolutely necessary - naturally ventilate them for as much of the day / year as possible. The myth of 'efficiency' is pervasive - but why use machines at all if you don't need to?[23]
2) **Heat / Cool the people not the building:** A strong move is back to using what the Californians call Personal Environmental Technologies (PETs) - like small heaters, fans or air-conditioners to provide local comfort for individuals within low (or high in hot climates) background temperatures.
3) **Adaptive Behaviours are a key part of the comfort equation:** Include lots of opportunities for people to adjust themselves and their buildings to achieve comfort - including clothing, activities, shutters, curtains, shades, screens and the ability for people to move around spaces in 'thermally landscaped' buildings[24].
4) **From still to breezy air movement:** Most of the early work in comfort was done in climate chambers in northern Europe and the whole 20th comfort approach defines air movement as 'draughts' – a very bad thing. In fact, breezes are very different and can be harnessed to enhance comfort and people really do like 'fresh air'.

---

[21] Brager, G., H. Zhang and E. Ahrens (2015). Evolving opportunities for providing thermal comfort, Building Research and Information, 43, 3, May-June, pp.274-287.
[22] S.Roaf (2018). Building Resilience in the Built Environment, in *Architecture for Resilience: A series of interdisciplinary dialogues*, K. Trogal, R. Lawrence, I. Bauman and D. Petrescu (Eds). Routledge, London.
[23] Roaf, S. and F. Nicol (2017). Running Buildings on Natural Energy: Design thinking for a Different Future, *Architectural Science Review*, 30 Mar 2017 (Online), 28 Apr 2017 (Print), ID: 1303924 DOI:10.1080/00038628.2017.1303924
[24] S. Roaf (2018). Thermal Landscaping of Buildings: Climate-Proofing Design, in *Activism in Architecture: the bright dreams of passive energy design*, Margot McDonald and Carolina Dayer (Eds.), Taylor and Francis Ltd., London, pp.145-174

5) **From Neutrality to Delight:** Stop thinking that the only way to provide comfort is to put people in a uniformly warm / cool room soup. Re-learn how to make people *sense* 'thermal delight'. A cosy fire in winter or a cool breeze can trigger sensual pleasure and enhance happiness and well-being.
6) **Design Climate Refuges into buildings:** Every home / building should have a safe cool or cosy corner so that people (particularly the old and the young) can stay warm / cool there during extreme weather. You just need one room to be safe during such periods.
7) **Time and Place are key - Harvest comfort from the micro-climates in and around buildings[25]:** Every place, site, aspect, room will have its own micro-climate that, once understood, can be used to provide more or less comfortable locations for different activities over a year. *The building is not a box* plonked on the site but a complex intervention in the flows of people, resources and climate in and around it.

The time has come to re-think the way we design for thermally comfortable buildings[26] and it is hoped that this paper is useful, in combination with our keynote presentation on a three stage process to help designers create genuinely low energy and high comfort buildings.

[25] Roaf, S., G. McGill (2018). Place, Time and Architecture: The growth of New Traditions, *Architectural Science Review*, Vol. 61, 2018, Issue 5, Pp 267-271. Published online: 27 Jul 2018, https://doi.org/10.1080/00038628.2018.1502156

[26] Nicol, F. and S. Roaf (2017). Rethinking thermal comfort, *Building Research & Information*, Volume 45, Issue 7, pp. 711-716. Published online: 30 Mar, ID: 1301698, http://dx.doi.org/10.1080/09613218.2017.1301698

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

`Sustainable` Systems and Equipment in Green Buildings - How Sustainable Are They? An Exergy Perspective

Prof. Dr. Birol Kılkış

Energy Engineering Graduate Program Chair, Başkent University, Ankara, Turkey

ABSTRACT

In the quest of decoupling the human-oriented sustainability index from CO_2 emissions, green buildings are touted as an important asset. This is true only from the point of view of the First-Law of Thermodynamics. In reality, several systems and equipment that have been developed, marketed and implemented under the label of *green* are not green unless they are designed and operated according to the Second-Law of Thermodynamics (Exergy). Otherwise, they will keep on their CO_2 emissions responsibility at large and decoupling will never happen. This presentation will give the fundamentals of the relevant theory and provide several examples of applications from the building and energy sector that they are not green. Examples include but not limited to:

- Energy Recovery Ventilation Systems,
- Absorption Cooling in Cogeneration,
- Solar PVT Systems,
- Heat Pumps for Heating and Cooling of Buildings
- Electricity generation with Organic Rankine Cycle with low-temperature waste and geothermal heat,
- Solar Energy in High-Rise Buildings,
- Electric Cars,
- Waste Heat Recovery from Industrial Plant Stacks,

Such applications will be analyzed in detail by using the Rational Exergy Management Model (REMM) and engineering solutions with new rating metrics for a new roadmap will be

given to show that exergy is not only a game changer but at the same time game provider for true sustainability and real decoupling, which is the main target of EU28 Countries.

Two unsuccessful applications in the context of the First-Law of Thermodynamics are given below, which need a holistic view coupled with the Second Law of Thermodynamics. The first one is about the energy recovery ventilation, ERV. This unit gains some thermal exergy from the exhaust air in order to preheat the fresh outdoor air but spends more electrical exergy in its fan motor. The second one is a solar PVT system coupled to a ground-source heat pump. In this case, the system, which aims to cool the PV cells and simultaneously generate heat, will again destroy more exergy that it absorbs from solar insolation if the heat exchanging medium is not properly designed and the fan motor power demand is not minimized.

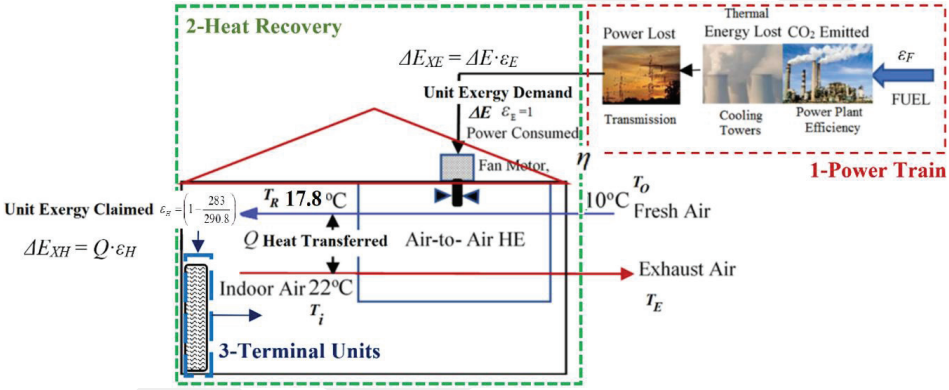


Figure 1. Case 1: Holistic View of Heat Recovery in a Sustainable Building.

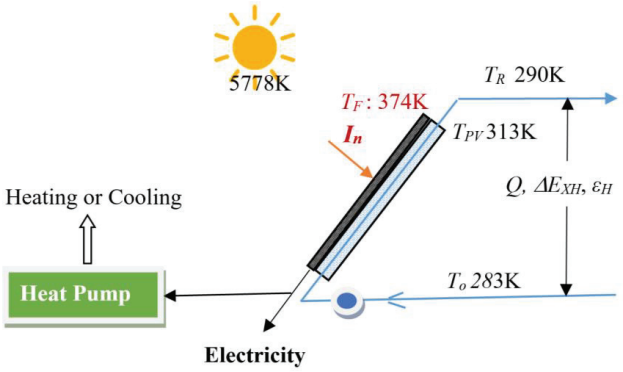


Figure 2. Case 2: Solar PV Panel with Air-to-Air Heat Exchanger (PVT-air) with Forced Circulation.

GCRIS

EXTENDED ABSTRACTS

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Use of Multi-Criteria Assessment Techniques in Defining Sustainable Transport Systems for Different Sized Cities Ankara and Rize Example

Furkan Akdemir[1*], Hayri Ulvi[2], Aslınur Ekiz[3], Saime Yılmaz [4]

[1] Gazi University, Urban Transportation Technology, Accessibility Implementation and Research Center (UTTAC), 06570, Ankara, Turkey*
furkan.akdemir@gazi.edu.tr

[2] Gazi University, Urban Transportation Technology, Accessibility Implementation and Research Center (UTTAC), 06570, Ankara, Turkey
hayriulvi@gazi.edu.tr

[3] Gazi University, Urban Transportation Technology, Accessibility Implementation and Research Center (UTTAC), 06570, Ankara, Turkey
aslinur.ekiz@gazi.edu.tr

[4] Gazi University, Urban Transportation Technology, Accessibility Implementation and Research Center (UTTAC), 06570, Ankara, Turkey
saime.yilmaz@gazi edu.tr

Abstract: Transportation is an important component in the sustainability. Making the right decision on transportation investments plays an important role in saving the resources. Transportation master plans that focus on transportation investments require a decision-making process on resources. In this study, the analytical hierarchy process, which is a multi-criteria evaluation technique, is used. It is being investigated which component of sustainability is effective in transportation systems of different sized cities.

Keywords: sustainable transport; decision making; transport planning

Introduction

The city is defined as "a settlement unit in continuous social development that meets the basic needs of the society and is composed of small neighbourhood units, which are more concentrated in terms of population with fewer people nowadays engaged in agricultural works"(Aydoğdu, 2013).

Demographically in Turkey 100.000-750.000 populated cities are medium sized. The cities with a population above this value are defined as big sized (Üzmez, 2012).

Large-scale cities;

- Grows uncontrollably and quickly.
- The continuity of mobility can't be ensured.

- The time and money spent on transportation is excessive.
- 40-50% of the journeys are home-business trips (Burgess and Jenks, 2002).

Ankara is an example of large-scale cities in terms of its attributes. The rate of home-business trips in the city is 50-60%.

It seems that the built-up periphery of Ankara has reached a radius of 50 km. (UTTAC, 2014)

Medium – Sized Cities

- Urban economic functions are presented in a mixed way.
- Has a sustainable urban future potential with its intact structures.
- Home-business day trips are moderate (Tosun, 2013).

Rize city, which is examined in the scope of the study, can be given as examples of medium sized cities in terms of its attributes. The rate of home-business trips in Rize is 28%. There is a negative effect on the development of the transportation network of the topography which is in a rugged structure throughout the city. Urbanization speed is slow due to inadequate transportation network structure (UTTAC, 2016).

Sustainable transport systems are shaped by the choice between multiple scenarios in the process of planning. At the beginning of the conditions necessary for a healthy selection of the type of transportation, it is necessary to make a comparison between the scenarios. There are different problems in different sized cities. As a solution to the problems, more than one suitable alternative should be produced according to the attributes of cities and these alternatives should be evaluated with social, economic and environmental criterias. (Orman vd.. 2018).

Multi Criteria Decision Method

Multi-criteria evaluation is the method of selecting the best one from multiple alternatives produced for problems. The choice of scenario is important in terms of sustainability of future transport systems, in keeping with economic, social and environmental criteria.

One of the methods used among multi-criteria evaluation methods is the analytical hierarchy method (AHP). AHP is a frequently used method that results in a multidimensional structure. In transportation plans, expert opinions are taken and important criteria are determined for the city. Alternative scenarios according to the calculated criteria weights are evaluated with AHP and the most appropriate scenario is determined (Orman vd.. 2018).

Findings and Discussion on Ankara Transport Master Plan and Rize Transport Master Plan

Ankara Transportation Master Plan and Rize Transportation Master Plan were made by Urban Transportation Technology Accessibility Implementation and Research Center (UTTAC). It is evaluated by multi-criteria evaluation method from the scenarios developed within the scope of the plans. (See Table 1)

Table 1. Criteria Used In Transportation Master Plan

Main Criteria	Sub Criteria	Definition
Economic	Journey Cost	The cost of a journey created by a passenger
	Investment Cost	The cost of investment for transportation types
	Journey Time	Km per average Journey time of a passenger
Environmental	Air Pollution	Emission value created by transportation types
	Noise Pollution	Decibel value created by transportation types
	Energy Consumption	Type of transport energy consumption (Kcal/passenger)

Each city has its own different dynamics. Ankara and Rize are cities of different sizes and different attributes in terms of which is stated in the study. Different results are observed for the transportation plan for Ankara and Rize, where the same method is used for the two transportation master plans. If these results are to be examined;

5 main objectives have been set for the Ankara transportation master plan;

- Reduction of motor vehicle traffic in the future
- Improving the public transport infrastructure

- Increasing mobility and accessibility inner city
- Ensure sustainable transport system with efficient use of transport system
- Creating a more livable urban environment.

It is seen that 4 alternative scenarios are produced in line with the targets set for Ankara city. (See Table 2) The weights of the criteria determined for evaluating such scenarios as a result of expert opinions are as in the decision equation (See equation 1). The economic criterion value is 54% while the environmental criterion value is 46%. Briefly, the economic measures for Ankara city more important than environmental measures.

As a result of these calculations, a decision equation is formed;

Fk= (0,15∗Journey Cost + 0,13∗Investment Cost + 0,25∗Journey Time)+ (0,09∗Air Pollution + 0,07∗Noise Pollution + 0,30∗Energy Consumption) (1)

In the equation, the cost of the multi-criteria evaluation of the scenario is calculated using the standardized costs in each scenario. According to this:

Table 2. Total Weight Factor Ratio For The Scenarios

Scenarios	Current	Highway	Rail Road	Mixed
Economic Cost (%)	%40	%38	%36	%37
Environmental Cost (%)	%44	%45	%37	%30
Total Cost (%)	%84	%83	%73	%67
% Percentage Display	%84	%83	%73	%67

It is observed that the mixed development scenario is less costly and preferable than the other scenarios when evaluated by the analytical hierarchy method (UTTAC, 2014).

In Rize, another city of this study, there are four main objectives of the transportation master plan;

- Reducing the effects of the vehicle traffic foreseen by the increase,

- Improvement of public transport infrastructure and transfer of travel requests from individual transport to public transport
- Formation of mobility by keeping accessibility in urban transport
- Making environment and energy efficient use and transportation systems sustainable,
- It is seen that 4 alternative scenarios are produced for the targets determined for Rize city. (See Table 3)

In Rize, the weight of the economic criteria is 46% while the weight of the environmental criteria is 54%.

In summary, environmental measures for Rize city seem to be more dominant than economic measures.

As a result of these calculations, a decision equation is formed;

Fk= (0,55∗Journey Cost + 0,26∗Investment Cost + 0,17∗Journey Time)+ (0,25∗Air Pollution + 0,50∗Noise Pollution + 0,25∗Energy Consumption) (2)

When the equation is written in place of the standardized costs in each scenario:

Table 3. Total Weight Factor Ratio For The Scenarios

Scenarios	Monorail	Tram	Rapid Bus Line	Current
Economic Cost (%)	%31	%32	%20	%36
Environmental Cost (%)	%52	%50	%51	%50
Total Cost (%)	%84	%83	%71	%86
% Percentage Display	%84	%83	%71	%86

It is observed that the rapid bus line scenario is less costly and preferable than the other scenarios when evaluated by the analytical hierarchy method (UTTAC, 2016).

Conclusion

Techniques are used to make choices with decision-making mechanisms that determine more than one criteria in order to solve problems in urban transportation planning. For Ankara,

a big size city, it seems that a mixed scenario targeting an economically sustainable transportation system has been selected to reduce motor vehicle use, to direct traffic demand from private automobiles, increase accessibility within the city, and create a more livable urban environment. For medium sized Rize city, it is seen that the rapid bus line scenario is selected as a system that reduces the environmental effects of the motor vehicle system, promotes mass transportation, does not harm the environment that aims for a more environmentally sustainable transportation system with the efficient use of the economy, and contributes to economic development.

The study uses the analytical hierarchy process method. Within this method, expert opinion is asked and method is applied. As a result of the applications made in Ankara which is a large scale from the 2 cities examined, it is seen that the travel time is the most weighted by the economic criteria. This may be attributed to the high population of Ankara and therefore the demand for travel. The high cost of travel may be attributed to frequent travel by passengers. In Ankara, air pollution is the most important environmental criterion. This weight may be attributed to the number of Ankara's intensive private vehicles and the emission of greenhouse gases generated by these vehicles.

In the medium-sized city of Rize, environmental criteria are more weighted. The city of Rize is plenty with vegetation. As a result of this situation, air pollution may be considered as having a low weight by the experts. Long journeys between neighborhoods in the city may cause the journey time to have a heavier value on economic criterias. The public transportation service in Rize is done at high prices due to its long distance. This may have an impact when the travel cost variable is having an average weighted parameter.

Acknowledgments

The authors would like to extend their thanks the editors, referees and experts for their valuable contributions to the present study. This study was supported by the data of the Project on the Transportation Master Plan of the Ankara Metropolitan Area and Its Surroundings and Transportation Master Plan of Rize

References

Aydoğdu, İ. B. (2013). Information City: The Anatomy of a Change. *Journal of Knowledge Economy and Management*, *8*(2).

Üzmez, U. (2012). Medium Urban Areas Search for Solutions to Problems in Turkey: The Case of Zonguldak. *Journal of Faculty of Economics and Administrative Sciences*, *14*(2), 1-32.

Burgess, R., & Jenks, M. (Eds.). (2002). *Compact Cities: Sustainable Urban Forms For Developing Countries*. Routledge.

Tosun, K. E. (2013). Analysis Of The Compact Urban Model İn The Sustainable Urban Development Process*. Dokuz Eylül University Journal of Social Sciences Institute*, *15*(1), 103-120.

Orman, A., Düzkaya, H., Ulvi, H., & Akdemir, F. (2018). Multi-Criteria Evaluation by Means of Using the Analytic Hierarchy Process in Transportation Master Plans: Scenario Selection in the Transportation Master Plan of Ankara. *Gazi University Journal of Science*, *31*(2).

UTTAC (2014). *AUAP Plan Raporu*. Urban Transportation Technology Accessibility Implementation and Research Center, Ankara: Gazi University.

UTTAC (2016). *RUAP Plan Raporu*. Urban Transportation Technology Accessibility Implementation and Research Center, Ankara: Gazi University.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Courtyards thermal efficiency during hot regions' typical winter

Omar Al-Hafith[1*], Satish B. K. [1], Pieter de Wilde[2]

[1]School of Art, Design and Architecture, University of Plymouth, Plymouth, the UK omar.al-hafith@plymouth.ac.uk
[2]Chair of Building Performance Analysis, School of Art, Design and Architecture, University of Plymouth, Plymouth, United Kingdom, pieter.dewilde@plymouth.ac.uk

Abstract: Many researchers have experimentally proven the thermal efficiency of courtyard buildings in hot regions during summer. However, a limited number of studies have tackled courtyards' winter performance. In these studies, it has been stated that courtyards are possibly not efficient for winter conditions. This study aims to address this point. It investigated the impact of changing courtyards geometrical properties on occupants' thermal perception during typical winter conditions of a hot region. The study conducted a simulation experiment using Envi-met 4.2 simulation tool. Baghdad was used as a case study. Thermal comfort limits for hot regions were used as a reference. IBM SPSS statistics 23 was used to analyse variables' correlations. The results show that all courtyard forms are thermally comfortable during typical winter conditions of a hot region. Courtyards' geometry has a significant impact on their thermal conditions. The most effective property is the ratio of courtyard width to height.

Keywords: courtyard; thermal comfort; baghdad.

Introduction

This paper presents a part of a PhD study that aims to develop a thermally and energy efficient housing design for Iraq to inform potential large scale housing developments in the country. The study explores adopting the courtyard pattern, which has been advocated as a thermally efficient pattern for hot regions (Soflaei, Shokouhian, & Shemirani, 2016; Muhaisen, 2006). Experimentally, it has been shown that courtyard buildings can provide an environment with temperature less by 6 to 13 ºC than outside temperature (Edwards, 2006). Having this efficient performance is governed by air movement and solar radiation in courtyards, which depends on having courtyards designed properly (El-deep, El-Zafarany, & Sheriff, 2012).

However, some studies argue that a possible drawback of courtyards is their inappropriateness for winter because of the cold temperature (Agha, 2015). This study investigates this issue. It assessed courtyards' performance during Baghdad's typical winter. As a reference for the courtyards' assessment, occupants' comfort Globe Temperature of 22 ºC and the minimum comfort threshold of 8 ºC were defined depending on a thermal comfort study conducted by Aljawabra (2014) in Marrakech. In the absence of a thermal comfort standard suitable for Baghdad, Marrakech study was found to be of the closest context to Baghdad in term of climate and relevant culture.

Methods

This study used Envi-met simulation tool to test the thermal conditions of various courtyards in Baghdad during winter. This simulation tool was used for its inclusive and validated measurements (Al-Hafith et al., 2018; Ridha, 2017).

The research variables included dependent and independent variables. The first category was the occupants' thermal perception. The Globe Temperature (Tg) was used as a thermal sensation index for its high agreement with people's actual thermal perception (Toe & Kubota, 2011). As a measurement, its value combines the impact of air temperature, air velocity and the Mean Radiant Temperature (Song, 2011). The second variables category included courtyards' geometrical properties and the outdoor Tg, as courtyards are outdoor spaces affected by outdoor conditions (Al-Hafith et al., 2018). The considered courtyards' geometrical properties were the ratios of courtyard width/length (W/L), width/height (W/H), periphery/height (P/H), the ground area and orientation, which was represented by the courtyards' long axis orientation (Muhaisen, 2006).

In the simulation experiment, 360 different courtyards were tested (see Figure. 1). Baghdad typical winter period is during the months of December, January and February (Bilal, Al-Jumaily, & Habbib, 2013). The prevailing climatic conditions of this period for the year 2016 were obtained from the Iraqi Meteorological Organization and analysed to define typical winter conditions (see Table 1). The simulation configuration was built depending on this research's objectives and with considering settings used in previous studies (Al-Hafith et al., 2018) (see Table 1).

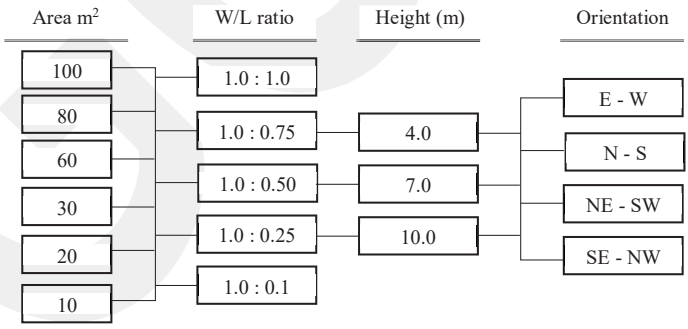


Figure 1. The tested courtyard configurations' parameters matrix

Table 1. Simulation settings

Simulation parameters	Input	Material parameters	Input
Start date	21-01-2017	Thickness	0.30 m
Start time	00:00:00	Absorption	0.80 Frac.
Simulation time	32 (hours)	Transmission	0.00 Frac.
Output interval	30 (minutes)	Reflection	0.05 Frac.
Wind speed	2.7 m/s	Emissivity	1.10 Frac.
Wind direction	East	Specific heat	1300.0 J/(kg*k)
Roughness length	0.01	Conductivity	0.30 W/(m*k)
Max air tem. and time	19.7 ºC at 14:00	Density	1000.0 kg/m^3
Min air tem. and time	13.6 ºC at 04:00		
Max Hum. and time	89% at 04:00		
Min Hum. and time	68% at 14:00		
Lateral boundary conditions	Cyclic		

Notes

- The first six hours of simulation results were not considered as the impact of the stored heat in buildings on night thermal conditions is missed.
- All of the not mentioned software's parameters were kept as default.
- Having the wind from directions other than East might change the simulation results.

Findings and Discussion

The simulation results show that the Globe Temperature in all of the tested courtyards is higher than the minimum thermal comfort threshold (See figure 2). Regarding the impact of courtyards' geometry on their thermal condition, the results indicate that changing the courtyard dimensions and orientation can lead to a difference in Globe temperature of around 20 ºC. The courtyards with the highest Globe Temperature are the ones with (E-W) or (S-N) orientations and of the bigger area and lower height, as the offer higher exposure to the solar radiation.

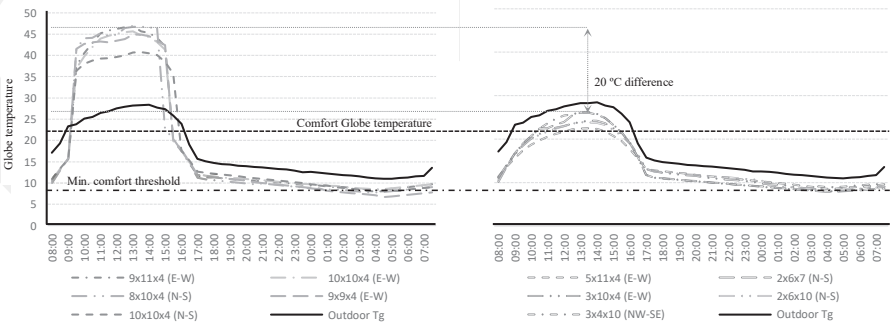


Figure 2. Hourly (Tg) in the warmest courtyards (to the left) and coldest ones (to the right)

To have an accurate assessment of the impact of courtyards' geometry on their conditions, statistical analysis was conducted using IBM SPSS statistics 24. The analysis shows that all of the independent variables have positive relations and significant correlations with the dependent variable, except the W/L ratio ($P \leq 0.05$). The most effective variable on courtyards' conditions is the ratio of W/H. However, as an outdoor space, outdoor conditions have the dominant impact on its thermal conditions (see Table 2).

Table 2. Variables correlations

	W/L	W/H	P/H	Area	Outdoor Tg
Pearson Correlation	0.11	0.096	0.082	0.056	0.848
Sig. (P-value)	0.139	0.000	0.000	0.000	0.000

These results highly agree with what has been found in the explored previous literature regarding the impact of courtyards' geometry on its thermal conditions. Regarding courtyards' winter performance, results indicate that, during hot regions' typical winter, courtyards' conditions will be within the thermal comfort limits. However, this result does not consider factors other than temperature, such as rain or wind, which might also affect the thermal comfort in courtyards.

Conclusion

This study assessed courtyards thermal efficiency during a hot city's typical winter conditions. The results show that all courtyard forms will be within the comfort limits. The geometrical parameters of courtyards have a significant impact on their thermal conditions. These results help to increase the awareness of courtyards' thermal efficiency. They can help designers to develop more thermally efficient courtyards. For future studies, the environmental impact of courtyard buildings' various elements, other than the courtyard, needs to be investigated.

Acknowledgments: This study is fully supported by the [HCED] in Iraq.

References

Agha, R. (2015). Traditional Environmental Performance: The Impact of Active Systems upon the Courtyard House Type, Iraq. Journal of Sustainable Development, 8(8), 28-41.

Al-Hafith, O., B.K., S., De Wilde, P., & Bradbury, M.-S. (2018). Determining courtyard pattern's thermal efficiency in the current time. Paper presented at the 10th International Windsor conference: Rethinking comfort, The UK.

Aljawabra, F. (2014). Thermal comfort in outdoor urban spaces: The hot arid climate. University of Bath.

Bilal, D. A., Al-Jumaily, K., & Habbib, E. (2013). Air temperature trends in Baghdad, Iraq for the period 1941–2000. Int J Sci Res Publ, 3(9), 2250-3153.

Edwards, B. (2006). Courtyard housing: Past, present and future. The UK: Taylor & Francis.

El-deep, K., El-Zafarany, A., & Sheriff, A. A. (2012). Effect of building form and urban pattern on energy consumption of residential buildings in different desert climate. Paper presented at the PLEA 2012, 28th conference opportunities, Limits and needs towards an environmentally responsible architect, lima, Peru.

Iraqi Meteorological Organization. (2016). Summarise for Metrological Elements. Retrieved from http://meteoseism.gov.iq/index.php?name=Pages&op=page&pid=169

Muhaisen, A. S. (2006). Shading simulation of the courtyard form in different climatic regions. Building and Environment, 41(12), 1731-1741.

Ridha, S. (2017). Urban Heat Island mitigation strategies in an arid climate - Is outdoor thermal comfort reachable? (PhD thesis). France: Toulouse University.

Soflaei, F., Shokouhian, M., & Shemirani, S. M. M. (2016). Investigation of Iranian traditional courtyard as passive cooling strategy (a field study on BS climate). International Journal of Sustainable Built Environment, 5(1), 99-113.

Song, G. (2011). Improving comfort in clothing: Elsevier.

Toe, D. H. C., & Kubota, T. (2011). A review of thermal comfort criteria for naturally ventilated buildings in hot-humid climate with reference to the adaptive model. Paper presented at the Conference Proceedings of the 27th International Conference on Passive and Low Energy Architecture.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Resilience planning from theory to practice

Deniz Altay Kaya[1]

[1] *City and Regional Planning, Cankaya University, Ankara, Turkey, denizkaya@cankaya.edu.tr*

Abstract: The paper aims to compare resilience planning in theory and practice. For this, the paper firstly presents a model on the operationalization of resilience planning and secondly analyse resilience plans that are prepared by different institutions with reference to the provided framework. Examining the resilience planning framework in practice, with reference to available resilience plans brings out the major traits of the resilience planning perspective in implementation. It reveals the basic requirements for the operationalization of resilience. Accordingly effective coordination and management, scientifically grounded and inclusive planning processes, the need for a participatory and engaged governance systems are among the attributes that are necessary to be institutionalized. Moreover, the analysis helps reframing resilience planning within planning theory context; and allows the discussion on whether it introduces a radical approach for city and regional planning or rather an integrative framework based on former approaches.

Keywords: resilience; resilience planning; urban resilience; planning theory

Introduction

Resilience is a concept borrowed from natural sciences and it is defined as a systems ability and capacity to cope with uncertainty, absorb disturbances, and undergo change while adapting to and re-organizing around changing conditions (Adger, 2000; Baud&Hordijk, 2009; Nelson et al., 2007; Resiliance Alliance, 2007, Walker et al., 2004). The present entwined relation between human societies and nature brought about the expansion of the scope of resilience studies beyond the ecological context, towards encompassing social processes. Cities and regions emerged therefore as a new focus for resilience discussions, elaborating the ability of societies to cope with and respond positively to unexpected shocks and stresses. Urban and social resilience is studied not only in face of ecological uncertainties but also economic, social, spatial and political ones. A great amount of valuable work have been produced within the last decades, seeking for ways to define and measure urban and/or social resilience through empirical studies and literature reviews.

Within and outside academia the scope of resilience discussions shifted from defining and measuring urban and social resilience to operationalizing resilience through planning and effective management. In parallel, planning for resilience became subject both to theoretical discussion and practice. In a world governed by ecological, economic, political uncertainties; resilience plans have been accepted as a tool for preparedness by central or local authorities, as well as nationally or internationally operating organisations. A great number of resilience plan documents have been prepared with reference to varying disturbance definitions.

This paper presents a model for the implementation of resilience planning based on the literature, and test its applicability by analysing the already produced resilience plans. The theoretical model gathers and synthesize what is being mentioned within the literature on urban and regional resilience in relation to the aims, main components, desired attributes and indicators for measurement. Through the analysis of plan documents with reference to the provided model, the major traits of the resilience planning perspective in implementation are expected to be found out. In addition the analysis tests the applicability of the proposed resilience planning model. The analysis will also bring out the shared and specific components of resilience plans, and reveal potential problem areas in implementation. It reveals the basic requirements for the operationalization of resilience. Moreover, the analysis helps reframing resilience planning within planning theory context; and allows the discussion on whether it introduces a radical approach for city and regional planning or an integrative framework based on former comprehensive, strategic and collaborative planning approaches.

Methods

The model used for the analysis of resilience plans is based on a process based understanding (Nelson et al., 2007), where the resilience of systems is achieved through the perception of risks and vulnerabilities (Ainuddin and Routray, 2012; Marshall, 2010), planning and developing strategies in relation to the identified risks (Maguire and Cartwright, 2008; Bradley and Grainger, 2004) actualising readiness and capacity building actions, and responding and recovering from disturbances (Foster, 2007). The model adopts the two phased and four staged framework developed by Foster (2007). Accordingly, the process of planning for resilience includes the stages of assessment and readiness as part of preparation resilience; and the stages of response and recovery as part of performance resilience. Different actions, operations and policies are identified under these stages.

The presented research will examine four different plan documents with reference to the presented model. The sample of plan documents include resilience plans with different scopes and geographical scales. The addressed challenges include climate change and other natural disaster risks, migration and economic instability. The sample allows the comparison between resilience plans with different disturbances addressed. The plans are also examined according to the actors involved, the organisational model, the outputs, aims, actions foreseen, chosen fields of intervention.

Findings and Discussion

The preliminary findings of the analysis shows that similar stages that are asserted by the model are followed by all resilience plans, independent from the addressed disturbance. Plan preparation and developed strategies are in parallel to the main determinants and dimensions of resilience highlighted in the literature. These include physical, environmental, social, economic attributes (Beatley, 2009) as well as institutional capacities, governance, participation, knowledge and information (Adger, 2000; Nelson et al., 2007). These present a more comprehensive and multi-dimensional set of objectives for the resilience plans. This situation creates the main difference of resilience plans from traditional spatial and strategic plans.

It is also observed through the analysed resilience plans that at the cross section of all resilience plans, certain principles operate. These can be grouped under four headings: (1) decision making based on scientific knowledge, inter-disciplinary and inter institutional collaboration; (2) having an engaged governance model based on transparency, inclusiveness, participation and community involvement; (3) building community capacities through social cohesion; and (4) efficiently coordinating the implementation process in equitable and democratic ways.

Conclusion

The main difference of resilience plans is based on the way it defines potential risks and opportunities. At the outset, the assessment stage is crucial as being the stage where the current situation of the city and region (its vulnerabilities and capacities) and the potential risks and threats are identified. Based on these assessments, plans are not only created to guide and control urban development; but to be prepared to identified risks and to build capacities in critical fields that facilitates adaptation and benefiting from emerging opportunities. In that sense the scope of resilience plans is wider, because it develop strategies for social, economic, environmental, institutional, as well as spatial issues. It can be claimed that both in terms of methods and content, resilience plans encompass plan decisions for different geographical scales: from region to neighbourhood. But, resilience plans are at the same time narrowed down, because they develop strategies, policies, actions and spatial interventions centred on the pre-defined risks and threats. For instance, a resilience plan for responding to climate change and economic revitalisation may have conflicting strategies, and this is a challenge for the theory of resilience planning.

Within the context of prevailing planning theories, the significance of resilience planning resides in the new set of principles it asserts, as mentioned above; and the ethical values it is grounded on – like governance, participation, cohesion, collaboration. These principles and values calls for comprehensive restructurings in the planning system and governance models functioning in many countries. Other than that the implemented methods and techniques present an integrative approach combining the available planning approaches together, such as comprehensive, collaborative, strategic and the similar; in a way that corresponds to the needs of the complex and contingent context of contemporary cities and societies.

References

Adger, W. N. (2000). Social and ecological resilience: Are they related? *Progress In Human Geography*, *24(3)*, 347–364.

Ainuddin, S., & Routray, J. K. (2012). Community resilience framework for an earthquake prone area in Baluchistan. *International Journal of Disaster Risk Reduction*, *2*, 25-36.

Baud, I.S.A., & Hordijk, M. A. (2009). Dealing with risks in urban governance: what can we learn from 'resilience thinking.' In: *The New Urban Question – Urbanism beyond Neo-Liberalism*, 4th International Conference of the International Forum on Urbanism (IFoU). Amsterdam/Delft.

Beatley, T. (2009). *Planning for coastal resilience: best practices for calamitous times*. Washington: Island Press.

Bradley, D. & Grainger, A. (2004). Social resilience as a controlling ınfluence on desertification in Senegal. *Land Degradation & Development, 15*, 451–470.

Foster, K.A. (2007). A Case Study Approach to Understanding Regional Resilience. *UC Berkeley IURD working paper series*. https://escholarship.org/uc/item/8tt02163. Accessed: 20 Nov 2017.

Maguire, B. & Cartwright, S. (2008). *Assessing a community's capacity to manage change: A resilience approach to social assessment*. Camberra: Australian Government Bureau of Rural Sciences.

Marshall, N.A. (2010). Understanding social resilience to climate variability in primary enterprises and industries. *Global Environmental Change*, *20*. https://www.journals.elsevier.com/global-environmental-change. Accessed 4 April 2011.

Nelson, D. R., Adger, W. N. & Brown, K. (2007). Adaptation to Environmental Change: Contributions of a Resilience Framework. *Annual Review on Environment and Resources, 32*, 395-419.

Resilience Alliance (2007). A research prospectus for urban resilience: a resiliance alliance initiative for transitioning urban systems towards sustainable futures. http://www.resalliance.org. Accessed 09 September 2009.

Walker, B. H., Holling, C.S., Carpenter, S.R. & Kinzig, A. (2004). Resilience, adaptability and transformability: social–ecological systems. *Ecology and Society*, *9(2).* www.ecologyandsociety.org. Accessed 1 November 2010.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Why in-between spaces are important to everyday architecture?

Susana Alves[1]

[1]*Architecture Department, Çankaya University, Ankara, Turkey, susanaalves@cankaya.edu.tr*

Abstract: This paper discusses the concept of in-between spaces in architecture. The space in-between has been defined as the space mediating the inside and the outside – the space between buildings and other types of land use. Even though every kind of architecture has an in-between space, researchers know little about their potentialities and significance in human life as sites for meaningful activities. Drawing from Lefebvre's critique of everyday life and his tripartite model of space, and also from Gibson's ecological theory, I first discuss the notions of everyday life and the perception of in-between spaces. Then I enquire about the possibilities of use in-between spaces provide in public settings in Turkey. Next, I analyse the emotional qualities of in-between spaces—also called 'atmospheres'. This paper concludes by stressing the need to take in-between spaces potentialities into account in architectural theory and practice.

Keywords: in-between spaces; everyday architecture; affordances; atmospheres; everyday life

Introduction

The spatial context of our everyday lives is marked by the presence of in-between spaces. In-between spaces and everyday architecture are two concepts that have been gaining ground in architectural discourse. Architecture of the everyday makes a plea for an architecture that is concerned with use of space in people's quotidian life. In-between spaces refer to those spaces appertaining to the *intermezzo*.

Between buildings and other land uses, in-between space ranges from streets and parks to *terrain vague* with undefined uses and functions. Ignored due to their unappealing appearance or because they are left over after the construction of roads (Hofmeister, 2002), in-between spaces have not figured prominently in architecture and urban planning. However, this paper argues for making better use of these existing spaces in design interventions.

In-between spaces express the need to understand 'mediation of landscape' – the landscape seen not as an object but as a mediation between physical and phenomenal worlds (Berque, 2013). In this logic, in-between spaces become significant sites for socialisation, definition of social identities, and imagination. They express emotional qualities called 'atmospheres' that have a great influence on human action (Böhme, 2017).

The notion of everyday life also lies in an *intermezzo* position between that of nature and culture. According to Lefebvre (2002), the everyday is situated between that which is cyclical (nature-related) and that which is linear (man-made; rational). In architecture, there has

been a general disregard for the significance of in-between quotidian spaces and their possibilities of accommodating human activities. This paper brings attention to this 'dimension of relation' conveyed by the notion of in-between spaces, their spatiality, and potentialities for use.

Drawing from Lefebvre's critique of everyday life and his tripartite model of space, and also from Gibson's ecological theory, I first discuss the notions of everyday life and the perception of in-between spaces. Then I enquire about the possibilities of use (Gibson's affordances, 1979) of in-between spaces and the kind of atmospheres they create (according to Böhme's atmospheres, 2017). I address in-between spaces located in the public realm in Turkey. Finally, drawing upon this theoretical background and grounded on proposed examples, I explore how in-between spaces can be applied in everyday architecture to promote human well-being.

Methods

Ethnographic research methods are employed to document, understand and analyse in-between spaces in public settings in Turkey. The analysis in terms of affordances and atmospheres is based on ethnographic work developed by this researcher and her students in the last 6 years in the departments of Architecture at Çankaya and Okan Universities in Turkey. In teaching "Use of Public Spaces" courses, I have reflected on the role of in-between spaces in the context of urban everyday life by using a mix of qualitative and quantitative methodologies. Form these exercises, many examples of in-between spaces resulted and are now available for analysis in this paper.

Discussion

In the discipline of architecture, the predominant concept of architectural space takes space to be closely related to the notion of 'function' and a view of perception of separate objects. Within this perspective, in-between spaces have found little value. In order to recognise the value of in-between spaces, it is necessary to see 'function' as a 'potentiality' in its relationship with the other parts of the urban system. Louis Kahn and Bernard Tschumi are examples of architects who proposed an architecture where form does not necessarily follow function but that takes into consideration the actual situations and people's everyday experiences in the designed spaces (Kahn,1972; Tschumi, 1994).

Instead of function, an ecological approach to perception allows us to understand the information available in the environment in the form of affordances for an active perceiver to obtain it directly (Gibson, 1979). By not being internal to the organism, perceiving the environment represents a direct process of picking up values and meanings in a relational manner. Perceiving thus expresses a process of reciprocity between environment and behaviour and occurs in an everyday context.

To understand the everyday critically, I use Henry Lefebvre's theory of 'the socially produced space' (1991/1974). By holding the view that space is physically and socially produced by means of practices of everyday life, Lefebvre (1991) proposes that human experience consists of three interrelated aspects of space: representations of space (conceived space), spatial practices (perceived space), and spaces of representation (lived space/spaces of lived experience). Conceived space refers to an abstract space produced by the state, markets, and planners to create relations of production and "order". Perceived space is the outcome of people's choices and practices. In between of these two categories, there is space as real-and-imagined - the 'lived space'. Lived space is a space of personal and collective spatial experiences, and represents an integrated moment of social space. It is directly lived through its associated images and symbols (Watkins, 2006).

These three categories of space: conceived, perceived and lived spaces serve to understand the dialectical interaction between physical and social processes in the production of urban environments. Lefebvre (1991) calls these three categories as "the three moments of social space" to draw attention to the diversity of space in its relation with individuals and groups using it. Lefebvre's lived space requires the picking up of affordances and their actualisation—which entails a diversity of in-between spaces. This is because perception of in-between spaces conveys the point that places are perceived and created through the creative interaction of a perceiving subject and an object perceived. Thus the notion of in-between spaces gives full weight to the physical aspect of the environment while simultaneously addressing the role of the human subject.

What is the potential and necessity of in-between spaces in design? Everyday spaces, such as streets, parks, street corners and small green areas are located between home and work settings. These spaces are important because they allow people to develop different activities—such as, walking, meeting with friends, observing others, undertaking utilitarian pursuits, relaxing and so on. One kind of in-between space -- green spaces – have been associated with

positive affective responses and self-regulation pursuits (e.g., Korpela et al., 2008) and psychological restoration and coping with stress (Hartig et al., 2014). In-between green spaces have great value for designing restorative environments to contribute to human health and psychological wellbeing.

How might an awareness of everyday lived spaces and their affordances inform architectural practice? In architecture, the everyday has been seen as that which is apparently insignificant. But in fact, placing emphasis on quotidian lived spaces and what they offer in terms of human action gives us a useful tool to critically address architecture. Everyday life theory links architecture to lived space and therefore to in-between spaces (e.g., green spaces) and their affordances. It is a way for researchers and practitioners to recognise meaning in architecture through understanding associated images and symbols in the use of space.

There has been an increasingly disintegration of in-between spaces due to their disengagement from people's 'real' and everyday environments. The promotion of in-between spaces in architecture brings it to the level of human inhabitants. It makes it possible to design flexible, multi-functional and playful forms of urban spaces which people can appropriate for diverse uses. Urban interventions which take in-between spaces seriously can dissolute the strict divisions between the public and the private. In other words, there is the need to attend to in-between spaces in architecture—as spaces of personal and collective attachment and transformative potential.

Conclusion

In conclusion, in this paper I argue for the recovery of in-between spaces as lived spaces rich in affordances for wellbeing. For that to happen, it is necessary to understand the role of architects and designers in the creation of *spaces of potentiality*. Lefebvre's spatial trialectics provide an insightful tool to explore everyday architecture. Gibson's affordances and Böhme's atmospheres serve analyse lived spaces in terms of potentialities for wellbeing. In closing, I would like to call for a multi-disciplinary approach to architectural design and education where knowledge produced in disciplines such as environmental psychology, everyday life studies and ecological aesthetics become relevant to inform design thinking and practice.

References

Berque, A. (2013). Thinking through Landscape. Translated by Anne-Marie Feenberg-Dibon. New York: Routledge.

Böhme, G. (2017). Atmospheric Architecture: The Aesthetics of Felt Spaces (translated by A. Chr. Engels-Schwarzpaul). London: Bloomsbury.

Gibson, J. J. (1979). The Ecological Approach to Visual Perception. Boston: Houghton-Mifflin.

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. Annual Review of Public Health, 35, 207-228.

Hofmeister, S. (2002). The rediscovery of transition in spatial planning and environmental planning. Time & Society, 11(1), 105–130.

Kahn, L. (1972). The room, the street, and human agreement. Arts in Society, 9(1), 110-118.

Korpela, K., Yléna, M., Tyrväinen, L., & Silvennoinen, H. (2008). Determinants of restorative experiences in everyday favorite places. Health & Place, 14(4), 636-652.

Lefebvre H, (1991). The Production of Space (translated by D. Nicholson-Smith. Oxford: Blackwell.

Lefebvre H, (2002). Critique of Everyday Life, Vol. II (translated by J. Moore). New York: Verso.

Tschumi, B. (1994). Architecture and Disjunction. Cambridge: MIT Press.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Meaning in Cultural Sustainability

Gökçe Atakan[1*], Saadet Akbay[2]

[1*]*Interior Architecture, Çankaya University, Ankara, Turkey, gatakan@cankaya.edu.tr*
[2]*Interior Architecture, Çankaya University, Ankara, Turkey, akbay@cankaya.edu.tr*

Abstract: Culture is considered as an essential element within the notion of sustainable development. Cultural values are always interconnected with the built environment which carries important meanings to the society. The purpose of this paper is to shed some light on the notion of maintaining the value and the meaning in cultural sustainability through the built environment. Evaluation of the subject through the aspect of cultural value facilitates the utilization of semiological and cognitive meaning perspectives. This approach as a promising one to yield further case studies.

Keywords: sustainability; culture; cultural sustainability; meaning; value

Introduction

Sustainability has become a new positive economic, environmental, and social value under the term of sustainable development. Culture is also considered as an essential element within the notion of sustainable development. Culture is affected by social relations, social structure, values, and norms which influence human activities, behaviours, and attitudes towards the natural and the built environment (Chiu, 2004). According to Rapoport (1977), culture has two dimensions. First is the social dimension that contains family structure, social network, and identity; and second is the ideological dimension that comprises values, ideals, and norms. In totality, as Chiu (2004) asserts "[culture] includes morals, values, laws, codes, customs, traditions, heritage, lifestyles and the ways we socialize within specific social structures." (p. 67). Social structure and social values are always connected with cultural values that carry important meanings to the society. Chiu (2004) claims that the social dimension and cultural dimension of sustainability are interlinked with sustainable development. Cultural sustainability, therefore, is counted under social sustainability because of including its social dimension. However, Soini and Birkeland (2014) state that the cultural dimension of sustainability should be constructed independently of the rest since it is the fourth pillar in addition to economic, environmental, and social sustainability. Fithian and Powell (2009) also support this idea by stating that people's identities, signifying systems and values form the environment that they live in, therefore, culture should be considered as a further dimension of sustainable development (cited in Opoku, 2015).

Cultural sustainability reserves the tangible and intangible cultural values of the society (Opoku, 2015). Tangible values refer to the material culture that generally concerns the conservation of cultural heritage like historical buildings and monuments. Intangible values, whereas, indicate the immaterial culture that covers the issues of traditions, knowledge, signifying systems, oral literature related to tangible heritage (Soini and Birkeland, 2014). Both types of cultural values are intertwined with each other in order to transform the world towards sustainability (Axelsson et al., 2013). Therefore, cultural sustainability is defined as "[…] the concept for the recovery and protection of cultural identities. It is linked to previous traditional practices through celebrating local and regional histories and passing down cultural values to future generations." (qtd. in Soini and Birkeland, 2014, p. 261). Cultural values are always interconnected with the built environment which carries important meanings to the society.

The purpose of this paper is to shed some light on the notion of maintaining the value and the meaning in cultural sustainability through the built environment. This paper analyses the cognitive and semiological meanings of cultural values in terms of sustainability where built cultural heritage is the standpoint of reference.

Meaning in Built Cultural Heritage

Cultural heritage is related to the built environment. The act of conveying different meanings from one generation to another in terms of the built cultural heritage is considered as a part of the sustainable development that defines a sense of a place and an identity for a society (Tweed and Sutherland, 2007). This study discusses the term value in the built cultural heritage from two different perspectives; through cognitive and semiological meaning.

Perception is briefly the interpretation of the environmental stimuli through sensory organs in cognitive psychology. The significance of perception escalates as it is considered to be the main dynamic that constructs the premises of interaction of the human with its environment. The cognitive process during this interpretation of the perception phase is essential for the received data to be converted into information. This process is only possible with signification which is associated with objective and subjective knowledge of the environment that is related to long-term memory. In other words, the organization, identification, and interpretation of the data through perception is necessary in order to understand the sensory information of the environmental stimuli. All thoughts, behaviours, and attitudes of people are shaped through this cognitive processes and this leads to giving meaning

to the environment. Hence, the stimuli in an environment in terms of the quantity and quality of the thoughts and behaviours are regarded as values (Ackoff, 1989; Schacter et al., 2011). The term value, in general, is used to describe morals, ideas, and principles of individuals and collective groups in society. However, the value, in cultural heritage, is considered as a utility in terms of playing instrumental and symbolic function in society rather than an intellectual activity (Feilden and Jokilehto, 1998). As each individual constitutes the body of a whole society, it is important to evaluate the structural relation between the individual and the society. The notion of identity is of great significance among the attributes of the interconnection between the individual and the society. Identity in social psychology, regarding an existential point of view, is the self-definition of an individual throughout the data sensed from the environment (Turner, 1982). It is important for the individual to be able to collect cultural data from the environment in order to prevent social disidentification in terms of cultural sustainability. In this context, the data (i.e. the collective identity of the community), which is collected through built heritage, serves as an important function in defining the individual's self-identification through being the cohesion among each individual and yet forming the present built environment.

The sense of a place and an identity of a society as the two necessary factors for a built cultural heritage are defined further comprehensively by Rapoport (1982) as four main factors, which are space, time, communication and meaning. According to Rapoport (1982), “Communication refers to verbal or nonverbal communication among people, while meaning refers to nonverbal communication from the environment to people.” (p. 178). Rapoport (1982) also suggests that the perception of the environment filtered through cultural and personal images. These filters might be matched with the objective and subjective knowledge of the individual, which is already positioned in the long-term memory (Rapoport, 1977), as mentioned above.

In semiotics, Pierces’ (1977) theory classifies signs into three aspects, namely as ‘sign’ (i.e. representatum), ‘object’ (i.e. referent, denotation) and ‘interpretant’ (i.e. connotation) (Chandler, 2002). According to this theory, the meaning is divided into two parts: denotation (literal meaning) and connotation (associated meaning). In the architectural context, the sign identifies the form of the building, the denotation compensates the function of the building, and the connotation refers to the cultural value of the building or the environment and the user's personal experience (Eco, 1997; Aydınlı, 1993).

Hershberger (1970), defines in his study, a basic model of meaning; with representational and responsive stages. The representational stage refers to percepts, concepts, and ideas of the stimulus object; responsive stage indicates prescription, affect and evaluation of the representations. Hershberger (1970) points out the representational meanings are objective whilst responsive ones are subjective. This approach considers the built heritage from the designers' point of view and refers to the value of the building as a designers' response to the stimulus of the period in which it is designed.

Cognitive and Semiological Meaning of Cultural Value

Fielden ve Jokilehto (1993) identify the types of cultural values with three categories which are recognition, research, and statistics. According to the recognition category, the identity value is related to emotional ties of the society. Relative artistic or technical value, based on research, stand on scientific evaluation and assessments. Rarity value depends on representativeness or uniqueness of the building in terms of type, style, builder, period, and etc. This study aims to magnify the semiotics and the cognitive parts of each approach (Table 1).

In semiotics point of view, identity value refers to the meaning that Rapoport (1977) describes as 'nonverbal communication from the environment to people'. This communication can be related to the cognitive process of perception where people collect data from the environment about the period and emotionally tie these data with their knowledge. The relative artistic or technical value, on the other hand, is connected with the motives and the material of the built heritage rather than emotions. These signs are cognitively interpreted in people's mind and they are reinforced in terms of the meaning of the building which emphasizes the comparison of the periods and finalizes as an evaluation. Rarity value of a historic building consists of the significance of the qualities that are semiotically linked with the architect's response to the period and his or her peculiar expectations. In the cognitive perspective, the buildings functional tendencies affect the meaning of the building experience of the ambiance and related settings accordingly.

Table 1. Evaluation of cultural value in terms of semiological and cognitive meaning

	Fielden and Jokilehto (1993)			Atakan and Akbay	
CULTURAL VALUE	**Type**	**Related to**	**Consist of**	**Semiotics**	**Cognitive**
	Identity Value (based on recognition)	Emotional ties: tradition, age, continuity, etc.	Perception	Meaning Association of the period in user's thoughts	Images about the period (Cultural data collection) , Knowledge on the approach of the period
	Relative Artistic or Technical Value (based on research)	Historic evaluation of the design	Relation to its own time, to other periods and to the present	"Signifing system" of the building Signs Motives Material	Period comparison Reinforce the meaning
	Rarity Value (based on statistics)	Type, style, builder, period, etc.	Significance of qualities	Communication Response of the architect to the period	Continuity of function as intended

This paper evaluates the built heritage sustainability in terms of cultural value. Evaluation of the subject through the aspect of cultural value facilitates the utilization of semiological and cognitive meaning perspectives. This approach as a promising one to yield further case studies.

References

Ackoff, R. L. (1989). From data to wisdom. *Journal of Applied Systems Analysis, 16*(1), 3-9.

Axelsson, R., Angelstam, P., Degerman, E., Teitelbaum, S., Andersson, K., Elbakidze, M., & Drotz, M. K. (2013). Social and cultural sustainability: Criteria, indicators, verifier variables for measurement and maps for visualization to support planning. *Ambio*, *42*(2), 215-228.

Aydınlı, S. (1993). *Mimarlıkta Estetik Değerler.* İstanbul: İstanbul Teknik Ünversitesi, Mimarlık Fakültesi Baskı Atölyesi.

Chandler, D. (2002). *Semiotics: The Basics.* New York: Routledge.

Chiu, R. L. (2004). Socio-cultural sustainability of housing: a conceptual exploration. *Housing, theory and society, 21*(2), 65-76.

Eco, U. (1997). Function and Sign: The Semiotics in Architecture. In N. Leach, *Rethinking The Architecture* (pp. 173-195). London: Routledge.

Feilden, B. M., & Jokilehto, J. (1998). *Management Guidelines for World Cultural Heritage Sites*. Rome: ICCROM.

Hershberger, R. G. (1970). Architecture and meaning. *The Journal of Aesthetic Education*, 37-55.

Opoku, A. (2015). The role of culture in a sustainable built environment. In *Sustainable Operations Management* (pp. 37-52). Springer, Cham.

Rapoport, A. (1977). *Human aspects of urban form* (Vol. 3). Oxford: Pergamon.

---. (1982). *The meaning of the built environment: A nonverbal communication approach*. Beverly Hills, CA: Sage Publication.

Schacter, D.L., Gilbert, D.T., & Wegner, D.M. (2011). *Psychology*. New York: Worth Publishers.

Soini, K., & Birkeland, I. (2014). Exploring the scientific discourse on cultural sustainability. *Geoforum, 51*, 213-223.

Turner, J. (1982). Towards a cognitive redefinition of the social group. In H. Taifel, *Social Identity and Intergroup Relations* (pp. 15-40). Cambridge: Cambridge University Press.

Tweed, C., & Sutherland, M. (2007). Built cultural heritage and sustainable urban development. *Landscape and urban planning*, *83*(1), 62-69.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture,

Planning, and Design, 17-19 October 2018, Ankara, Turkey

An Assessment of the Energy Performance Evaluation within the Form Conception Process

Cem Ataman[1*], İpek Gürsel Dino[2]

[1*]*Architecture, TOBB University of Economics and Technology, Ankara, Turkey, cataman@etu.edu.tr*
[2]*Architecture, Middle East Technical University, Ankara, Turkey, ipekg@metu.edu.tr*

Abstract: Most current research using performance concepts in the design process has been previously restricted to simple architectural forms. When architectural form is consented to basic polygonal shapes or simple curvature, performance values are well-understood and manageable. However, the current developments in design computation allow designers to deal with increasingly complex forms while still considering energy performance without the limitations of simple dimensional variations in form. This study aims at investigating the relationship between architectural form and performance for complex geometries. To this end, different form conception techniques, being rigid and topological transformation operations are explored for energy performance using EnergyPlus to quantify the total thermal load. A number of design alternatives are generated and a comparative analysis on thermal performance is presented. The presented method illustrates the ways in which energy performance has an effect on the form-based design process through advanced simulation and form conception codes in the computational medium.

Keywords: Architectural form; form generation; performance evaluation; design exploration.

Introduction

The realization of a design idea in an optimal way, from the functional, structural, aesthetical perspectives, is a difficult and complex problem area. Today, energy performance contributes to this complex system as a dominant parameter, and mathematical and algorithmic formulations are introduced in order to understand the consequences of the decisions on either performance or form conception. Integrating performance requirements into the design process increases the complexity of the design problem, especially in that form conception cannot be fully separated from energy-related issues in design activity (Gerber & Lin, 2013.). However, architects and designers, overwhelmed by technological advances in design computation, run the risk of neglecting to incorporate other aspects of architecture, including the building performance.

In architecture form is paramount. This study is motivated by the potential to explore different means of form-finding processes informed by performance-based approaches. Computation has the potential of shifting form-making activity into a complex, dynamic operation based on performative aspects of architectural design (Oxman, 2006). The increase in the amount of information embedded in architectural form allows architects to explore

design approaches in which form-making and simulation-based performance analysis are combined in integrated design processes. In this manner, the digital design process emphasizes emerging possibilities to create complexity in architectural design without restricting any form generation methods. A major influence is performative architecture, where advanced possibilities of design development with simulation, optimization, and generation occurred and concluded with examination and manipulation of relationships based on performance concepts (Kolarevic, 2010.).

In this context, the value of parametric design systems must be emphasized, since they increase the computational control over the design process. Parametric modelling tools coupled with simulation software allow the integration of performance analysis into design activity. The necessary adaptability and responsiveness are provided by these tools, which are essential for considering complex and dynamic design criteria, which also support design exploration in performative architecture (Gürsel Dino, 2012.). Architectural form conception becomes a process that reflects multi-dimensional nature of architecture without neglecting performative aspects. A greater complexity of form is created while examining the ways in which the form fulfils the requirements of the various performance criteria (Gürsel Dino, 2012.).

This study focusses on architectural forms made possible by computational tools, and their performance evaluation. To this end, different form transformation methods supported by parametric design tools are seamlessly coupled by performance analysis to demonstrate the possibilities of performative architectural design for form generation (Grobman & Neuman 2012.). In this study, the emphasis is placed on the relationship between architectural form and energy performance. However, the presented study can be generalized into a design method in which design generation and evaluation are coupled for performative design exploration.

Methods

The aim of this study is to explore the performance – form relationship in the computational design medium. In order to conduct this study, two different form conception techniques are applied, which are rigid operations and topological operations. Four shapes are considered as initial forms; a geodesic dome, a tetragonal prism, a sphere and a cylinder. Following, each form is subjected to a form transformation process to generate new parametric variations. Each transformation consists of a number of steps encoded in

Grasshopper, an algorithmic modelling tool. The performance of each form is quantified by means of energy simulations by using EnergyPlus software, a transient energy simulation tool. In order to decrease the gap between parametric modelling tool and simulation engine, EnergyPlus is connected to Grasshopper by Honeybee, an environmental plugin for making simulation tools available in a parametric way.

The first phase of the study is to examine form-based design by rigid operations. A geodesic dome and a tetragonal prism are chosen for rigid operations due to their geometric properties. The transformation is conducted by the operations of *cutting*, *scaling* and *extruding* in each step. The scaling factor is determined bigger than '1' and no subtraction is made in order to provide an increasing volume and surface area. (See Figure 1.)

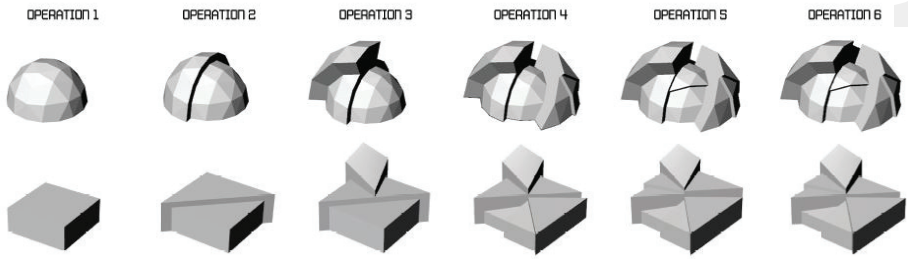


Figure 1. Form conception process for a geodesic dome and tetragonal prism by rigid operations.

For the second phase of the study, topological operations are examined in form conception process on a sphere and a cylinder. The initial forms are transformed into new forms by *bending* and *twisting* operations. A shape transformation process is encoded in Grasshopper, however, the volume and the surface area are not ever-increasing as it is in the rigid operations although no scaling is pursued. All the operations are conducted inside a defined volume in order to easily control the shape transformation. (See Figure 2.)

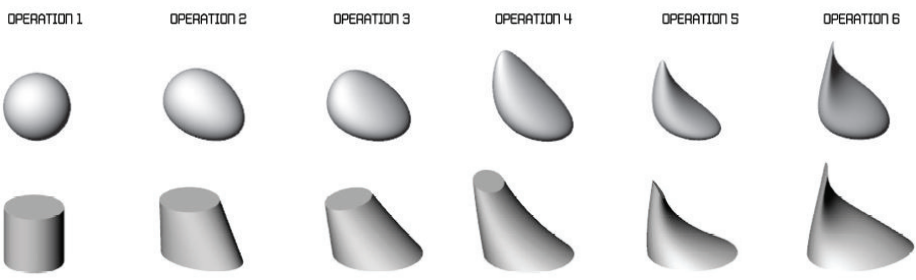


Figure 2. Form conception process for a sphere and a cylinder by topological operations.

As the final phase, 24 alternative forms are simulated in EnergyPlus to calculate their thermal performance (heating and cooling). As the performance metric, Energy Use Intensity (kWh/m^3) is used to be able to comparatively analyse a number of alternative forms and benchmark them against each other. The orientations are fixed and the glazing factors are the same for each transformed shape.

Findings and Discussion

There are several remarks that have to be highlighted according to the simulation results. Primarily, energy performance shows a direct correlation with volume and surface area in rigid operations as expected. As it can be seen in Table 1, the greater exposure to the sunlight provides better performance values for the rigid shapes. Since the geodesic dome enlarges in various directions and angles, its performance values get better due to the higher exposure to the sunlight. In this sense, geodesic dome shows better results than tetragonal prism especially for the energy required for their heating. When it comes to the compactness of the shapes, the results show that the increase of the surface area has more influence on energy performance. If the orientation and the glazing are well-organized to obtain enough sunlight, the energy performance improves even when the compactness of the shape decreases.

Table 1. The simulation results of the rigid operations.

TETRAGONAL PRISM	**O_1**	**O_2**	**O_3**	**O_4**	**O_5**	**O_6**
Total Thermal Load (kWh/m^3)	31,23	28,38	26,17	27,43	27,07	26,39
Heating (kWh/m^3)	28,20	25,71	23,81	24,88	24,54	23,92
Cooling (kWh/m^3)	2,67	2,67	2,35	2,55	2,53	2,48
Surface Area (m^2)	810	1077	1319	1501	1526	1563
Volume (m^3)	1350	1917	2415	2690	2771	2927
GEODESIC DOME	**O_1**	**O_2**	**O_3**	**O_4**	**O_5**	**O_6**
Total Thermal Load (kWh/m^3)	23,66	21,91	19,89	19,11	18,94	17,99
Heating (kWh/m^3)	20,98	19,52	18,02	17,31	17,16	16,25
Cooling (kWh/m^3)	2,68	2,39	1,87	1,80	1,78	1,74
Surface Area (m^2)	732	947	1325	1855	1853	1899
Volume (m^3)	1391	1898	2761	3943	3993	4417

The performance results are more changeable in the topological operations. Since it is not easy to control the volume and the surface area of free-form shapes as in the rigid operations, the results show different variations although the operations are pursued similarly

as it is represented in Table 2. The surface area is still a dominant factor for the topological operations as well; however, the two shapes are not consistent with each other even though the operations and their values are exactly the same. At this point, the number of surfaces becomes important to make a correct performance evaluation. Since the change of the direction of a surface has more effect on the sunlight gain, having more surfaces and oriented faces is useful to decrease thermal load and recover the energy performance without looking their compactness in the topological operations.

Table 2. The simulation results of the topological operations.

SPHERE	**O_1**	**O_2**	**O_3**	**O_4**	**O_5**	**O_6**
Total Thermal Load (kWh/m^3)	6,24	5,80	5,39	5,30	6,46	6,91
Heating (kWh/m^3)	6,19	5,74	5,29	5,21	6,26	6,88
Cooling (kWh/m^3)	0,06	0,07	0,10	0,09	0,20	0,03
Surface Area (m^2)	826	925	1048	1065	762	971
Volume (m^3)	2143	2676	2847	2675	1413	1854
CYLINDER	**O_1**	**O_2**	**O_3**	**O_4**	**O_5**	**O_6**
Total Thermal Load (kWh/m^3)	5,39	4,39	3,54	2,95	4,58	3,39
Heating (kWh/m^3)	5,26	4,22	3,27	2,65	3,91	3,05
Cooling (kWh/m^3)	0,13	0,17	0,26	0,30	0,67	0,34
Surface Area (m^2)	1056	1251	1412	1501	1231	1620
Volume (m^3)	2591	3237	3511	3424	2017	3138

Conclusion

Two different form conception processes which aim at producing a number of variations for design alteration are examined in terms of their effects on energy performance.

- Orientation and surface area emerge as the directing factors rather than compactness of architectural form.
- Having more surfaces is always advantageous since it is important to direct a full surface towards the sun in order to maximize sunlight.
- Form generation and performance evaluation processes are interwoven into each other in order to provide an integrated design methodology.
- Considering performance concepts at the early design phases is important, since the form alteration and design changes are made frequently at these stages.
- Proposed method can be used as design generation and exploration process for other performance criteria, if the computational tool used for evaluation changes.

References

Gerber, D. J., & Lin, S. E. (2013). Designing in complexity: Simulation, integration, and multidisciplinary design optimization for architecture. Simulation, 90(8), 936-959. doi:10.1177/0037549713482027

Grobman, Y. J., & Neuman, E. (2012). Performalism: Form and Performance in Digital Architecture. London: Routledge.

Gürsel Dino, İ. (2012). Creative Design Exploration by Parametric Generative Systems in Architecture. METU Journal of the Faculty of Architecture. doi:10.4305/metu.jfa.2012.1.12

Kolarevic, B. (2010). Performative Architecture: Beyond Instrumentality. New York: Spon Press.

Oxman, R. (2006). Theory and design in the first digital age. Design Studies, 27(3), 229-265. doi:10.1016/j.destud.2005.11.002

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Computation of Performative Architecture within Integrated Design Process

Cem Ataman[1*], İpek Gürsel Dino[2]

[1]Architecture, TOBB University of Economics and Technology, Ankara, Turkey, cataman@etu.edu.tr*
[2]Architecture, Middle East Technical University, Ankara, Turkey, ipekg@metu.edu.tr

Abstract: During the last decades, highly interactive relations between various disciplines in architecture have led architectural practice to a point in which performance concepts are tightly integrated into the building design process. Computational tools that are used for evaluating building performance during design exploration processes support this integration further. The critical effect of early consideration and simultaneous synthesis process is emphasized by design professionals and academia by underlining its difference from traditional optimization methods. In this study, the computation progress of building performance with simulation-based modelling tools is presented, and the core literature existing on the topic is reviewed in order to identify the current status, different approaches, significant changes, and areas of future research on the subject. The results of the study confirm that despite the practical and technological barriers, great opportunities exist for performative architecture to integrate building performance into computation design process.

Keywords: Building performance; integrative design approach; simulation tools; design synthesis.

Introduction

Recent advances in architecture aim at fulfilling the contemporary complex demands of performative design. The design complexity requires the involvement of many disciplines with their domain knowledge in order to analyse and evaluate building performance (Gerber, 2013). Yet, the involved disciplines typically take part at different design phases and time periods, which might create a gap between active design members, including architects and engineers. To this end, integrated design strategies need to be adopted for supporting and guiding performative building designs to facilitate the collaboration between the different disciplines.

Computational technologies that support performance-based design processes provide great opportunities for supporting integrated strategies in architectural practice. Computation provides significant opportunities since it identifies the relations between design problems, systematically analyses and evaluates building performance and generate alternatives for performative solutions (Cagan et al. 2005). Currently, designers have the necessary tools and methods to formulate design needs, architectural requirements and convey them into a computational formalism that can aid in the design of performative buildings. In line with this, computational design process encourages transformation and generation of a model in accordance with the environmental performance after evaluation. In this manner, computational

design strategies become an inseparable part of performative architecture, and their use and validities increase day after day in the architectural design process.

Methods

At first, the topic of integrated performative design is presented through a literature review which comprehends performance factors and architectural requirements. Then, previous reviews on relevant subjects are referenced and computational performative architecture is identified by its analysis in three combining aspects: performative design approach, design simulation, and design synthesis. Finally, the conclusions are presented after the discussion section.

Findings and Discussion

Performance is defined as the manner in which or the efficiency with which something reacts or fulfils its intended purpose (Stein, 1983). It is a notion that consists of one or multiple objectives determined at the beginning of the task, and mechanisms or subjects are expected to meet these previously stated objectives. In this manner, performance becomes the fulfilment and the ability of a practice that is achieved through a process. Performative design, on the other hand, is the process in which performance requirements are translated and integrated into a building design. It combines a list of performance criteria to sustain overall building performance, which spans the whole design process.

Performative design approach emphasizes a larger generation and use of design alternatives, and cope with the limitations of time without conflicting any privileged design decisions. This design approach consists of two parts; generating design alternatives with given requirements, and then using performance in their evaluation. The approach underlines the significance of design integration, and therefore, the generation and evaluation processes need to be pursued concurrently (Shi, 2010). For this reason, architectural modelling tools seamlessly coupled with simulation tools are preferred by the architects and involved engineers, to support design integration and collaboration within the same medium.

In performative architecture, design responsiveness towards data regarding performance simulations becomes the focal point of performative design. Since such level of responsiveness cannot be achieved in the conventional CAD models, the computation of performative design requires a different process. In conventional methods, the analysis and evaluation of design alternatives are sequential and separated; therefore, they do not support

integrated design approaches. In performative design, the sequential process gives its place to a cyclic process, which provides the required iterative and dynamic coordination between involved disciplines. Simulations and generation processes are synchronized in order to provide generative responses in this kind of an approach (Oxman, 2009).

In computational performative design approach, two possible performative models can be suggested. The first one is the model in which performance factors are encoded in the parametric model, which generates alternatives that fulfil the given performance criteria. The second model is the one that is coupled with external performance simulation tools in search of the optimal performance. Since the limit of performance-related knowledge in parametric modelling is not comprehensive in most cases, the latter model is more suitable for combining complex performance issues within a cycle of generating, evaluating and modifying (Gursel Dino, 2012).

The simulation process aims at generating observable output states for analysis, and their mapping to suitable quantifications of performance indicators. Simulation capability of computational modelling extends and includes a wide range of performance criteria, from material characteristics to construction systems (Soebarto, 2001). Therefore, designing and evaluating (or simulating) the behaviour or response of the building become critical to predict the anticipated performance criteria. The building's behaviour under a certain usage scenario is modelled and observed through building simulation in performative design model. A piece of reality is reflected into a model, and a variety of experiments is studied in an experiment box. Experiments refer to simulation runs while experiment box is used for the simulation tool (Hensen, 2012). The simulation process generates a number of states to be observed in order to provide relevant information about the performance behaviour. At the end, the experiment should reveal meaningful information according to the measures that come from performance criterion and its quantification. Therefore, a deep understanding of the physical domain, the performance measures, and the experiment box is needed to conduct the experiment systematically (Augenbroe, 2004).

Within performative design process, the architect also aims at optimizing performance, and as a consequence, it becomes the ability to directly manipulate the properties of the model according to performance analyses. Since performance evaluation is pursued under a computational/parametric 3D modelling environment, the process is clarified among architects by the terms "generative" or "computational", referring the simulation and optimization techniques.

Computational design is useful in finding performance parameters and evaluating them. However, the synthesis in this medium provides a model where the simplicity or complexity of the solutions is still left to the designer. The process of computational design synthesis allows interpretations and evaluations made by the architects. In order to present multiple levels of information, representations are combined within the same model, which are essential for communication, analysis, modification and data integration in design activity.

Conclusion

Computational performative design provides great opportunities for integrated architectural design strategies by means of simulation based modelling tools and these opportunities can be listed as follows;

- Computational tools support design exploration and provide the necessary adaptability and responsiveness for the complex and dynamic performance criteria in an integrative way.
- Detailed simulations are conducted to offer a guidance over design alternatives and find possible solutions. The simulations directly inform, generate and modify the design model in contrast to the sequential analysis and modification method in traditional systems.
- A number of representation structures are embedded into a single representation in computational model, which constitutes the design space including architectural and performative factors.
- Performative design approaches need to seamlessly combine modelling, methods, tools, and people that in order to encourage technological advances and emerging computational methods in architecture.

References

Augenbroe, G., & Malkawi, A. (2004). Advanced building simulation. London: Spon Press.

Cagan, J., Campbell, M. I., Finger, S., & Tomiyama, T. (2005). A framework for computational design synthesis: model and applications. Journal of Computing and Information Science in Engineering, 5(3), 171-181.

Gerber, D. J., & Lin, S. E. (2013). Designing in complexity: Simulation, integration, and multidisciplinary design optimization for architecture. Simulation, 90(8), 936-959.

Gursel Dino, I. (2012). Creative Design Exploration by Parametric Generative Systems In Architecture. Metu Journal Of The Faculty Of Architecture.

Hensen, J. L., & Lamberts, R. (2012). Building Performance Simulation for Design and Operation. Florence: Taylor and Francis.

Oxman, R. (2009). Performative Design: A Performance-Based Model of Digital Architectural Design. Environment and Planning B: Planning and Design, 36(6), 1026-1037.

Shi, X. (2010). Performance-based and performance-driven architectural design and optimization. Frontiers of Architecture and Civil Engineering in China, 4(4), 512-518.

Soebarto, V., & Williamson, T. (2001). Multi-criteria assessment of building performance: Theory and implementation. Building and Environment, 36(6), 681-690.

Stein, J. M. (1983). The Random House dictionary of the English language. New York: Random House.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Evaluation of Urban Mobility In Terms of Space and Equality, Case Study of Yozgat

İlker ATMACA[1], Seçil Gül MEYDAN YILDIZ[2], Hazal Ilgın BAHÇECİ[3]

[1]*Department of City and Regional Planning, Yozgat Bozok University, Yozgat, TURKEY, ilker.atmaca@bozok.edu.tr*
[2]*Department of City and Regional Planning, Yozgat Bozok University, Yozgat, TURKEY, secil.meydan@bozok.edu.tr*
[3]*Department of Political Science and Public Administration, Yozgat Bozok University, Yozgat, TURKEY, hazali.bahceci@bozok.edu.tr*

Abstract: People are on the move to carry out a range of activities for their areas of interest, such as business, education, and shopping. These movements can be carried out using walking, motorized or non-motorized vehicles. This mobility reflected in the consumption of space, energy, time and financial resources can also bring negative consequences such as accidents, atmosphere pollution, noise and traffic congestion.The intensive urbanization processes that have taken place in recent years have increased the demand for cities that offer a good quality of life and are able to accommodate mobility opportunities for people, vehicles and goods. These requests have already begun to be seen in large cities with serious social, economic and environmental problems related to the mobility of their inhabitants, as well as in medium and small-sized cities.The main aim of this research is to propose alternatives to prevent the negative externalities created by mobility and to increase the social benefit by showing the effects of the change in income levels on the human mobility in the cities through the Yozgat city center example.

Keywords: Urban transportation, mobility; spatial equity, Yozgat

Introduction

Transportation is directly related to the daily lives of the urban population in cities, where population growth and settlement is concentrated with industrialization, technological development and economic activities. In this context, urban transport, this is considered as one of the important elements of urban life. Transportation can be considered as one of the basic indicators of the evaluation of the development levels and economic growths of modern societies. Urban transport, including pedestrian, vehicle and freight movements within the borders of the city, plays an important role in ensuring social and economic equality.

Methodology

The method of the research is to investigate not only the social and economic aspects of urban mobility, but also the factors and the conditions of movement that motivate people. In this context, the data which will constitute an input for the research were obtained by the

Turkish Statistical Institute (TUIK), which produces statistical data at the country level, the data of local administrations, field surveys and literature survey on the subject. Field research was carried out with a qualitative on-site inspection technique. Thus, the conditions of mobility of different social groups were examined comparatively and social structure and trends were introduced. In this way, the methodology of work reveals how the negative effects of mobility are produced and how the results are affected. In addition, it enables the creation of a more appropriate decision-making platform for the implementation of public policies in the framework of mobility by revealing the differences between urban mobility systems.

Research Findings

Urban mobility, emerging in parallel with the increase of human activities in urban space, consists of home, business, education, health, entertainment, etc. focused travels and varies depending on the circumstances such as security or income level.

The transportation systems that establish and influence the relationship between urban structures are not only an important part of the absolute space fiction of the physical environment, but also an important part of the social and cultural process that ensures disadvantaged groups in urban spaces such as the disabled, the elderly, the women and children to become part of urban life. Transportation service is an economic activity on its own, as well as an effective cultural development policy in the process of reducing the social inequalities and protecting the environment with its influence on the space.

The level of income, which is one of the main elements in shaping of today's urban spaces, is one of the basic factors that should be taken into account while creating healthy urban transportation policies too. Housing areas in urban spaces are shaped according to income levels of individuals; income-based differentiations are reflected both in residential areas and in all urban spaces. (Figure 1.)

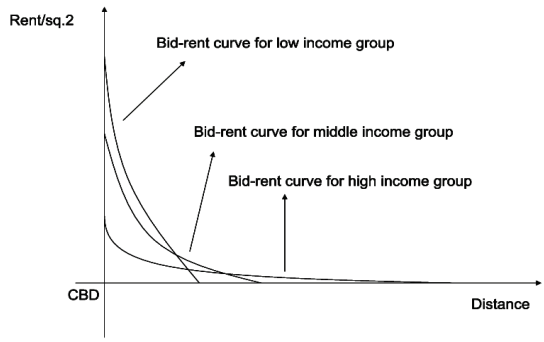


Figure 1. Bid-rent model (Royuela & Vargas, 2016)

As a result of the interaction between land/housing prices and income level, the fact that the people who have to live in periphery and have limited resources remain outside the public transport network limits the accessibility of the people living there. The movement possibilities of this group, which makes longer journeys with more transfer, are relatively limited. Therefore, the disadvantaged position of those who do not have access to public transport is improved and after a while this sector is detached from the urban space. Since the availability of public transport services depends on the availability of transportation services, it is essential for a healthy urban life to integrate distant settlements and central areas into one another in terms of transportation network. The availability of transportation services by low-income people depends on the availability of public transport services. Therefore, integration of distant settlements and central areas in terms of transport network is essential for a healthy urban life. Therefore, it is important to address that the multidimensional effects of urban-spatial injustice and social exclusion, both on urban space and urban life, within the framework of rational plans, in the process of making decisions, policies and plans for urban transport systems.

Transportation systems consume large amounts of urban land because of both moving traffic and parking spaces. Even in developing countries, roads have disproportionately large areas (close to 20%) compared to urban areas. If the fields used by transport dependent services are added to this value, the rate will be much higher. In order to create a healthy system in urban transport and to provide social equality, it is necessary to analyze how the built road area is used by people, in addition to the consumption of physical space. In countries where social and economic differences are great among people, the use of roads is

very diverse. In such countries, personal mobility increases as the level of personal income increases. In addition, increases in economic affordability also cause people to prefer individual vehicle use. The increase in the use of individual vehicles will cause vehicles to occupy space in traffic more than necessary. Therefore, traffic congestion problem will occur as well as increase in travel times will occur.

The cost of mobility is directly related to the mode of transport used. The cost of using automobiles and motorcycles for individual transportation is the sum of the fuel and parking fees required for travel (direct) and the car's fees such as maintenance, taxes, insurance (indirect). According to the data of the TUIK for the year 2013, transportation expenditures constitute 17.7% of annual expenditures of households living in urban areas. This shows that there is a significant relationship between income level and transportation expenditures, and that transportation mode to be selected for mobility has a significant impact on household expenditures. For example, in Figure 2, three families, consisting of 4 people and income levels different, have been built for the daily routine mobility level and the mode relationship they use for this mobility.

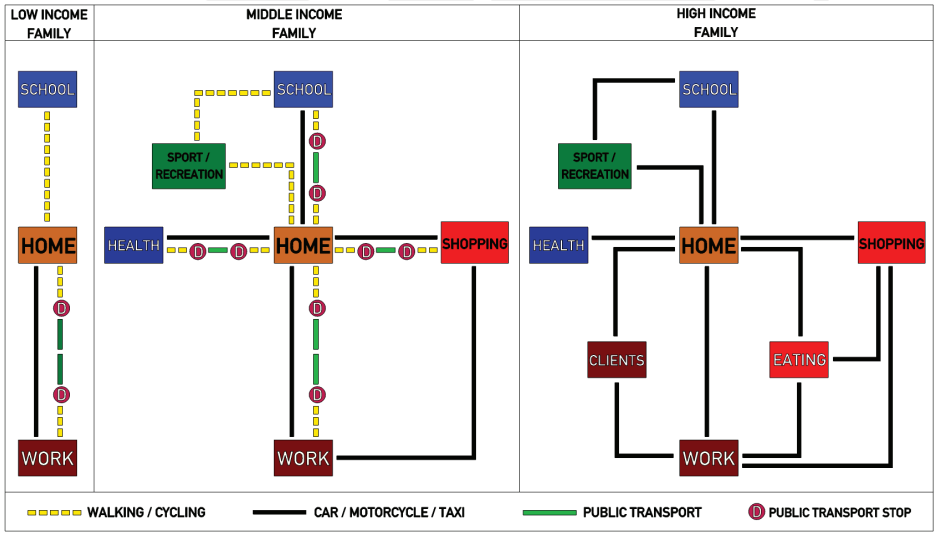


Figure 2. Network of activities by type of income (Source: Self made)

Transportation modes used by a low-income family for mobility are pedestrian, bicycle, motorcycle and public transport. The preferred mode of transportation is mostly pedestrian / walking.

Motorcycle transport can be more attractive compared to public transport. Because it does not have to be connected to the route like a bus, it provides faster and shorter access to the desired point and can reduce the daily travel time. However, since the cost of using motorcycle is relatively lower than the bus, it can also reduce the share of transportation on household expenditure. On the other hand, motorcycles frequently have problems in traffic because they share the same platform with other motor vehicles.

The modes used by a family at middle-income level for mobility are pedestrian, bicycle, automobile and public transportation. Automobile transport provides faster and shorter access times and can reduce daily travel time but it brings with a series of problems such as energy consumption, lack of transportation infrastructure, increased emissions of pollutants and the formation of accidents.

In cases which the car is purchased but not used or when the use of the car is reduced due to public transport, household transportation cost will decrease, although daily travel time and distance increase. Therefore, social benefit increases while individual harm decreases.

The modes used by a family at the upper-income level for mobility are pedestrian, car and taxi. Individuality and comfort are prioritized in the mobility. Accordingly, daily travel time, distance and fare increase. In this case, individual benefit is given priority, but social benefit is reduced.

The analysis of the three levels of income clearly shows the opposition between individual interests and social interests. Urban individuals identify mobility strategies, by considering their needs and income levels in order to reduce costs and travel time and enhance comfort. The negative effects that these strategies can produce against other people are ignored and "negative externalities" (pollution, congestion, accidents) are created for other people by advocating personal interests.

Yozgat is a city that has not yet encountered significant problems of transportation and environment in major cities such as Istanbul and Ankara in terms of both macro-form and transportation infrastructure and transportation movements. It has very important features and possibilities to be a clean and livable city.

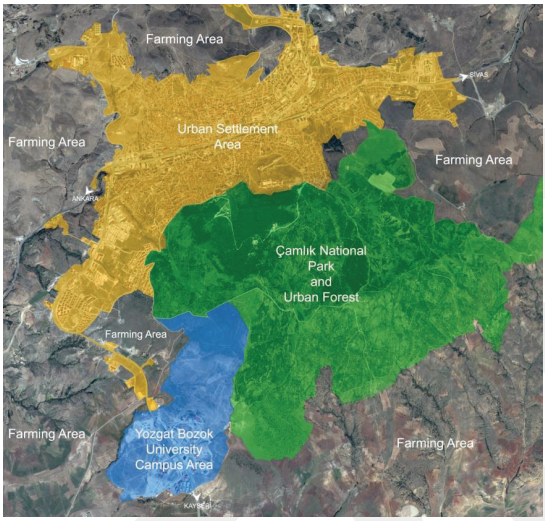


Figure 3. Yozgat city and its surroundings (Retrieved and processed from Google Earth, 2016, TKGM, 2018)

According to data from TUIK, Yozgat population is 418.650 in 2017. This population 269.334 (64,3%) people live in the cities and 149.316 (35,7%) people live in the villages.

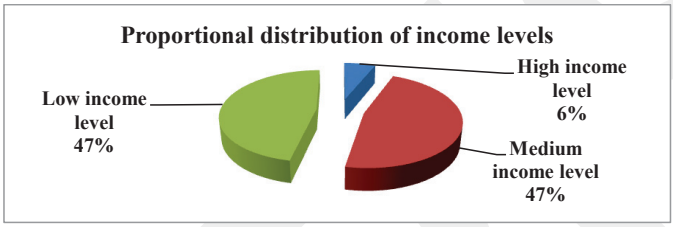
The total population of Yozgat province showed a steady increase in the period 1975-2000, but a very rapid decline occurred in the period of 2000-2017. The total provincial population of 682,919 in 2000 and the population growth rate of 1,7 decreased to 418,650 and decreased by -5.7 in 2017. Given that there is no change in the administrative division of the province of Yozgat, it can be argued that the decline in population is due to the limited employment opportunities and economic underdevelopment of the city compared to those in the periphery.

The largest district in terms of population size of the province is the central district with a total population of 103.965 and an urban population of 88.730. The central district is the third with a population of 15,235 people in rural area. In the direction of this data, it is seen that the urban structure of the central district is more dominant than the rural one. Population growth rate in Yozgat central district urban centre has increased by 2.82% in the last 10 years to 2.5%. (TUIK, 2018) In this context, the future forms of land use of the city and the distribution of these uses in the city are important.

One of the most fundamental determinants of mobility levels in the urban center is the level of social and economic development of urban individuals. According to the socio-economic development ranking of the provinces and regions prepared by the Ministry of

Development (2011), Yozgat province ranked 65th in Turkey. According to TUIK's income distribution data for 2016 households, the upper income group for the Yozgat province has a share of 6.2%, the upper-middle income group is 10.6%, the middle income group is 14.8%, the lower-middle income group is 21.6% and the lower income group has a share of 46.8%.

In the scope of the research, for a clear distinction, upper middle, middle and lower middle income levels are combined as "middle income" (Graphic 1). The spatial distribution of this income groups is shown in Figure 4.



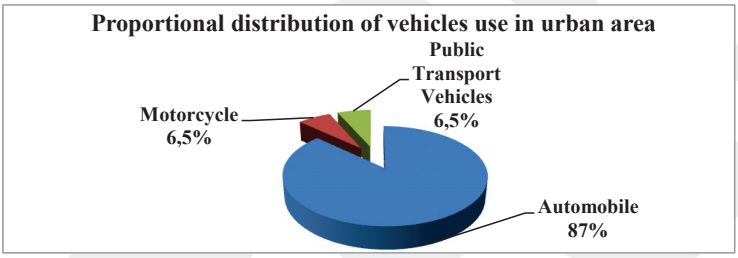
Graphic 1. Distribution of income levels in Yozgat urban centre (Retrieved and processed from TUIK, 2016)

Figure 4. The spatial distribution of income groups in Yozgat urban center settlement area (Retrieved and processed from Open Street Maps, 2018, Yozgat Municipality, 2018, TKGM, 2018)

According to the Socioeconomic Status Groups Analyse (SES) that have been frequently used recently, the upper income group formed by the sum of A and B groups in

Yozgat has a share of 13%, the middle income group formed by the sum of C1 and C2 groups has 51% share and the income group has a share of 37%. Although the data obtained are partly based on the provincial and regional scale, they contain consistency in terms of obtaining information on the socio-economic profile and user groups.

In terms of ownership of vehicles in Yozgat, it is determined that according to TUIK 2016 data, there is 93 vehicles per 1000 persons, according to Yozgat Provincial Police Department data, there is 104.000 vehicles registered to traffic and 46% of them are cars, 45% of them are agricultural and construction machinery, 3% of them are motorcycles and 3% of them are public transport vehicles. 87% of the vehicles that use urban areas are automobiles, 6.5% of motorcycles and 6.5% of public transport vehicles.



Graphic 2. Distribution of vehicles use in urban area (Retrieved from EGM, 2018)

In Yozgat, the lack of a mobility plan that includes areas reserved for parking for vehicles or bicycles in both urban centres and residential areas and that provide access to other urban structures, affects the quality of life negatively. The lack of policy in urban transportation facilitates spatial mobility of upper income groups but it causes low income groups that are located on the periphery of the city to not be involved in urban mobility. In addition, it has a negative impact on urban mobility by causing medium income groups to be exposed to traffic congestion.

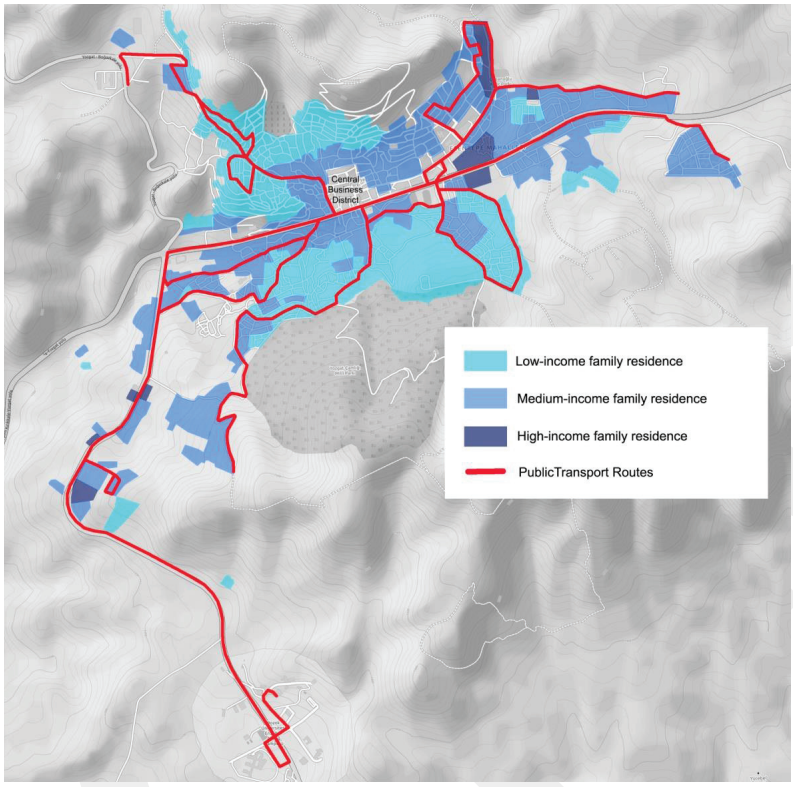


Figure 5. The spatial relationship between income groups and public transportation in urban center settlement area (Retrieved and processed from Open Street Maps, 2018, Yozgat Municipality, 2018)

Conclusion

When analyzing the movements of people in the city, it is observed that they are carried out in different conditions of time, comfort and safety. The main factors that interfere in their mobility are income, gender, age, occupation and educational level. The availability of using motorized transport strongly impacts mobility, but it can be considered as a factor associated with income. That is to say, there is a great difference between the displacements made by people of high or low income, related above all with the use of individual modes powered by high income people. Individual benefits and individual damages arise from all other residents who share the same city. This is particularly evident with the increase in car use.

Urban transportation systems in Yozgat urban center result in inefficient and efficient use of urban land due to the intensity of the traffic in motion and the lack of parking spaces. Especially the lack of transportation measures to provide security for disadvantaged groups leads to social injustice within the social system. Another important problem is that the suspension and parking prohibitions are not implemented seriously. Therefore, it is observed that external costs are not taken into account in transportation costs.

With a transport planning approach that takes into account the negative effects of mobility types on the urban area, less polluting or risky modes of transport can be developed and positive effects of changes in mobility conditions can be seen.

With this more fair approach, societally more equitable and environment-friendly mobility conditions and environments can be established.

References

Deniz et al. (2015). Determining socio-economic status variables through cluster analysis, Elementary Education Online, 14(1), 108-117

Harvey, D. (1996). Justice, Nature and the geography of difference, Blackwell, UK.

Newman P.W.G y Kenworthy, (1999). Sustainability and cities-overcoming automobile dependence, Island Press, Washington, D.C.

Property status application (14.07.2018). Retrieved from: https://parselsorgu.tkgm.gov.tr/

Royuela, V. And Vargas, M. (2010). Residential segregation: A literature review, Working Papers 7, Facultad de Economía y Empresa, Universidad Diego Portales, 19-21

Satellite photos (9.19.2006). Retrieved from: https://earth.google.com/web/

Satellite photos (23.07.2018). Retrieved from: https://www.openstreetmap.org/#map=15/39.7801/34.8307&layers=C

Tolley, R. and Turton, B. (1995). Transport systems, policy and planning, a geographical approach. Longman, UK.

Turkey Statistical Institution. (2016). Income and Living Conditions Survey. Retrieved from: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=24579

Turkey Statistical Institution. (2017). Province populations by years. Retrieved from: www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=1590

Turkey Statistical Institution. (2013). Yozgat with selected indicators. Retrieved from: http://www.tuik.gov.tr/ilGostergeleri/iller/YOZGAT.pdf

Turkey Statistical Institution. (2014). Gross Domestic Product by Provinces, 2004-2014. Retrieved from: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=24920

Yozgat municipality construction directorate. (2016). Construction master plan research report. Retrieved from: Yozgat municipality construction service.

Yozgat municipality transportation services directorate. (2018). Transportation master plan pre-research report. Retrieved from: Yozgat municipality transportation services.

Yozgat police headquarters traffic registration branch directorate.(2018). Number of annual registered vehicles. Retrieved from: Traffic registration branch directorate.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Remote sensing and sustainability. Case studies in Campania

Alessandra Avella[1*], Pasquale Argenziano[1], Nicola Pisacane[1]

[1]*Department of Architecture and Industrial Design, Università della Campania Luigi Vanvitelli, Aversa, Italy, e-mail alessandra.avella@unicampania.it, pasquale.argenziano@unicampania.it, nicola.pisacane@unicampania.it*

Abstract: The paper intends to show a graphic investigations of some areas of Ager Campanus in Campania Region, affected by a notable anthropization compared with other areas that retain natural characteristics. The comparison is developed through diachronic interrogations of satellite data being remotely sensed and represented with traditional and innovative media. Among satellite free-sharing data, the authors select some multispectral ones that record the electromagnetic response of the elements in the landscape (vegetation, rocks, anthropic features) in the segments "invisible" to the human eye.
Maps and aerial images, complement the multispectral satellite data and widen the investigative gaze beyond the limit of the 'visible'. Open satellite data, freely available on the web, are new tools for investigating the territory in the fields of planning and architectural design.

Keywords: satellite remote sensing, open data, multispectral data, GIS.

Introduction

The vocation of the Campania territory was originally agricultural, then has become intensely urbanised and industrialised. Starting from the seventies of the last century, this anthropic transformation has been recorded by satellite remote sensing platforms, designed by USA institutions to monitorate and investigate environmental phenomenon, masking intelligence activities during the so-called Cold War.

The real innovation of the digital applied to the Earth remote sensing are the "cube data", that is the "deep" models produced by the satellite platforms comparable to the geometric and electromagnetic information archives characteristic of the scanned territory. The maps that can be obtained are selective representations of specific information contained in the given cube or numerical elaborations made on the basis of raw satellite data.

This paper proposes some graphic analyses of the Campania territory from multispectral satellite data, a technology able to highlight the green areas in the densest built up areas, and also allows to evaluate the state of health of the highlighted vegetation.

The case studies, all in Caserta District, of sand quarries, 'Lago Piatto' area and coastline refer respectively to the above mentioned conditions of a denied sustainability of anthropogenic and natural transformation of landscape.

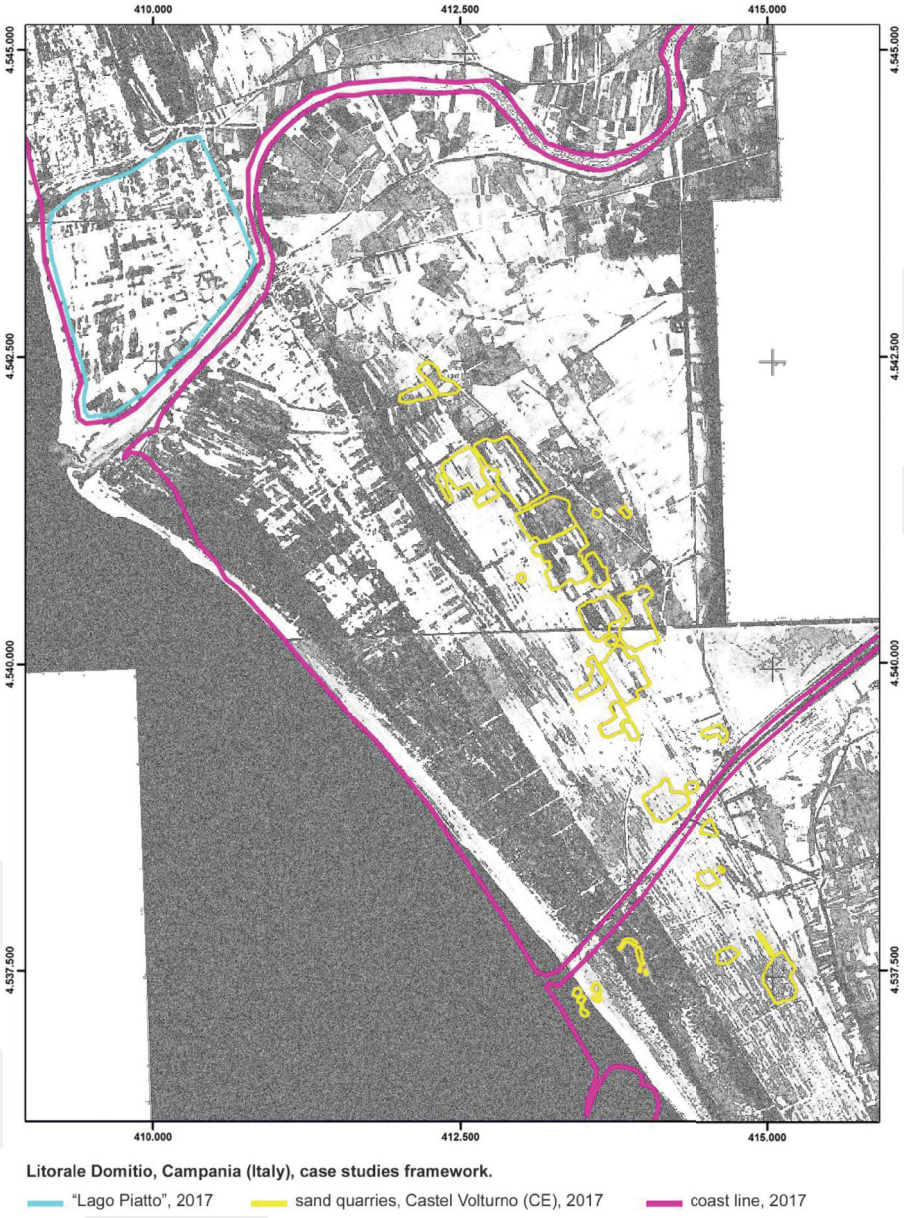


Figure 1. A comparison among the vector digital processing of the archive airborne images (1957) and the boundaries of coastline, sand quarries and 'Lago Piatto' area. In the last sixty years, the unsustainable use of the territory has produced evident transformations, hardly reversible.

Methods

The paper introduces a research based on the integration of digitised historical cartography, aerial photography, vector layers and satellite imagery in a GIS (Geographic Information System) environment. GISs are an efficient mean to compare, integrate, analyse and manage complex landscape data. With the aim of promoting an open science initiative, our analyses were performed on open source platforms. Georeferred maps and aerial images are complemented by open multispectral high resolution satellite scans of the landscape.
The analysis of the electromagnetic response of the landscape in ranges "invisible" to the human eye allowed qualitative and quantitative considerations and richer critical evaluations on the transformation of the natural landscape.

Multi-temporal satellite data used in this research were retrieved from online international sources of environmental data collected for EU and USA programmes.

Earth Observation satellites record a volume of georeferenced data, the data-cube, whose height has a resolution corresponding to the spectral characteristics of the sensor and the intensity of the recorder radiation, encoded as digital numbers, may have a corresponded monochromatic or tri-chromatic representation, in true colour, false colour or pseudo-3D.

In particular, the false colour representation of the landscape is more relevant to this research where the presence of water in soils is more easily detected. The selective processing of the "cube data" in relation to specific algorithms corresponds directly to thematic representations in which monochromatic or trichromatic tones give a false image of reality because it relates to the component invisible to the human eye and therefore difficult to interpret without the corresponding dimensional / chromatic scales and the vectorization of homologous data.

Findings and Discussion

Among the many cases of intense anthropization in Campania and especially in the Caserta district, the authors selected three emblematic cases.

'Lago Piatto' area (Nicola Pisacane)

The coastal area is low, sandy and rarely pebbly, towards the interior it has several orders of dune, generally anthropized, followed by vast swampy areas. The pinewood and the Mediterranean vegetation, that were planted in the depressions in the dunes, are today almost completely disappeared for the indiscriminate building starting from the 70s of the twentieth century. The example of the settlement in the area known as 'Lago Piatto' in Castel Volturno

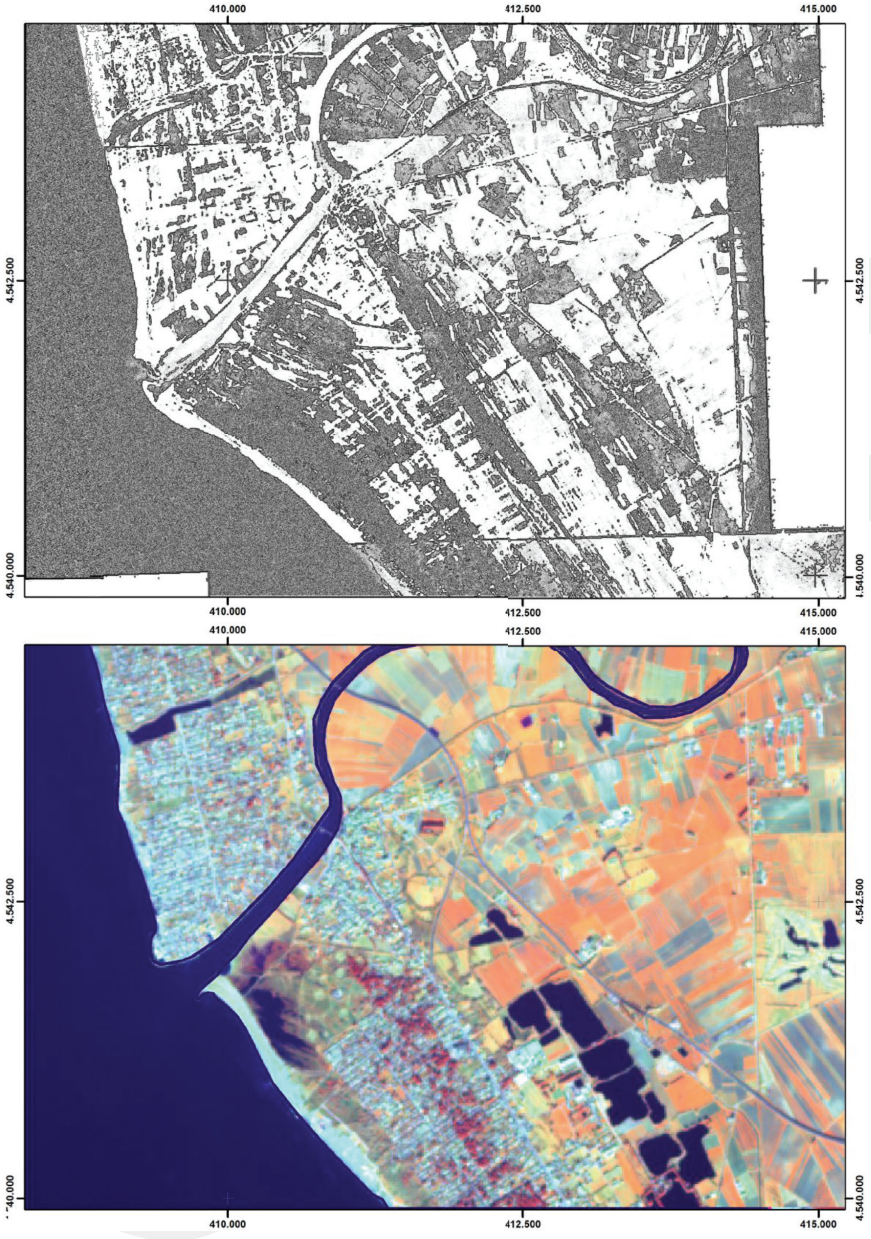


Figure 2. Litorale domitio and Volturno River mouth, Campania (Italy). Thanks to GIS multilayer comparison, it's possible to evaluate the territorial transformations occurred from 1957 to 2018. The multispectral satellite image (2018) highlights the edification (cyan), the vegetation (red or orange), the raw soil (yellow), and the water (dark blue). In the 1957, the area was characterised by sand and the Mediterranean scrub.

Municipality is significant. This area id just in the north of Volturno river and is characterized by the presence of low-value construction settlement born without a plan and through the construction of buildings mainly abusive, made with shoddy construction techniques and materials with lack of any basic services and infrastructure that would ensure quality housing. The census data have point out more of 4000 building in an area of around 200 hectares not divided into lots and with total absence of commercial facilities and transportation services in support of a high-density housing development. The few commercial activities are placed at the ground floors of the residences on the main road, parallel to the coastline, crossing the entire area. Residential presence are above all isolated houses of two floors, surrounded with an open area used as a garden. The state of preservation and maintenance is largely poor, due also to constructions made of low quality materials and technologies and to widespread state of neglect and decay.

Thanks to GIS multilayer managing, a comparison among the archive airborne images and satellite ones is possible. As the pictures show, in 1957 the area was characterised by sand and the Mediterranean scrub, and in 2018 the multispectral Sentinel-2A image highlights a lot of cyan pixel into the ‘lago piatto’ area. These pixel represents the buildings made since 1970; the red/orange pixel are spread among the building, but a large vegetation area is still at south of Volturno river mouth. This strong anthropogenic transformation was realized in few years in an area of high environmental value. The value of the site still shows even if hidden by intensive construction activity and the abuse that undermines every piece of land in an area of high environmental value and hydrogeological risk: the line of sea coast, the bend of Volturno river and the areas close to lake. Human action is realized in contrast to any prescription and any environmental constraints and urban security.

Sand quarries (Pasquale Argenziano)

The extraction activities of the sand quarries spread along the coast between the mouth of the river Volturno and Lago Patria extend into a fragment of ‘Litorale Domitio’ territory particularly interesting for a diachronic analysis of the coastline and its hinterland.

The 'false color' classifications of satellite data due to the absorption of damp surfaces clearly show all the watercourses, among which the sand quarries of Castel Volturno stand out for which it was possible to trace their boundary and evaluate the area evolution for the observation period. The semi-automatic vectorialization of the water area in GIS for each annual datum allows a stunning qualitative and quantitative evaluation of the phenomenon: in

a quadrangular area of about 30 sqkm, in 1957 it is possible to recognize four stretches of water for an extension of about 70000 sqm, after thirty years the ponds multiply by an area of about 1 sqkm and, after sixty years from the first observation, they are more than tenfold for a surface about 1.35 sqkm. This phenomenon of looting of the territory is evidently connected to the immoderate and unregulated urbanization of the 'Litorale Domitio' area and of many cities in Caserta district. The ponds are the result of the extraction of sand for the production of concrete; marine sand evidently not suitable for building production but used equally thanks to more or less suitable washes to lower the salt content.

The excavations of these quarries have touched the water table and by capillarity the sea water has completely filled the excavated volume, so much that already in the first satellite acquisitions in the repertoire the electromagnetic absorption do not allow evaluation about the depth due to the turbidity of the water.

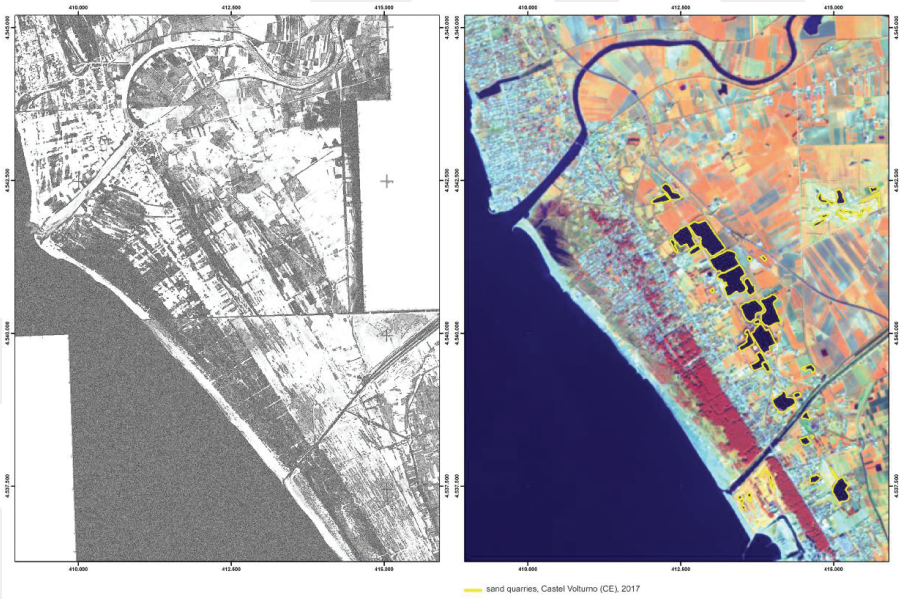


Figure 3. Litorale domitio and Volturno River mouth, Campania (Italy). The multispectral Sentinel-2A image shows the 20 slam lakes grow up in the sand quarries; this good quality sand has been used for structural concrete of the coastal building and not only.

Coastline (Alessandra Avella)

The case study area has a margin, in correspondence of the sea, from the very variable course due to the presence of the cusp of the Volturno river as well as the coastal volcanic presences

of the Campi Flegrei and Somma Vesuvio. The superficial hydrography of the site is a direct branch (tributary or effluent) of the Volturno river and the 'Regi Lagni'. While the first is the most important stream of Southern Italy, the second corresponds to the most recent settlement of Clanio river by Borbone dinasty, which from the sources of the Monti Avella cut the Ager Campanus with a mostly unstable path up to the natural confluence in the basin, today called Lago di Patria, formed as a result of the damming of the coastal cord dunes.

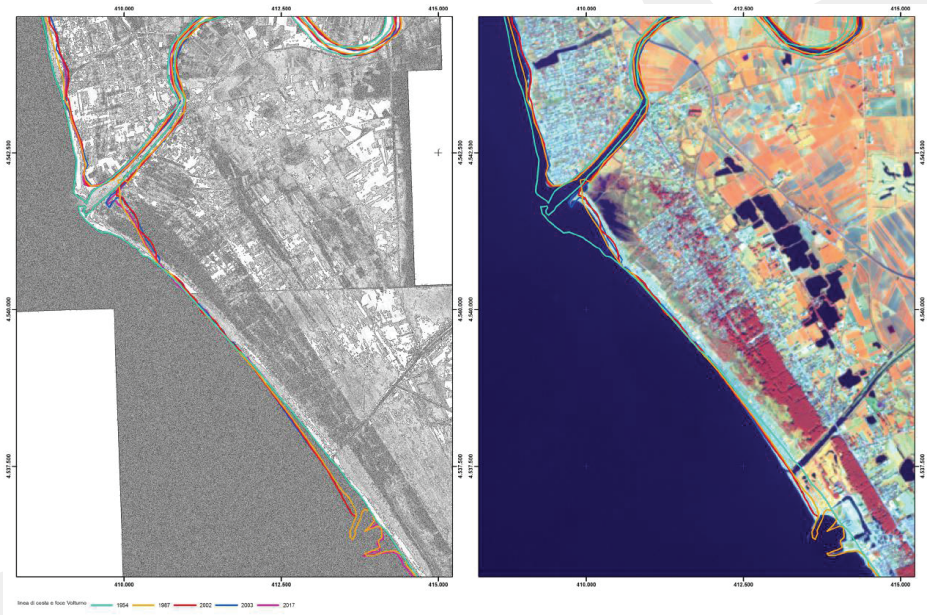


Figure 4. Litorale domitio and Volturno River mouth, Campania (Italy). The vector drawing of the coastline in the last sixty years shows the results of the unsustainable exploitation of the territory. The retreat of the river mouth is the most evident sign. The construction of the small port of 'Villaggio Coppola', below, is an hard sign of the building speculation.

The coastal dune is another area characterizing the natural environment of 'Domitio' landscape and in particular the case study area. The main dunes are located near the waterways and near the mouth of the Garigliano, Volturno and Lago di Patria. In addition, in the short stretch of coast analyzed for about 15 km, there are 'SIC' ("sito di interesse comunitario", Site of Community Importance) and 'ZPS' ("zone di protezione speciale", special protection areas), as well as Nature Reserves and WWF Oasis, such as the swamp Coast of 'Variconi' at the mouth of the Volturno river, the 'Castel Volturno' oasis, the Nature Reserve 'Foce Volturno', 'Lago di Patria' SIC area.

The diachronic analysis and comparison of aerial and satellite images with the cartographic archives allow to reconstruct the modifications of the coastline. The satellite data acquired in the electromagnetic segment reflected from the 'visible' to the 'near infrared' - in scales 1:25000 and 1:50000 - refer to the time period 1987-2017 and appropriately selected in continuity with the IGM photographic repertoire. Continuing the analysis through the last data, the following modifications of the coastline are recorded: at the mouth of the Volturno, between 1954 and 1987 the retreat of the shoreline of about 600 linear meters was measured with a total loss of about 600000 sqm of sandy shore, still in place in the 1994 image; also in 1987 the coastal area between the mouth of 'Regi Lagni' and the 'Villaggio Coppola' settlement advanced about 300 meters for a total of 435000 sqm. The coastal protection infrastructures in operation in 2005, already in 2007, appear to be obviously damaged as a result of storms, showing their total inadequacy in terms of planning and construction.

Conclusion

The proposed graphical analyses are the synthesis of multi-thematic and diachronic queries of the remote sensed and represented data, with traditional and innovative media, which are managed in the geo-data-base open source structured ad hoc, referring to the most significant publications concerning the topic and to the geographical databases of national and international Institutes. The integrated analysis of such heterogeneous data allows, even on the territorial scale, qualitative and quantitative analyses of the landscape that would otherwise be lacking if they were only interested in tangible dimensions.

References

Avella, A. (2017). *Disegnare in continuo. Ambiente/Città/Architettura/Oggetto Continuum representation. Environment/Town/Architecture/Object*. Napoli: La Scuola di Pitagora.

Dent, B., Torguson, J., Hodler Thomas W. (2008). *Cartography: Thematic Map Design*, McGraw-Hill Education.

Knowles, Anne K. (ed.) (2002). *Past Time, Past Place: GIS for History*. ESRI Press.

Lillesand, T., Kiefer, Ralph W., Chipman J. (2015). *Remote Sensing and Image Interpretation*. John Wiley & Sons.

Longley, Paul A., Goodchild, Michael F., Maguire, David J., Rhind, David W. (2015). *Geographic Information Systems & Science*, John Wiley & Sons Inc.

Pisacane, N (2012). *Knowledge and representation for landscape re-design: the area of Lago Piatto in Castel Volturno.* In Gambardella, C. *Le Vie dei Mercanti. Less/More. Architecture, Design, Landscape.* Napoli: La Scuola di Pitagora.

von Lünen, A., Travis, C. (eds.) (2013). *History and GIS. Epistemologies, Considerations and Reflections.* Springer.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Bibliographic Evaluation of the Concept of Sustainability in the Postgraduate Theses of Architecture in Turkey

Özlem Aydın[1]

[1]*KTU Architecture Faculty, Department of Architecture*

Abstract: At the universities, both theoretical and practical information obtained as a result of scientific activities are systematized and made available to people. The diversity of these scientific activities with graduate and doctoral programs that provide vocational specialization in universities after graduation is increasing day by day. The contents of these programs vary according to the needs of the technological developments of the day. In this context, attention is increasingly drawn to the disciplinary and interdisciplinary platform with increasing interest in concepts such as environmental awareness, solutions to environmental problems and sustainability.

When the prominence of the concept of sustainability in the world and in our country is taken into consideration; academic research has been carried out in this area. In this study, data on the concept of sustainability was searched in the graduate thesis which was made in the department of architecture in the universities between 1996-2017 in Turkey. It is aimed to create a resource to emphasize the importance of sustainability concept in the field of architecture. In the study, the 228 graduate thesis year which has been made in the field of architecture branch of the YÖK Thesis system was examined and analyzed in terms of bibliometric characteristics such as year and university, key words, index.

Keywords: Bibliography; Sustainability; Post-Graduate Education; Thesis; Architecture

Introduction

Since the 1970s, when the concept of sustainability has become increasingly important, many inhabitants have been reorganizing, changing, and improving their approaches to economic growth, social development and environmental protection in line with the changing worldview that accompanies this concept (Adams, 2006). Today, the concept of sustainability is increasingly important. A lot of work is being done in each area to increase social awareness about sustainability. The changes to be made in this area in the discipline of architecture have been mentioned in the Charter for Architectural Education prepared by the International Union of Architects (UIA) and United Nations Educational Science and Culture Organization (UNESCO) in 1996. In this context, it is very important that the concept of sustainability is firstly applied to design action by taking economic, environmental and social aspects in architectural education and practice.

The role of higher education in creating a more environmentally sustainable future is irrefutable. In this context, different approaches to introducing sustainability into an architectural program are proposed and examined. In recent years, sustainability permeates the

curriculum to fully integrate into each subject. It must be taken into account that sustainability is assumed to be a global responsibility in architectural education and practice. Thus, it is inevitable to take place in practice in academic studies. The subject and methods of these academic studies vary from year to year depending on the developments in disasters, science and technology, which are experiencing changing living conditions. In the article, Kural discusses the concept of sustainability in architectural education; what is the level of sustainability, what is taught in this topic, and what the concept of sustainability is part of education in universities, especially in the architecture departments of our country and in the world (Kural).

Methods

Theses that can be regarded as the most important output of the graduate education period contribute to the development of the literature and its application areas from the side of the authors who are influential in choosing the future academic study fields of the authors from the standpoint of the subjects they deal with. As well as the number of theses prepared in a specific discipline, the diversity of the topics covered in theses is also important. The number of thesis can give an idea about the amount of scientific knowledge produced by theses prepared in that area, while the diversity of theses can give an idea about the scope of scientific information produced (Tekin, 2016).

In this study, an architectural thesis in the department are related to the concept of sustainability in Turkey were examined. The reason for focusing on the thesis that the concept of sustainability is particularly relevant in the research; is a movement of discipline and interdisciplinary of sustainability with the growing interest in the world and our country. The most important aim of the study was to contribute to architectural education by bringing in different views on the works to be done and compiling literature information by conducting bibliometric analysis of the theses studied in this respect. Bibliometry deals with the examination of various elements of academic publications (author, subject, year, number of pages, citations etc.) with the help of numerical analysis and statistics (Yozgat, Kartaltepe 2009).

The material of the study is the master theses of the department of architecture, which is completed in YÖK National Thesis Center and completed in 1996-2017 and opened in the

YÖK Thesis system. In the research, screening and content analysis method and sharing made in architecture branch are open 228 online graduate thesis online through YÖK National Thesis Center. The theses determined were obtained from the author, advisor, publication year, publication language, number of pages, method, purpose, subject, index, keyword information system. In the light of this data, the concept of sustainability; the subject of the theses was taken into consideration. According to this, bibliometric analysis of the theses examined under the title of university, year, index and key words were made. When evaluating the results obtained in the research; the concept of sustainability in architectural education is increasing day by day with the issues of architecture and environment (ecology, energy).

Findings and Discussion

In the research, 228 shared open theses on architectural master's course in architectural graduate education examined the years in which the concept of sustainability was addressed in which universities and how often. When the titles of the theses analyzed were examined, sustainability / sustainable words were used in the beginning of 117 theses.

When the theses are analyzed according to the years, especially after 2010, the concept of sustainability has been discussed and worked more in the theses made in the field of architecture graduate education. According to this, most of the work has been focused on this subject in 2010 (25), 2011, 2012 (27) and 2014 (31) (Figure 1).

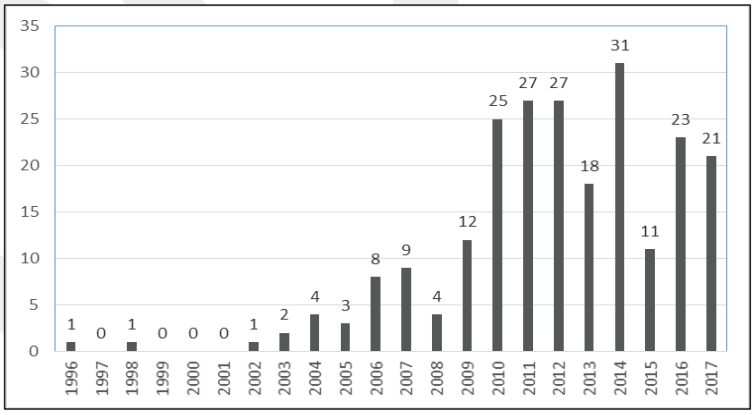


Figure 1. Study of the concept of sustainability according to years in theses.

Analyzing the concept of sustainability of universities according to subject, index, key words in the theses examined, it seems that this issue is taken up more in the graduate studies of ITU and Yıldız Technical University (Figure 2). Accordingly, 26% of the theses were made in ITU and 16% in Yıldız Technical University.

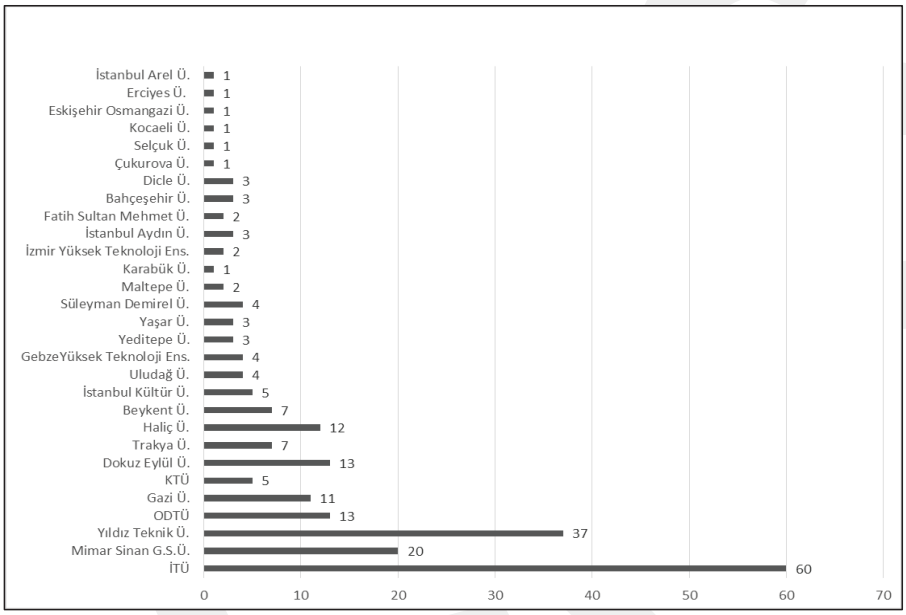


Figure 2. Universities where theses are made.

When the indexes and key words of the theses examined are analyzed; the most used word has been sustainability. However, sustainable architecture, sustainable architecture, sustainable building concepts have also become the most used concepts in the index and key words group. (Figure 3). Moreover, when the analysis of the words used in conjunction with the sustainability in the index and key words of the theses was done, it was seen that the words of environment, energy, ecology were used together.

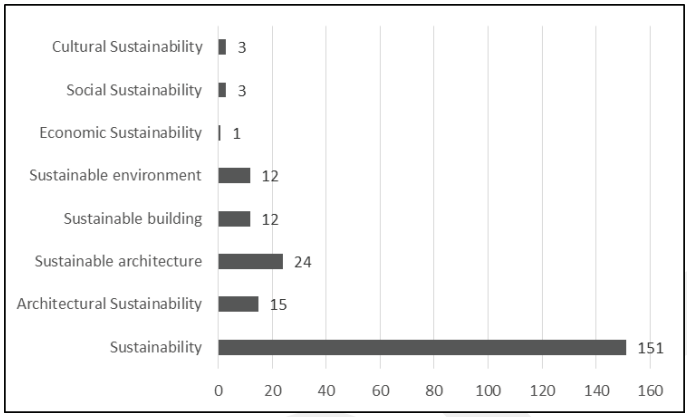


Figure 3. Sustainability concept and sustainable concepts in theses.

Conclusion

Sustainable development rhetoric of the last 20 years, though popular, is still a new issue for Turkey. 1996 The concept of sustainability, which sat on our social agenda in theory with the Habitat II-BM Human Settlements Conference in Istanbul, began to take its place among studies that were more focused on the academic field later in 2010. It is hoped that these academic studies in the field of sustainability will be a guide and take place in practice for relevant institutions and organizations. Sustainable economic development, social development and environmental protection can be achieved through the passing of dreams, academic work and management cooperation in order to create a sustainable lifestyle.

Conclusions should include the principles and generalisations obtained from the results, any exceptions to, or problems with these principles and generalisations, theoretical and/or practical implications of the work, and conclusions drawn and recommendations.

References

Adams, W. M. (2006). "The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century", Report of IUCN Renowned Thinkers Meeting.

Kural, İ., S., Sürdürülebilirlik Kavramı Çerçevesinde Mimarlık Eğitimine Eleştirisel Bir Bakış, from http://www.tsmd.org.tr/Eklenti/63,ilhankuralbildiripdf.pdf.

Tekin, Ö., A. (2016). The Focused Issues on Postgraduate Tourism Theses in Turkey: 1984-2015, International Journal of Alanya Faculty of Business, (vol.8, pp. 175-187).

Yozgat, U. ve Kartaltepe, N. (2009). "Ulusal Yönetim ve Organizasyon Kongre Kitaplarında Yer Alan Bildirilerin Bibliyometrik Profili: Örgüt Teorisi ve Örgütsel Davranış

Bildirileri Üzerine Bir Araştırma", Osmangazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 1, 149-165.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Analysis of Kızılcasar Village in terms of Vernacular Architecture

Filiz Bal Koçyiğit[1], Nazlı Nazende Yıldırım[2], Papatya Nur Dökmeci Yörükoğlu[3]

[1]*Department of Architecture, Atılım University, Ankara, Turkey, filiz.kocyigit@atili.edu.tr*
[2]*Department of Interior Architecture and Environmental Design, Atılım University, Ankara, Turkey, nazli.yildirim@atilim.edu.tr*
[3]*Department of Interior Architecture, Cankaya University, Ankara, Turkey, papatya@cankaya.edu.tr*

Abstract: In this study, the structure of the settlement areas in the historical texture and the measures that could be used in the history of using environmental energy and energy in the residential architecture in the most effective way were investigated and the effects of these measures on life style were examined both in urban and residential dimensions. The study was sampled in Kızılcaşar Village of İncek district in Ankara, which is located in the Central Anatolia Region, which has a hot and dry climate. This review showed that; local and historical urban and residential architecture, first of all, respect for each other, not only in cultural dimensions but also in environmental dimensions, which are crucial in such settlement areas. The interrelationships and paths between residential settlements in the village are formed within a certain respect in order to provide water and effective usage of the stream for all the residential units. At the same time in the settlement, relations between the houses, effective use of sunlight in the space during the summer and winter periods enables the use of heat and lighting energy in the most efficient way. Similarly, using air currents increases air quality. In this respect, it is important to ensure natural ventilation and coolness during hot weather and decrease air pollution during winter. Thereby, indoor air quality is improved in all seasons. In addition, in these residential structures, energy is provided for other requirements such as drying of laundries and protection of food from hot weather.

Keywords: Vernacular architecture; Kızılcasar Village; sustainability; energy efficiency; natural energy sources.

Introduction

All through history, while the traditional urban fabric was formed, residents of the era did not have direct access to artificial energy sources, so they designed their lifestyles and spaces to use the existing natural energy resources in the most efficient way. Since then, settlements have primarily developed on the edges of water and have been developed in such a way that sun and wind can be used in the most efficient manner. The basis of this approach lies in the detailed analysis of nature and environment. Adaptation of buildings to the natural environment due to climate change has grown rapidly (deWilde & Coley, 2012). For typical developed countries such as OECD countries, it has been determined that about 25-40% of greenhouse gas emissions are from human sources and 40-95% from building sources. It can be seen how contemporary architectural approaches away from nature may lead to negative consequences. This situation further reveals the importance of vernacular architect.

When the characteristics of vernacular architecture are reviewed; it is observed that the climatic and topographical characteristics, cultural and traditional data, structure, local building materials and the area determine the building form. Traditions respect the neighbours and the presence of trees, streams, and other elements of nature. The building system is plain and easy to understand. Instead of determining an aesthetic quality for each building, harmony with each other is observed; aesthetic quality is transmitted from generation to generation (Sezgin, 2006). It is possible to find examples of different vernacular architecture in each different region of Turkey (Figure 1). The most distinctive feature that creates these differences is the use of different materials due to climatic factors. Wood in the Black Sea, Marmara, Thrace, Inner Aegean and Inner Mediterranean Regions; masonry in Coastal Aegean, Central and Southeastern Anatolia; and sun dried brick building materials in Central and Eastern Anatolia are used.

Figure 1. The distribution of vernacular housing in Turkey (Sezgin, 1992).

Ankara Kızılcaşar Village is an ancient settlement located in a hot and dry region. The local architectural style of the village was examined and the effect of environmental energy sources on the settlement texture and structure design was analyzed. In this context, the relations between the houses of Kızılcaşar Village, and plan schemes are examined within the scope of city and housing. The accessibility of the stream passing near the village in all the dwellings was determined in the scheme plan that is studied (Figure 2). In addition, there are three fountains that all houses can access. Within these relations, it has been determined that there is a settlement texture that will enable each house to be directed so that they do not interfere with each other and do not block out sun and wind.

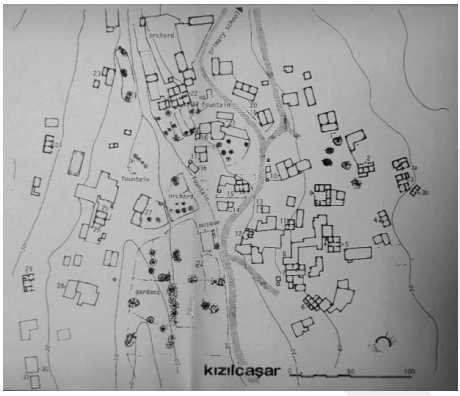


Figure 2. Site plan of Kızılcaşar Village (Turan & İmamoğlu, 1980)

Methods

In this case study on Kızılcaşar Village, it was aimed to make surveys with village residents and local authorities in order to determine the demographic changes. Through the findings of these surveys, it is aimed to investigate the effect of the types of housing used in the past and the quality of life of the residents that are changed after the construction of new residential units. At the same time, a bird's-eye view showing relations with the immediate surroundings of the settlement are taken and the relationship between the topographic structure of the village and the settlement texture are analysed with these images. The comparative analyses of these images are done with the building surveys at plan and section level. Thus, the riverbeds, horizontal and vertical slopes in the surrounding are determined and the relation of sun, wind and landscape of urban texture are evaluated. As a result of the environmental analysis, plan charts are drawn based on occupancy gap, closure and openness and entrance directions, taking into account the relations between different types of residential units. These schemes and the relationship of the researched building types reveal how much each house benefits from the sun and the wind. At this stage, regional and local data of meteorology are used as well. Wind direction and flow velocity are determined considering the topographical structure of the land and it is evaluated on the basis of each unit and in relation with the region. Especially the effects of sun and wind on the interior design of the residence in kitchen, sleeping spaces and living areas are evaluated.

Findings and Discussion

As can be seen in the preliminary analyses, the sloping terraced houses are positioned astonishingly well in such a way that they would not interfere with each other`s sunlight or block each other`s scenery (Figure 3). On the edge of the water there is a historical mosque in the centre of the village where all village residents can reach. In addition, there are three fountains in the reach of all village residents.

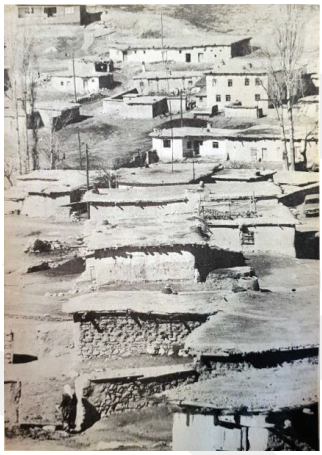


Figure 3. View from the Village (Turan & İmamoğlu, 1980)

Local urban textures resemble the creation of new families from growing children of one or two families, such as the growth of a flower on the water's edge. They respect each other's lives. In this context, these family structures, whose lives are directly related to environmental data, show this effect in the location and orientation choices of housing and typologies (Figure 4).

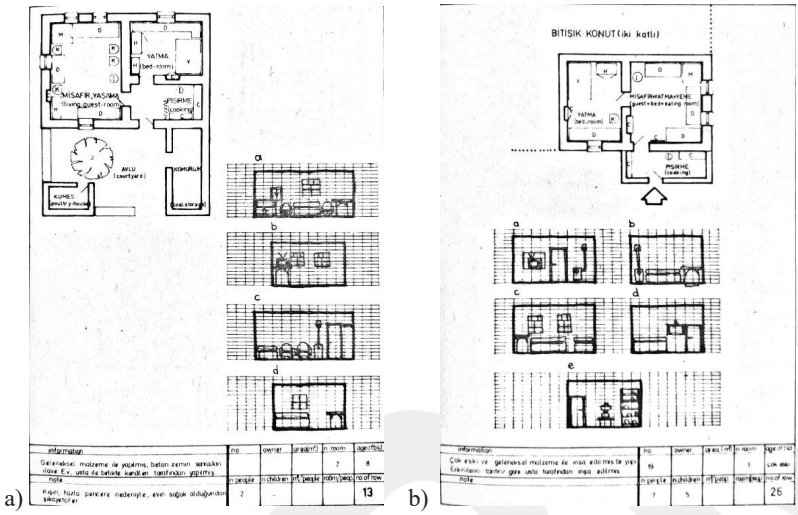


Figure 4. a) House plan, b) adjacent house plan (Turan & İmamoğlu, 1980)

Urban and residential buildings that will be inspired by natural life in today's city and building plans form the basis of the architectural approach that can protect sustainable energy resources. Throughout history in vernacular architecture, eco-friendly methods that respect nature are used, and it should be promoted and improved to allow new developments in our contemporary building innovations to reduce energy consumption and increase the use of natural resources.

It is aimed to create preliminary information about the most efficient use of energy in a certain region with the data obtained at the end of the studies done on the example of Kızılcaşar Village. With the help of this data, an infrastructure can be created on how to design a settlement texture in an energy efficient way.

Conclusion

Within the scope of this study on Kızılcaşar Village which is a vernacular architectural example in urban and residential dimension, it is seen that the effective use of environmental data in terms of sustainable architectural approaches are used. As can be seen in Figure 2, which shows the Kızılcaşar village plan, urban texture is primarily based on the location of the water, and Figure 3 shows that the settlement is a respectful neighbourhood settlement that maintains the sun and the view angle vertically. The study also shows that the light-shadow relationships inside and outside the houses are constructed with the same sensitivity due to the

sunrise angle of the certain periods during the year (Figure 4). Findings show that many of the historical and vernacular architecture as well as the Kızılcaşar Village example of human needs in accordance with the environment established a strong connection with the environment. In this respect, Kızılcaşar Village is a good example in terms of vernacular architecture. As can be seen in Figure 1, different regional urban textures are observed in different regions of Turkey depending on their climate and topographical characteristics, and it is important that this rich regional structure and urban texture are investigated and documented.

References

Butera, Federico & Aste, Niccolò & Adhikari, R. (2015). Sustainable Building Design for Tropical Climates. Nairobi, Kenya: UN-Habitat

deWilde, P. & D. Coley. (2012). The Implications of a Changing Climate for Buildings (Editorial article). *Building and Environment*, 55, 1-7.

Sezgin, H.(1992). Architecture Traditionnelle Des Balkans-Turquie. Atina: Editions Melissa, ISBN 960-204-008-4.

Sezgin, H. (2006). Yöresel Konut Mimarisi ve Türkiye'deki Örnekleri Hakkında. *Tasarım Kuram*, 4, 1-20.

Turan, M. & İmamoğlu, V. (1980). *Kızılcaşar, a Study in Observation.* Ankara, Turkey: M.E.T.U. Faculty of Architecture Occasional Papers

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Dimensions of War Destruction in the City of Benghazi

Abdelhamed Barani[1*], Zerrin Ezgi Kahraman[2]

[1]*Civil Engineering, Tobrouk University, Tobrouk, Libya, aadam@ags-group.com*
[2] *City and Regional Planning, Çankaya University, Ankara, Turkey, ekahraman@cankaya.edu.tr*

Abstract: Wars recently broken out inside cities (Glaeser & Shapiro, 2002) results in multi-dimensional destructions in cities (Collier, 1999; Collier & Sambanis, 2005; Grünewald, 2016; Hills, 2004). This study aims to examine dimensions of damages in Benghazi, Libya, caused by the civil war occurred between 2011-2017. The study demonstrates that the war has brought about economic, demographic, socio-cultural, spatial and environmental destruction in the city. The war has led to economic recession in the city including collapse of business districts, lack of liquidity and decrease in living standards. Many historic and iconic buildings and educational institutions representing the socio-cultural accumulation of the city were destroyed. Additionally, the provision of health services has reduced. The citizens of the city escaping from war migrated to the periphery or other cities. Therefore, the internal migration rate has increased sharply. This fact triggering urban sprawl has threatened the environmental resources of the city.

Keywords: civil war; destruction; urban sprawl; Benghazi.

Introduction

Wars bring instability and insecurity to cities. They not only influence the demographic, economic, social, environmental structure of the city but also threat the urban macroform (Grünewald, 2016; Hills, 2004). It has similarly experienced in Benghazi, Libya which has suffered from civil war for seven years. In parallel to the need of filling this gap in the literature on how war has influenced the city, this study aims to examine dimensions of the destruction of war in Benghazi. The following sections discuss the method and findings of the study displaying multi-dimensional framework of the destruction.

Method

The methodological framework of the study includes both a literature view on dimensions of war destruction and a case study in Benghazi. In the light of dimensions revealed in the literature, this study attempts to synthesize master plans, satellite images, and national/international reports and other documents on Benghazi each of which focuses on different aspects of the city and/or consequences of war. The change in economic, social and demographic dimensions were examined through pre and post-war reports and documents. Satellite images were detect urban sprawl development zones and their penetration into the green belt and agricultural areas. By this way, the study intends to fill the gap in the literature

which is lack of comprehensive analysis on effects of civil war in the city, and how it makes cities more vulnerable and unsustainable.

Findings and Discussion

This study discusses the magnitude of the destruction of civil war in Benghazi under demographic, economic, socio-cultural, spatial and environmental dimensions.

Demographic Destruction

Wars result in two major demographic changes in cities. First, they increase the mortality rate, and may influence the fertility and natural growth rate in the city (Coale, 1989; Webb, 1963). Second, they may lead to the movement of population from instable and unsecure areas to the safer regions (Muggah, 2012; Albuja & Ceballos, 2010; Marion & Maurice, 2010;).

The mortality rate in Benghazi increase due to the war. For ages between 17-46, the rate increased from 6.4 to 9 per 1000 between 2005-2016 (Daw, El-Bouzedi, & Dau, 2016; Hewitt, 2017; Koenig, 2017). Additionally, because of the uprising against the Gaddafi regime in 2011 and the subsequent conflicts and wars, about 40% of the residents living in the center of conflicts moved to other parts of the city such as Bu Atni, Sidi Khalifa, Al Kwefiya, and Al Hawari, and a few of them moved to neighbouring cities such as Al Marj, Al Bayda, Tobrouk Ejdabia (UNCHR, 2017) (see Figure 1).

Economic Destruction

Wars negatively influence the economic structure of cities in accordance to growth, production, consumption and distribution (Collier & Hoeffler, 2002; Collier & Sambanis, 2005). In the Benghazi case, many of the factories and commercial areas in the city center were destroyed. Banks' liquidity has been severely curtailed. The increase in prices, the decline in purchasing power, the devaluation of local currency against foreign currencies have led to recession in the city. Almost all economic activities, especially oil production which is the mainstay of the Libyan economy, have witnessed a sharp decline after the uprising in 2011. Although there was some recovery in 2012 when the war ended, production soon declined during civil war initiated in 2014 (M. Khan & Mezran, 2013). Average consumer prices rose by 16 % in 2011. The inflation rate which was about 30 % in the end of the year

jumped to 80% in 2016. The budget shifted from continuous surpluses to a deficit of 19% of GDP in same year. The external current account surplus fell to 9.1 % of GDP which was 25 % per annum in the previous decade (Pedde, 2017). The economic structure still remains volatile owing to political instabilities in the country.

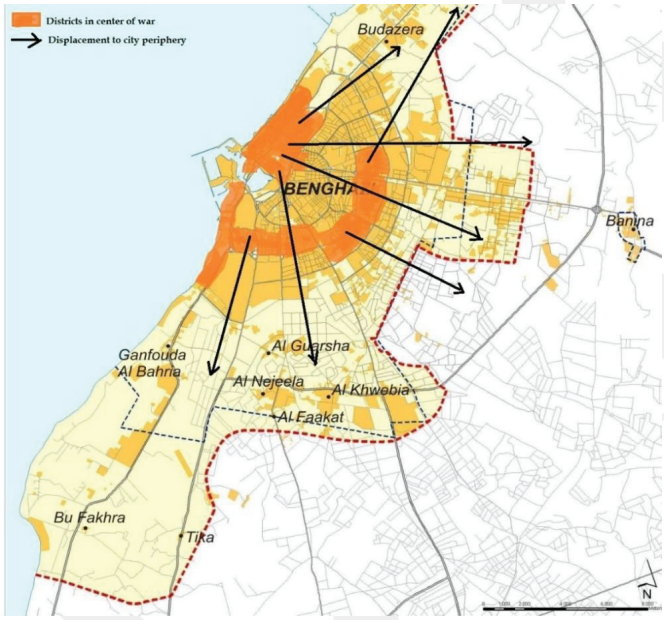


Figure 1. Displacement direction between 2011-201 (Adopted from BSRR, 2009)

Economic Destruction

Wars negatively influence the economic structure of cities in accordance to growth, production, consumption and distribution (Collier & Hoeffler, 2002; Collier & Sambanis, 2005). In the Benghazi case, many of the factories and commercial areas in the city center were destroyed. Banks' liquidity has been severely curtailed. The increase in prices, the decline in purchasing power, the devaluation of local currency against foreign currencies have led to recession in the city. Almost all economic activities, especially oil production which is the mainstay of the Libyan economy, have witnessed a sharp decline after the uprising in 2011. Although there was some recovery in 2012 when the war ended, production soon declined during civil war initiated in 2014 (M. Khan & Mezran, 2013). Average consumer

prices rose by 16 % in 2011. The inflation rate which was about 30 % in the end of the year jumped to 80% in 2016. The budget shifted from continuous surpluses to a deficit of 19% of GDP in same year. The external current account surplus fell to 9.1 % of GDP which was 25 % per annum in the previous decade (Pedde, 2017). The economic structure still remains volatile owing to political instabilities in the country.

Socio-cultural Destruction

Wars lead to devastation in the socio-cultural structure (Khan, 2013) as a result of various problem including unemployment, poverty, epidemics, weakened sense of community, and damage in infrastructure and building stock (Baddeley, 2011; Barth, Li, McCarthy, Phumiwasana, & Yago, 2006; Rotberg, 2005). Similarly, unemployment and poverty rates increased in Benghazi after the destruction and shutdown of city's major commercial and industrial businesses. The city's infrastructure was severely damaged after many of the roads, electricity, water and communications networks were destroyed. Many residential, historic and iconic buildings in the most densely populated neighbourhoods were also destroyed.

Spatial and Environmental Destruction

Wars create pressure on urban structure (Sampaio, 2016) and development (Glaeser & Shapiro, 2002). They may increase urban sprawl towards the periphery of cities (Grünewald, 2016). In Benghazi, the political instability since 2011 and the civil war since 2014 has changed urban structure and caused many problems. The destruction of residential neighbourhoods inside the city forced a large number of inhabitants to move to the suburban areas, towards the green belt (Dericioglu, 2018). Therefore, the city has spreaded to the outskirts of the planned areas, along the main roads (e.g. Banina Road) (see Figures 2). This uncontrolled development has threatened natural resources and the limited agricultural lands around the city.

Satellite images show the amount and severeness of urban sprawl after 2011. This confirms that the main reason of the uncontrolled urban sprawl is the war and the absence of government policy. Urban sprawl has threatened the natural environment and sustainability in Benghazi that provide agricultural products, air replenishment by absorbing carbon dioxide and reducing toxic emissions, and that makes Benghazi more vulnerable and unsustainable.

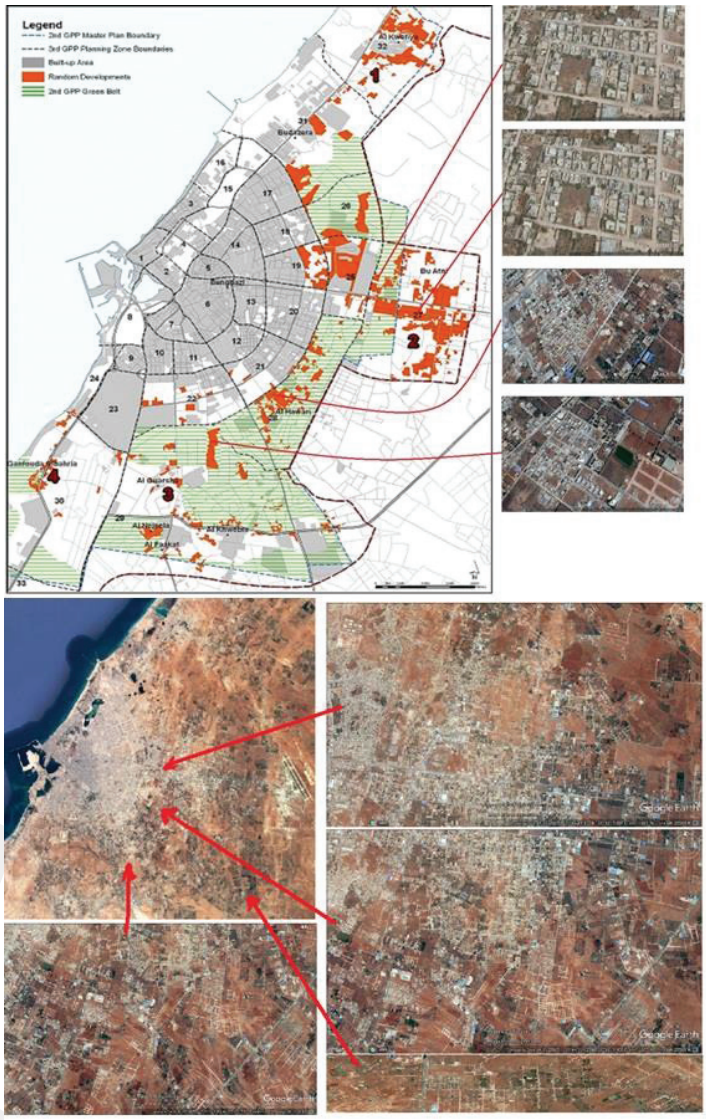


Figure 2. Random Housing Developments in the Benghazi Metropolis (Adopted from 2018 Google satellite images)

Conclusion

As consistent with the literature, the findings of the study displayed multi-dimensional destruction of civil war in Benghazi each of which has stimulated another. First, the war has influenced the demographic structure of the city due to increase in mortality and migration rates. Second, the war has led to decrease in GDP, increase in unemployment, devaluation of local currency against foreign currencies and insufficiency in banks' liquidity. Third, the city has witnessed socio-cultural destruction including increase in the demolition of historic buildings, the decrease in quality and provision of basic urban services, social discontent, and poverty. Fourth, the war has not only resulted in physical destruction in the city center and residential neighbourhoods, but also triggered uncontrolled urban sprawl towards the green belt and arable areas. Finally, the pressure on the natural environment has threatened environmental resources providing nourishment, fresh air and recreation to the city, and the city environmental sustainability.

References

Albuja, S., & Ceballos, M. (2010). Urban displacement and migration in Colombia. *Forced Migration Review*(34), 10.

Baddeley, M. (2011). Civil War and Human Development: Impacts of Finance and Financial Infrastructure.

Barth, J., Li, T., McCarthy, D., Phumiwasana, T., & Yago, G. (2006). Economic impacts of global terrorism: from Munich to Bali.

Collier, P. (1999). On the economic consequences of civil war. *Oxford economic papers, 51*(1), 168-183.

Collier, P., & Hoeffler, A. (2002). Aid, policy and peace: Reducing the risks of civil conflict. *Defence and Peace Economics, 13*(6), 435-450.

Collier, P., & Sambanis, N. (2005). *Understanding Civil War: Africa* (Vol. 1): World Bank Publications.

Daw, M. A., Dau, A. A. &El-Bouzedi, A. (2016). Libyan armed conflict 2011: mortality, injury and population displacement. *African Journal of Emergency Medicine, 5*(3), 101-107.

Dericioglu, K. T. (2018) *Discussions on urban sprawl and planning scenarios,* Personal communication.

Glaeser, E. L., & Shapiro, J. M. (2002). Cities and warfare: The impact of terrorism on urban form. *Journal of Urban Economics, 51*(2), 205-224.

Grünewald, F. (2016). War in Cities: Lessons Learnt for the New Century of Urban Disasters.

Hewitt, J. J. (2017). *Peace and conflict 2012*: Routledge.

Hills, A. (2004). *Future war in cities: rethinking a liberal dilemma*: Psychology Press.

Khan, M. (2013). The Social, Political and Economic Effects of the War on Terror: Pakistan 2009 To 2011. *ISSRA PAPERS*, 65.

Khan, M., & Mezran, K. (2013). *The Libyan Economy after the Revolution: Still No Clear Vision*: Atlantic Council, Rafik Hariri Center for the Middle East.

Koenig, N. (2017). Libya and Syria: Inserting the European Neighbourhood Policy in the European Union's Crisis Response Cycle. *European Foreign Affairs Review, 22*(1), 19-38.

Marion, C., & Maurice, H. (2010). Adapting to urban displacement *Forced Migration Review* (Vol. 34, pp. 76). Oxford: Refugees Studies Center.

Muggah, R. (2012). Researching the urban dilemma: Urbanization, poverty and violence.

Pedde, N. (2017). The Libyan conflict and its controversial roots. *European View, 16*(1), 93-102.

Rotberg, R. I. (2005). Failed States, Collapsed States, Weak States: Causes and Indicators" dalam Robert I. Rotberg. *State Failure and State Weakness in a Time of Terror*.

Sampaio, A. (2016). Before and after urban warfare: Conflict prevention and transitions in cities. *International Review of the Red Cross, 98*(901), 71-95.

UNCHR. (2017). MIXED MIGRATION TRENDS IN LIBYA: Changing Dynamics and Protection Challenges *UNCHR MIGRATION TRENDS*. Tunis: United Nation.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Evaluation of Early Republican Industrial Buildings in Antalya in the Context of Cultural Sustainability

Emine Barbaros Akay[1*], Yaren Şekerci[2], Hilal Tuğba Örmecioğlu[3]

[1*]*Architecture, Akdeniz University, Antalya, Turkey, eminebarbaros@gmail.com*
[2]*Architecture, Akdeniz University, Antalya, Turkey, yarensekerci@gmail.com*
[3]*Architecture, Akdeniz University, Antalya, Turkey, ormecioglu@akdeniz.edu.tr*

Abstract: The industrialization and modernization initiated by the industrial revolution in 18th century Europe also influenced the Ottoman Empire but this movement was limited with the central metropolises. Industrialization had begun to affect Antalya, which is a peripheral city of Anatolia and where agricultural production takes place, along with the inauguration of the Republic. The industrialization movement which was initiated by establishment of more than twenty small-scale industrial structures during the Early Republican Period was accelerated after built of large-scale industrial implants.

The traces of industrialization movement from early Republican period to 1980'shas started to be wiped off the collective memory of the city after 1980's by abandoning and demolishing these industrial buildings. The traces of the initiative to build an industrial cityfrom the early Republican era to the 1980s have begun to be erased by the abandonment or destruction of buildings belonging to that period. The disappearance of Antalya's industrial past damages the historical continuity of Antalya. Because of this reason, it is necessary to conserve and ensure the sustainability of the industrial heritage of Antalya. This study examines the industrial heritage of the Early Republican Period of Antalya and reveals its current status. Thus, it is aimed to create awareness about the conservation of industrial heritage of Antalya by revealing the historical and architectural values of these structures.

Keywords: Antalya Industrial Heritage; Cultural Sustainability

Introduction

The Industrial Revolution, which took its first steps in the mid18th century in England, but whose influence dates from the 19th century to the present day, played an active role in the social and economic transformation of human history. With the Industrial Revolution, the human power in the production process was replaced by machines, and the mode of production changed. This basic development has changed the social, economic and physical environment. Industrial buildings have emerged as new types of construction that have been realized through industrialization. Today, industrial heritage is valuable because they are the symbol of the industrialization and modernization of the cities they are in. These factories that started to be established in the Late Ottoman Period, have lost its function have been abandoned or have completely disappeared today.

Tanyeli (2000: 50) defines industrial heritage as "a cultural heritage consisting of specific architectural features in which the efficiency of producing goods and / or services with mechanical devices and contrivance". The discipline that involves the investigation and documentation of this heritage is also called "industrial archaeology". The development of an

international understanding of industrial structures as a cultural heritage to be protected and the preservation of structures has been achieved by the establishment of TICCIH (The International Committee for the Conservation of the Industrial Heritage in 1978 (Kaya, 2012: 50). The concept of industrial heritage has also become a recognized international phenomenon, as UNESCO listened to a list of world heritage sites in 2001. The fact that the industrial heritage, which is a new concept for our country, is not explicitly included in the law makes it difficult to protect these structures and to transfer the cultural values they carry to future generations.

Industrialization in the Ottoman Empire began in the 19th century and industrial facilities were predominantly established in and around the capital city of Istanbul (Köksal, 2005: 14).

Economic development plans and the policies pursued by the Republic of Turkey which has established the beginning of the 20th century, ensured industrial breakthroughs in different cities of Anatolia in addition to the big cities. In the cities like Antalya where the period is dominated by mostly agriculture-related industries, the industrial structures are important because these structures are often built by local people on difficult economic conditions after war. According to the report of Antalya, dated 18.02.1938, the industrialization movement which started with the establishment of twenty more small scale workshop structures in Antalya during the Early Republican Period, accelerated with the construction of large scale factory constructions afterwards (Güçlü, 1997: 66). The traces of attempts o establish industrial cities from early Republican era until the 1980s, began to erase from the collective memory after the abandonment or destruction of these industrial structures in the late 1980s. The fact that the urban regeneration starts to erase the traces of this industrialization process from the social memory negatively affects the historical continuity of Antalya.

Under these conditions, the aim of this study is to reveal the early Republican and mid-century industrialization efforts as an unknown period of Antalya, and to reveal implicit traces left by the industry in the development of the city through a small number of industrial structures standing today. In this way, the historical and architectural values of the industrial heritage of Antalya will be revealed and public awareness will be created that these structures must be conserved for sustainability.

Industrialization in Antalya

The industrialization movement in Antalya started with the establishment of twenty small-scale industrial buildings after the declaration of the Republic, and then continued with the construction of large-scale factory structures. These industrial structures, mostly related to food, mining, woodwork and energy, are mostly established by the initiatives and efforts of local people. Industrial structures established in Antalya in the process up to the 1950s are small scale enterprises called factories.

The factory word was used for ateliers and small industries where less than ten workers were working in (Çimrin, 2012: 289). These industrial structures were constructed in scattered locations in different parts of the city, depending on the location of the resources needed for production in the factory or the location where the production is needed. For this reason, the industrial region did not exist in Antalya. The scale of the factories established in Antalya in the period after 1950 also grew, they started to be established as industrial complexes and they were constructed as an industrial region by being built close to each other.

It is still possible to read the industrial structures established in Antalya in the post-1950 period today. Ferrochrome Plant and Kepez Power Plant, some of the leading industrial structures in Antalya, are the factories that are still in operation today. Antalya Cotton Mill and Antalya Battery Plant are not used today, but Antalya Cotton Mill has been re-functioned and opened for public use. While Antalya Battery Factory is in an idle state, it maintains its place in collective memories.

On the other hand, Antalya's industrialization traces of the Early Republican Period were erased because of the fact that the factories that were built at that time could not be protected. From factories built in Antalya in the early period; Reproduction and Rehabilitation Station of Antalya's Hot Climate Plant, Antalya Old Power Plant and Tekirova Mining Processing Plant were partially preserved and survived to today.

Studies for Sustainability of the Traces of Industrialization in Antalya

In order to ensure the sustainability of the traces of the industrialization process, it is necessary to prevent the destruction of factory constructions, which are the symbols of this process, and to protect them together with their cultural traces. Industrial structures that have ceased to operate and are idle can be re-functioned for protection. However, it is necessary to carry out the re-functioning practice sensitively and in a manner that respects the society and the mission that is undertaken by the building. Using the factory structure only as a shell, and

give a completely independent function will cause the continuity of the cultural traces of the plant to fail and to disappear over time. For this reason, it is necessary to prevent the actual purpose of the establishment of the factory from being deleted from the collective memories by leaving a field in the factory that refers to the product previously produced in the factory.

For the sustainability of the cultural traces of the faded away factory structures, it may be possible to transfer the gaps of the factory to the next generations. The land of demolished factories can be used as urban landscapes. It is possible to provide the continuity of the cultural traces of the factory by placing elements reminding of the factory on these urban landscapes.

The Reproduction and Rehabilitation Station of Antalya's Hot Climate Plant which is one of the industrial structures from the Early Republican Period in Antalya and is survived is now being used as the Western Mediterranean Agricultural Research Institute and continues to be used with a function similar to the original function of the building. Antalya Old Power Plant and Tekirova Mining Processing Plant are in idle condition and disappearing day by day. These structures must be restored and opened for public use in order to ensure cultural continuity. Apart from these survived structures, the lands of ice, timber, paddy and flour factories which were built in the Early Republican period and now completely forgotten today need to be rearranged so that the traces of these factories can be read again and sustained.

Conclusion

The industrialization movement, starting in the mid-18th century in the world and in the Late Ottoman period in Turkey, started losing its traces in time and this was particularly damaging to society's cultural continuity. In order to maintain cultural continuity, it is necessary to prevent industrial structures, which are symbols of the industrialization process, from being erased from the collective memory. It can be seen that the traces of the industrial heritage in the post 1950s can be read today in Antalya, which is the subject of this study, but the traces of the industry in the Early Republican Period are being erased. Most of the more than twenty industrial structures built in Antalya during the Early Republican Period were destroyed and their traces were disappeared. The disappearance of these structures causes Antalya's industrialization period to be read incorrectly and damages the cultural continuity. For this reason, it is necessary to take precautions for the protection of the surviving structures, and to ensure that the destroyed structures are replaced by collective memories.

References

Çimrin, H. (2012). Bir Zamanlar Antalya(Tarih, Gözlem, Anılar) Vol 2 Antalya Ticaret ve Sanayi Odası Kültür Yayınları. Antalya.

Güçlü, M. (1997). XX. Yüzyılın İlk Yarısında Antalya. Antalya Ticaret ve Sanayi Odası Kültür Yayınları. Antalya.

Kaya, Berrin.(2012). Endüstri Mirasımızın Korunmasında Planlama Yaklaşımı. Dissertation. Ministry of Culture and Tourism. Izmir.

Köksal, T. Gül. (2005). İstanbul'daki Endüstri Mirası İçin Koruma ve Yeniden Kullanım Önerileri. Unpublished Doctoral Dissertation. Istanbul University Graduate School of Natural and Applied Sciences. Istanbul.

Tanyeli, G. (2000). Endüstri Arkeolojisi Yapılarının Korunması ve Yeniden İşlevlendirilmesi. Domus m, (vol 8, pp.50-51). Istanbul.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Evaluation of Sustainability of Housing Transformations in Copenhagen

Nezih Burak Bican [1]

[1]*Danish Building Research Institute, Aalborg University, Copenhagen, Denmark, nbb@sbi.aau.dk*

Abstract: Extensive residential regeneration processes were undertaken in Denmark for more than a decade through comprehensive master planning and collaboration of various stakeholders. The pioneer of these processes was that of Gyldenrisparken, which was examined in detail by the author in his PhD study. Current study applies the methodology applied by the author to two other estates in Copenhagen, Vejleåparken (VAP) and Tingbjerg (TBJ), which are distinctive for their relatively large scales and inherited spatial qualities. Both projects involve critical transformative actions to diversify demand structure and densify public infrastructure in the open space. However, while TBJ project is concentrated more on construction of alternative houses of different types and tenures in line with current social mix policies of the city; VAP was developed more to diversify and re-scale open public space preserving single-tenure structure of its estates. The paper concludes that there are both common and dissimilar traits apparent in the cases evaluated; and context-dependant conditions have been considered for sustainable regenerations. The study develops the methodology utilized by suggesting addition of some new interventions discovered through the evaluation.

Keywords: social housing; regeneration; sustainability; evaluation; Copenhagen

Introduction

By the 1980s, social and physical problems started to accumulate in the social housing venues in Denmark due to lack of maintenance, concentration of poverty, violative actions, building decay, and resulting high turnover rates. Housing estates and governments applied a series of methods to solve the problems focusing particularly to renovative actions of varying scales. Nevertheless, no solid visible result was achieved until the beginning of 2000s (Bech-Danielsen, et al., 2011). Starting from the 2000s local governments began to take simultaneous actions against both physical and social problems of each individual settlements based on master plans. Gyldenrisparken settlement underwent the first successful transformation of the country integrating all stakeholders and residents into the process. Author of this paper examined the transformation in his PhD study (Bican, 2016) particularly focusing on the spatial attempts (interventions of architectural and urban design scale). He developed a theoretical matrix to classify individual physical efforts according to their contribution to sustainability and liveability of the settlement. The author elaborated his work in an article (Bican, 2018) where he described how it could be utilized to evaluate different transformative cases. Building on this fundamental methodology, current study digs into two other contemporary Danish social housing regenerations cases, Tinbjerg (TBJ) and Vejleaparken (VAP) and categorizes individual spatial attempts by getting use of the proposed matrix. This paper discloses the

findings; presents similar and different actions; and suggests new individual spatial interventions for similar transformative cases.

Methods

This study got use of semi-structured open-ended interviews with municipal agents, responsible workers/managers from housing associations, unregistered talks with residents, site visits, photographs -taken by the author-, documents collected from responsible agents, and previous studies to collect data. All information was noted and sorted systematically before utilizing the matrix for final classification.

The study gets use of a matrix developed by Bican (2016) to categorize and evaluate spatial interventions applied in the projects investigated. The matrix has three hypothetical axes: sustainability (includes liveability); scale; and spatial concepts. It is built up of several cells each of which is defined by a tripartite categorization: a 'scale', a 'sustainability component', and a 'spatial concept.' Each cell houses a certain definition of a spatial intervention (DSI). In other words, each DSI is defined by three components. Nevertheless, all cells do not necessarily house a DSI. It depends on the existence of an intervention in that given scale, contributing to that certain aspect of sustainability, through that certain spatial concept. The framework is filled in either by deductive or inductive reasoning (Bican, 2018). A suggested matrix filled up by findings from Gyldenrisparken, TBJ, and VAP cases is provide in Table 1 at the end of the text.

Findings and Discussion

VAP is situated 20 km away from the central Copenhagen area. The settlement with a current population of nearly 5000 houses nearly a quarter of the city of Ishøj. VAP was built between 1970-1973 with a total number of 2174 of apartments ranging from those with one to five rooms in 54 apartment blocks of four floors. TBJ was constructed in Brønshøj-Husum as a social housing settlement on 320 thousand square meters for all social layers in the 1950s designed by a well-known Danish architect (Steen Eiler Rasmussen). The area was aimed to be a green among bogs built in an attractive natural landscape. Construction of 2255 with total housing floor area slightly over 170.000 m2 took place between 1956 and 1971.

Transformation of VAP has already been completed (Figure 1Figure ***2***) ; the other one, Tingbjerg TBJ, is currently under practice (Figure 3Figure ***4***), however, there is plenty of information about its past and future planning for its transformation. Both projects were

originally completed in the 1970s; nevertheless, experienced physical decay and social problems since 1980s as much of their counterparts in the country. VAP experienced the most expensive transformation in Denmark; but afterwards, its disrepute of being a problematic ghetto has gradually dissolved as it started to attract residents from different backgrounds breaking the concentration of similar ethnicities and income levels. On the other hand, TBJ is now in the beginning of a period of extensive transformation under an ambitious project to make it integrated not only into its vicinity but to the rest of the city by densification and introduction of new houses of alternative tenures and facilities for public/private functions. The fundamental idea is to break the barriers of accessibility, and thus, to enhance the quality life across the settlement.

Diversification and densification are two key principles strategically embraced to enhance liveability in both cases examined. Diversity has been sought either by structural changes, such as, modifying major elements of the settlement such as types of housing, outdoor spaces, traffic connections, and landscaping; or by working on some relatively minor details, such as, decorating outdoor spaces or facades by getting support of different professional artists. In TBJ, densification of the neighbourhood is set as a primary goal set to increase possibilities of social encounters, natural surveillance, and the social capital. Accordingly, new housing blocks and retail shops are planned for a liveable settlement. In VAP, although new apartment units constructed contributed to physical densification of the neighbourhood, much of the care was given to design of outdoor spaces between blocks and within housing squares to densify the usable space; thus, to encourage the inhabitants to get use of those underutilized public space. Furthermore, accessibility has been considered with its different connotations: access to public services, transport, upper floors, outdoor spaces, or view are considered as common rights for all. Therefore, in TBJ, on one hand, new row houses to be established along the west side is planned to be aligned to provide direct physical and visual access to the vast green area -which is currently considered as ignored and underused. On the other hand, a new light rail system is under discussion and better pedestrian/public transport connections have been planned to ease the access to the urban network of the city; thus, to enable two-way access to and from Tingbjerg.

In VAP, spatial interventions in settlement and block scales were made to establish a more human scale environment with deliberate urban and architectural strategies. Double floor residences located on the edges has provided ‘medium’ scale between the large scale of VAP -consisting of particularly 5 floor row blocks- and the relatively small-scale neighbour area of

row/garden houses in the vicinity. This choice works for avoiding a perception of a sharp 'outside-inside' distinction; providing a smoother connection across than before; therefore, inviting residents for casual encounters. In block scale, arrangement of different material layout on the facades breaks down the visual 'heaviness' and monotony of the 5 floor row floors.

Current study disclosed that there are both common and dissimilar traits apparent in the two transformation cases evaluated; and context-dependant conditions have been considered for sustainable regenerations. Both projects involve critical actions in different scales to diversify the demand structure and densify the public infrastructure in the open space. However, while TBJ project is concentrated more on construction of alternative housing of different types and tenures and quits from mono-tenure rental structure in line with recently pronounced social mix and social mixing strategies of the municipality of Copenhagen; VAP, was developed more to diversify and re-scale open public space strictly preserving rental structure of its estates. Besides, despite being realized in two different periods, both projects display a variety of approaches for several aspects of sustainability, as at least one definition of spatial interventions could be determined and written in each cell of the proposed matrixes prepared for each project. We may note that apartment scale interventions could not be noted for TBJ as much as for VAR, as TBJ is in its initial phase and our investigation could not go into details of planned future renovations for apartment interiors.

Conclusion

Copenhagen is continuously building on its experience of renovating and regenerating its old residential areas. Social housing transformation projects have been undertaken in line with predefined social and physical master plan principles since the first comprehensively planned regeneration in Gyldenrisparken (2001-2014). One of the reasons is that stakeholders of the social housing market - local municipalities, housing associations, financing public/independent authorities, resident boards, and other public/private bodies- are aware of practical value of the experiences, particularly in the last decade. Architectural and urban qualities of implementations realized or planned reflects this awareness and support of expertise behind the projects. Furthermore, a culture of preservation is apparent in strict embracement of planning decisions which are kept through the whole implementation process of the old neighbourhoods.

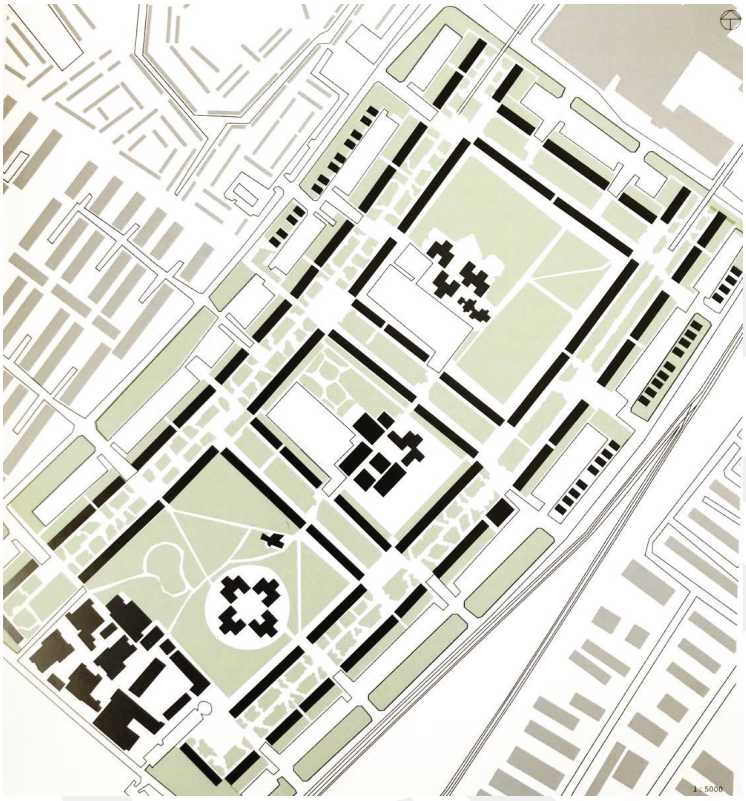


Figure 1. Vejleaparken Transformation Plan. Source: Fra Ghetto til Blandet By (2017)

Figure 2. Photographed by the author. Vejleaparken (2018).

Figure 3. Tingbjerg Transformation Plan.. Source: Tingbjerg Byudviklingsstrategi (2015)

Figure 4. Photographed by the author. Tingbjerg (2018).

Table 1. Proposed 'Sustainability-Scale Matrix for Spatial Interventions' after evaluating Vejleaparken and Tingbjerg projects

PROPOSED 'SUSTAINABILITY-SCALE MATRIX FOR SPATIAL DECISIONS' – Underlined phrases have been added after current evaluation							
	S	SETTLEMENT	B	BLOCK	A	APARTMENT
SOCIAL / EQUITY	PRG	• SOCIAL GATHERING AREAS • NEW SUBREGIONS FOR PUBLIC FUNCTIONS	PRG	• INTRODUCTION OF EXTRA SOCIAL FUNCTIONS • CONVERSION OF BLOCKS FOR NEW FUNCTIONS	PRG	• INTRODUCTION OF ALTERNATIVE LAYOUTS
	DIV	• ALTERNATIVE OPEN SPACES AND/OR SOCIAL FACILITIES TO ENCOURAGE SOCIAL MIXING • NEW TYPES OF HOUSING FOR SOCIAL MIX OF DIFFERENT TYPES OF RESIDENTS	DIV	• NEW UNITS (OF NEW TYPES/ NEW TENURE) TO HOUSE SOCIAL MIX	DIV	• ALTERNATIVE INTERIOR ARRANGEMENTS TO PROVIDE EQUITY OF OPPORTUNITIES
	ACC	• EQUITY OF ACCESS TO KEY SERVICES • EQUITY ACROSS GENERATIONS AND SOCIAL GROUPS (ELDERLY/YOUNG/CHILDREN;PEOPLE WITH BABIES/PREGNANTS; IMMIGRANTS; VULNERABLES)	ACC	• EASE OF VERTICAL ACCESS • ACCESSIBLE HORIZONTAL CIRCULATION • INTRODUCTION OF NEW SPECIFIC VOLUMES/ APARTMENTS FOR THE DISADVANTAGED	ACC	• UNIVERSAL DESIGN CONSIDERATIONS
	LAN	• OPEN SPACES	LAN	• ROOF GARDENS	LAN	• PRIVATE GARDENS
CULTURAL	IDE	• PRESERVATION OF ORIGINAL LAYOUT • ARTISTIC VALUES / SCULPTURES, INSCRIPTIONS	IDE	• PRESERVATION OF ORIGINAL ARCHITECTURAL FEATURES • USE OF AUTHENTIC MATERIALS	IDE	• PRESERVATION OF ORIGINAL ARCHITECTURAL FEATURES (MATERIALS, INTERIOR LAYOUT ETC.) • DAILY RITUALS
ECONOMIC	PRO	• PLANNING OF NEW FACILITIES AND OPEN SPACES TO MATCH LONG-TERM DEMAND	PRO	• RENOVATION • INTRODUCTION OF NEW BLOCKS TO LONG-TERM DEMAND	PRO	• INTERIOR RENOVATION • INSTALLATION WORKS
	DIV	• APPROPRIATENESS FOR A MIX OF HOUSEHOLDS • ENSURING 24 HOUR OF U½TILIZATION OF THE FACILITIES • RE-DESIGNATION OF ALLOTMENT RIGHTS • CONTROLLED INCREASE/DECREASE IN RENTS • INTRODUCTION OF ALTERNATIVE TENURE MODES	DIV	• UTILIZATION OF ABANDONED SPACE (ROOF GARDENS ETC.)	ACC	• RENOVATION OF INTERIOR ELEMENTS • CHANGE OF INTERIOR LAYOUTS

PROPOSED 'SUSTAINABILITY-SCALE MATRIX FOR SPATIAL DECISIONS' – Underlined phrases have been added after current evaluation

		S SETTLEMENT	B BLOCK	A APARTMENT
ENVIRONMENTAL		• SUN - SHADOW/SHADE CONTROL • WIND BARRIERS • CONTROL OF FLOW AND ACCUMULATION OF PRECIPITATION • RESOURCE HANDLING • RE-USE • INNOVATIVE TECHNOLOGIES • CLUSTER ARRANGEMENTS TO CONTROL MICRO CLIMATE	• SUNLIGHT - ORIENTATION/FACADE DESG. • WIND - ALLIGNMENT ACCORDINGLY • PRECIPITATION - RAINWATER COLLECTION • RESOURCES • WASTE MANAGEMENT • GREEN ROOFS / SUN PANELS • INNOVATIVE TECHNOLOGIES	• DAYLIGHT CONTROL • VENTILATION • MATERIALS • INNOVATIVE TECHNOLOGIES
LIVEABILITY	PRO	• PLANNING FOR NATURAL SURVEILANCE • SECURITY OF PARKING LOTS • ENSURE 24-HOUR OF UTILIZATION • NEW CONSTRUCTIONS TO ENCOURAGE SOCIAL ENCOUNTERS BY DENSIFICATION	• FUNCTIONAL ORGANIZATION WTIHIN BLOCKS • PUBLIC/PRIVATE AREAS - STORAGE – ENTRANCE • ALTERNATIVE TYPES OF HOUSING UNITS	• QUALITY OF SPACE PER PERSON • BALCONIES • STORAGES • RENOVATION ON DEMAND OF HOUSEHOLDS
	DIV	• LAYOUT OF BLOCKS • LAYOUT OF OPEN SPACES • GENERIC SPACES	• DIVERSITY OF ARCHITECTURAL FEATURES • GENERIC SPACES WITHIN BLOCKS • FAÇADE DECORATIONS	• FLEXIBILITY / GENERICITY FOR SITUATIONAL NEEDS
	DEN	• LAYOUT OF BLOCKS VS. OPEN SPACE		
	ACC	• ALLIGNMENT OF BLOCKS • PEDESTRIAN ROUTES / WALKABILITY • TRAFFIC SEPERATION • ACCESS TO URBAN INFRASTRUCTURE • NEW PUBLIC TRANSPORT LINES / FACILITIES	• TOPOGRAPHY - BLOCK RELATION • RELATION OF BL OCK ENTRANCES/EXITS WITH PARKING LOTS • ARRANGEMENT OF BLOCKS' ALIGNMENT FOR PHYSICAL AND VISUAL ACCESS	• UNIVERSAL DESIGN • DAYLIGHT OPTIMIZATION
	LAN	• GETTING USE OF TOPOGRAPHIC ARRANGEMENTS • MAJOR QUALITY IMPROVEMENTS • REACTIVATION OF NEGLEGTED AREAS	• ROOF GARDENS • TOPOGRAPHIC ARRANGEMENT TO MAXIMIZE CONTACT WITH ENVIRONMENT	• ALTERNATIVE GARDEN ARRANGEMENTS • CONTACT WITH OUTSIDE GREEN
	SCA	• MACROFORM • DESIGN FOR SCALE CONTROL	• HUMAN SCALE, HEIGHT, LENGTH • MODIFYING FACADES WITH ALTERNATIVE MATERIALITY AND/OR VISUAL ARRANGEMENT	•

ABBREVATIONS OF SPATIAL CONCEPTS: PRO: Program; DIV: Diversity; DEN: Density; ACC: Access; LAN: Landscape; IDE: Identity; SCA: Scale

References

Bech-Danielsen, & Christensen, G. (2015). Boligområder i bevægelse: Fortællinger om fysiske og boligsociale indsatser i anledning af Landsbyggefondens 50 års jubilæum. Landsbyggefonden.

Bech-Danielsen, C., & Stender, M. (2017). Fra ghetto til blandet by: Danske og International erfaringer med omdannelse of udsatte boligomrader. Gads Forlag.

Bech-Danielsen, C., Jensen, J. O., Kirkeby, I. M., Ginnerup, S., Clementsen, A., & Hansen, M. Ø. (2011). Renovering af efterkrigstidens almene bebyggelser: Evaluering af ti renoveringer med fokus på arkitektur, kulturarv, bæredygtighed og tilgængelighed. Hørsholm: Statens Byggeforskningsinstitut.

Bican, N. B. (2016). Securing Future of Social Housing: Learning from an Alternative Regeneration / Gyldenrisparken in Denmark (Unpublished PhD Thesis). Ankara: Middle East Technical University.

Bican, N. B. (2018). A New Methodology for Qualitative Analysis of Sustainability in Social Housing Regeneration: Gyldenrisparken in Copenhagen. METU Journal of the Faculty of Architecture.

Bjørn, N. (Ed.). (2008). Arkitektur Der Forandrer - Fra Ghetto til Velfungerende Byområde. Copenhagen: Gads Forlag.

Chiu, R. L. (2004). Socio Cultural Sustainability of Housing: a Conceptual Exploration. Housing, Theory and Society, 21(2), 65-76. Retrieved July 24, 2015, from http://www.tandfonline.com/loi/shou20

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The Social Dimension of Sustainable Development: Defining Urban Social Sustainability. Sustainable Development, 19, pp. 289- 300. Retrieved July 24, 2015, from http://onlinelibrary.wiley.com/doi/10.1002/sd.417/full

Domus Arkitekter. (2018). Domus Arkitekter Website. Retrieved from Omdannelse af Vejleaparken i Ishoj: http://domus.dk/node/24 //

Godschalk, D. R. (2004). Land Use Planning Challenges: Coping with Conflicts in Visions of Sustainable Development and Livable Communities. Journal of the American Planning Association, 70(1), 5-13. doi:10.1080/01944360408976334

Ishoj Kommune. (2018). Boligrapport 2017.

Kobenhavns Kommune. (2017). Forslag til Lokalplan for Store Torv i Tingbjerg. Copenhagen.

Kobenhavns Kommune, fsb, SAB/KAB. (2015). Tingbjerg-Husum Byudviklingsstrategi. Copenhagen.

Kural, N. (2009). PhD Thesis: Parameters of Sustainability in Urban Residential Areas: A Critique of Temelli in Ankara. Ankara: METU.

McKenzie, S. (2004). Social Sustainability: Towards Some Definitons. Working Paper Series No 27. Magil: University of South Australia. Retrieved July 26, 2015

Mortensen, P. D. (2013). Sound Settlements: An Interdisciplinary and Transnational Approach to Sustainable Housing. KADK, Copenhagen.

Vallance, S., Perkins, H. C., & Dixon, J. E. (2011). What is social sustainability? A clarification of concepts. Geoforum, 42, 342-348. Retrieved July 26, 2015, from http://users.metu.edu.tr/ioguz/Vallance_2011.pdf

Vestergaard, H. (2009). SBI Rapport 2009:14 Evaluering af virkninger af omprioriteringsloven fra 2000: Baggrund, indsatser og resultater i Bispehaven, Vejleåparken og Tingbjerg. Copenhagen: SBI (Danish Building Research Institute.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainability Beyond Architecture: Beyond Concepts, Beyond Scale and Beyond Time

Ebru Bingöl[1*]

[1]*Department of Architecture, Hatay Mustafa Kemal University, Hatay, Turkey, ebrubingol@mku.edu.tr, ebrubingol@yahoo.com*

Abstract: The idea(l)s of nature reveals how the culture reflects upon life and society. The speculative BBC Documentary, "The Use and Abuse of Vegetational Concepts" (2011) provokes that our modern idea of nature as a self-regulating network of systems was developed as a cybernetic fantasy in the 1950s by ambitious scientists, who aimed to transfer this idealization into novel ways of organizing societies. In a way, recent sustainability practice is seized by a life configuration with controllable, tamed, sanitized nature by taking its imperatus from technological developments and scientific inventions. Recent technological developments enable us to create high-tech buildings, smart buildings, energy efficient buildings that are mostly based on building scale technical solutions.

This paper aims to go beyond the limits of architecture by re-membering the dynamics of nature rather than configuration of a controlled nature and integrate it into architectural practice. It discusses whether the object of architecture –the building, fits into the sustainability demands today. This paper provides a theoretical discussion on a sustainability that functions beyond three limitations of architecture: beyond concepts, beyond scale and beyond time. This paper criticizes the conceptual divisions between nature and culture in sustainability approach; building scale, technology-based implementations of sustainable architecture neglected temporality of nature and city. By exploring some practices inside and outside the discipline such as Mohsen Mostafavi's Project in AA; 'River Thames Access Project', Charles Waldeim's Project "Milwaukee's Tower Automotive Site", and Bernard Tschumi and Derek Revington's Downsview Park entry, this paper attempts to go beyond limits of architecture.

Keywords: sustainability; nature-culture dichotomy; multiscalarity; temporality

Introduction

Recent sustainability practice is seized by a life configuration with controllable, tamed, sanitized nature by taking its imperatus from technological developments and scientific inventions. Recent technological developments enable us to create high-tech buildings, smart buildings, energy efficient buildings that are mostly based on building scale technical solutions.

Nature is a network of systems and forces working across scales that is constantly changing itself and its relationships. A sustainable architecture should re-membering the dynamics of nature rather than object-based configuration of a controlled nature. This paper provides a theoretical discussion on a sustainable architecture that functions beyond three limitations: beyond concepts, beyond scale and beyond time. Thus, this paper discusses the recent situation of sustainability on three levels. First, it focuses on the conceptual divisions

between nature and culture in sustainability approach. Second, it criticizes building scale implementations of sustainability and discusses about scale of nature. Third, it explores the object of architecture –the building, by recalling its durability, stability and static attitude in opposition to nature's temporality. These theoretical discussions will be detailed with some examples such as Mohsen Mostafavi's Project in AA; 'River Thames Access Project', Charles Waldeim's Project "Milwaukee's Tower Automotive Site", and Bernard Tschumi and Derek Revington's Downsview Park entry.

Methods

This paper is a critical exploration of sustainable practices in architecture that is generated by technology and merely responding to object of architecture –the building. It provides a theoretical discussion wrapped around conceptual divisions between nature and culture in sustainability approach; building scale, technology-based implementations of sustainable architecture and neglected temporality of nature and city in sustainability practice. The paper attempts going beyond three limitations of architectural object: beyond concepts, beyond scale and beyond time. These three-beyond principles will be discussed by exemplifying with Mohsen Mostafavi's Project in AA; 'River Thames Access Project', Charles Waldeim's Project "Milwaukee's Tower Automotive Site", and Bernard Tschumi and Derek Revington's Downsview Park competition entry.

1) Beyond concepts

In architecture, nature and culture are not only figuratively constructed but they are also "linguistic constructions with unstable foundations" (Weller, 2001, p.11) that are reconstructed due to idealization of these terms. Recent sustainability discussions and practices are grounded on the idea of reconstructing nature in the city. It is not natural; it is a construction. To think about sustainability in the twenty-first century entails removing the binary oppositions between nature and culture. Today, in the anthropogene era, all nature is constructed and city is naturalized. City is an entity structured by a system of complex relations between different, interdependent, but possibly contradictory forces where nature and city are intermingled. It means that there is nothing to be preserved and there is nothing to be sacrificed. Today, both nature and culture is one ecosystem working together. Thus, rather than protection-based formulations, sustainability has to focus on urban-natural system as a

whole. Under this title, Mohsen Mostafavi's Project in AA; 'River Thames Access Project' that constructed its ground on the idea of concept will be discussed.

2) Beyond scales

Twenty first century city is in relation with "multiple scalar networks" (Kahn, 2005, p.291) by referring to forces and processes from global to local, economical to ecological, production to consumption. Recent sustainability practices mostly create high-tech buildings, smart buildings, energy efficient buildings that are based on building scale technical solutions. On the other hand, natural systems linked to each other in larger scales of networks. Landscape scale is "areas much larger than any specific site, encompassing multiple ecological systems" (Pollak, 2006, p.129). Sustainability in the globalization period should consider not only the physical features or elements visible on site, but also invisible processes and movements working across scales. Recent sustainability practice has to expand beyond architectural scale. Here, Charles Waldeim's Project "Milwaukee's Tower Automotive Site" will be explored with its multiscalar approach.

3) Beyond time

Landscape as a living system which functions like ecology's self-organizing systems changing, adapting and evolving and organizing the site by itself. This understanding of dynamic landscape also modifies the role of the architect and her relationship with site. Architect does not develop one blueprint for the end result anymore. Rather, she designs the conditions for the ecosystems to develop and let the system grow, evolve where there is no one final state. To cope with change, she would prefer to incorporate adaptive strategies for developing the design conditions to strategically harbor the site's own productive capacity. Under this title Bernard Tschumi and Derek Revington's Downsview Park entry will be explored with its dynamic and time-bound change approach.

Findings and Discussion

This paper focuses on recent sustainable architecture practices that take its imperatus from technology and focus on the individual building. It discusses recent implementations that focus on the object of architecture –the building, could not fit into the assumptions of sustainability. Rather than feeding from technology, architecture practice could be generated by dynamics of nature. This approach entails transcending the limits of architecture such as

stability, cultural-natural dichotomy and its object-based individuality. By exploring some practices inside and outside the discipline such as Mohsen Mostafavi's Project in AA; 'River Thames Access Project', Charles Waldeim's Project "Milwaukee's Tower Automotive Site", and Bernard Tschumi and Derek Revington's Downsview Park entry, this paper attempts to go beyond limits of architecture.

Conclusion

Rather than taking its imperatus from technology, architecture practice could be generated by dynamics of nature. An architecture that surmount its object (the building) could go beyond cultural-natural dichotomy, beyond individual building-scale architecture and beyond durability and permanence. It could provide a holistic approach, larger networks of relationships and change and temporality into its practice and could provide new openings to sustainability practice.

References

Weller, Richard. (2001). Between hermeneutics and datascapes: a critical appreciation of emergent landscape design theory and praxis through the writings of James Corner 1990-2000 (Part One)", *Landscape Review,* 7 (1), 3-44.

Kahn, Andrea. (2005) Defining urban Sites, in *Site Matters: Design Concepts, Histories and Strategies.*Ed. Carol Burns and Andrea Kahn. 281-296. New York: Routledge Publications.

Pollak, Linda. (2006). Constructed Grounds: Questions of Scale, in *Landscape Urbanism Reader.E*d. Charles Waldheim. 125-140. New York: Princeton Architectural Press.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Role of Participation in Identification and Sustainability of Heritage; the case of the Windmill of Heybeliada

Burcu Büken Cantimur[1*], A. Binnur Kıraç[2], Gülce G. Okyay[3]

[1]Deparment of Architecture, Mimar Sinan Fine Arts University, Istanbul, Turkey, burcu.cantimur@msgsu.edu.tr
[2]Department of Architecture, Mimar Sinan Fine Arts University, Istanbul, Turkey, binnur.kirac@msgsu.edu.tr
[3]Department of Architecture, Mimar Sinan Fine Arts University, Istanbul, Turkey, gulce.okyay@msgsu.edu.tr

Abstract: Cultural heritage, when considered as an unique and perpetual social structure, humans are likely to be the main determinant of all constitutive elements, and therefore the most prominent factor of conservation practices. This point of view also make it possible to envision a composite relationship between cultural heritage and locally-related communities where all parties generate, nourish and enhance one another. In this sense, 'creation' of the heritage, depends not only in the physical space specified by concrete conditions, but also in the resources and potentials of the people or communities associated with it. Accordingly, the possibility of inclusion, where communities play an active role in the conservation of cultural heritage, is becoming increasingly important within the quest for wholeness, perhaps even a common future through these various interconnected elements. In the scope of the paper, a more participatory and inclusive heritage based on an interactive learning and exchange of knowledge is discussed in accordance with the experience gained from these heritage workshops conducted by the authors.

Keywords: heritage, workshops, participation.

Introduction

Cultural heritage can be considered as an unique social structure that continues to be created, decreated and recreated every day in terms of an individual and collective identity. This collective attachment to a place that embodies meanings and values that are important to a community or communities are defined as, social value (Jones 2017, Ferreira and Duxbury, 2017) and this accumulation can create resource for the development of societies by fostering pluralistic scenarios and enhancing existing stochastic representations.

Culture as a sector embraces tangible and intangible heritage, cultural and creative industries and cultural infrastructures and is the fourth dimention of sustainable development (Hawkes, 2001; Soini and Birkeland 2014; Dessein et al., 2015; Asikainen et al,2017), as evidenced in terms of poverty alleviation, social inclusion and environmental sustainability (Hewison and Holden 2006; Holden 2006). In a similar way, the Faro Convention (Council of Europe 2005) stated that the value and potential of cultural heritage can be used as a resource for sustainable development and quality of life in accordance with developing knowledge

through it to facilitate a peaceful social cohesion. Its central ideas including cultural diversity, shared responsibility and public participation bear a strong resemblance to recent documents (ICOMOS 2014; ICOMOS 2017).

This contemporary approach adopting new means of dialogue that allow related communities to take initiative for heritage as responsible agents within the light of public participation. Sani et al. (2015) identify participation as activating agency and a capability development process and emphasize that this approach "challenges the notion of 'participation' as doing for or even with, but rather focuses on communities doing for themselves, with the help of a range of resources". In this regard, the possibility of a multi-centered and inclusive approach to heritage is discussed within this paper.

Methods

Some have argued that to gain an understanding of values and to imply capacity building practices, it is necessary to carry out research with communities of interest using qualitative methods derived from sociology and anthropology (de la Torre and Mason 2002; Harrison 2011). Rapid/focused ethnographic assessment (Knoblauch 2005) and qualitative research such as place-based oral history interviews, site walks with community members and audio-visual recordings (Harrison 2011) are increasingly popular in many applied research contexts and are often characterized by mixed methods and multi-disciplinary teams. However, a key part of the process is that the attribution of expertise, whilst still important, is de-centred and distributed, whereas professionals and community participants are being recognized for their different kinds of knowledge and skilled practice (Harrison 2011; Emerick 2014).

Rapid/qualitative research methods and collaborative techniques are used in order to allow a more participative approach for this study. A heritage workshop, where more than 50 participants can openly discuss about the windmill and conservation specialists function as facilitators rather than sole decision-makers, was conducted by the authors and key findings are examined.

What is the Heritage of It? : The Windmill of Heybeliada

The windmill located on the western coast of Heybeliada, was known to be watchtower during the Byzantine period, and used by the monastery of Ayia Triada after being converted to a windmill (Türker 2003; Erdenen 1962) The whole area known as

'Değirmen Burnu' is expropriated and the mill was converted to a mansion during the Republican Period, prior to its refunctioning as an urban observation terrace.

Although its surrounding territory has continued to be used as a semi-private recreational area, the building has mostly lost its functionality and significance today. In 2014 architectural survey and conservation projects of the asset were prepared; they proved to be insufficient in terms of the sustainability of heritage values. Therefore, these values along with identifiability of this cultural asset in the urban memory have needed to be discussed and evaluated through a workshop conducted by the authors.

Being consisted of two interrelated practices extended roughly over a month, workshop aimed to transfer the basic principles directly and indirectly while seeking a broader perspective for the future of the mill. Participants were of heterogeneous backgrounds, yet, they consisted mainly of architecture and urbanism students, both undergraduate and graduate.

The first leg of the workshop was designed as a semi-informal meeting where participants were asked to form a heritage cluster. After a brief introduction regarding the evolution and current state of the mill, this cluster discussed and documented the associative meanings/references they attributed. In order to transform the process into a shared experience, they were given a short seminar on heritage and asked to decide collectively on the values the mill encompasse as well as questioning the most suitable scenario for the future.

For the second leg, a day-trip were organized to the recreational area where the mill is located. Place-based oral history interviews, audio-visual recordings with people who have real life experiences with the mill and a heritage walk to monastery to further understand the contextual relationship were also planned within this trip. Following these, an open-air forum with the participation of conservation specialists, people from local government and NGO's took place. It allowed participants to make a dialectical comparison between analyses from various perspectives and re-evaluate the previous findings in its original setting.

Findings and Discussion

This study highlighted that the motivation of participants were mainly emotional rather than professional. When these references were roughly classified in three groups as emotional, physically observable/descriptive and architectural, it was surprising to see that the

least emphasis was made on the last. Even the short seminar on heritage values and/or an on-site visit did not affect the above-mentioned ratio.

The fact that the only architectural references were *"stone", "historical"* and *"multi-layered"* while aspects like *"loneliness", "sadness", "distance", "forgotten", "melancholia", "in between"* mentioned repeatedly is suggestive in terms of observing approaches of a group specializing in architectural field. Participants' consensus on the protection of mill's current state and "ruin" aesthetic suggests that the decisions made about the future also come from emotional causes rather than from functionality.

On the other hand, terms such as "*memory, identity, context, production, change, integral and valuable*" are important to show that workshops can be useful in creating awareness. This aspect has been also emphasized by the participants while evaluating the achievements of heritage workshops; in addition to providing an atmosphere of sincerity, establishing relations among various users and forming different opinions.

In this regard, quest for alternative approaches to heritage and increase of pluralistic debates is vitally important. Creating a common ground and bridging the gap between different –and highly personal- perspectives can help making a human-focused; but more balanced decisions while developing autonomy, sense of community and consensus among communities.

Conclusion

In this paper, it is argued that social value and public participation have become increasingly prominent in international heritage frameworks and the conservation policies even though they remain relatively marginal in many areas of practice. The theme of European Year of Cultural Heritage: 2018, where the past meets the future, is about cherishing and honouring our past in order to build a new and common future for younger generations. This possible future shared and valued by different communities has its roots on the notion that heritage is the right and responsibility of every individual on an equal basis. Collaborative methods involving heritage professionals and communities in a network of on-going relationships with heritage can be considered the most productive in this sense. Ultimately, the creation of an appropriate framework in which participative initiatives can grow and be maintained in the long term, in which collaboration between different subjects and actors is essential for sustainability.

References

De la Torre, M. & Randall M. (2002). Introduction. In (ed) M. de la Torre*, Assessing the Values of Cultural Heritage*, , 3–4. Los Angeles: The Getty Conservation Institute.

Dessein, J., Soini, K., Fairclough, G. &Horlings, L. (eds) (2015). *Culture in, for and as Sustainable Development*. University of Jyväskylä, Finland, 20-25

Emerick, K. (2014). *Conserving and Managing Ancient Monuments: Heritage, Democracy, and Inclusion*. Woodbridge: Boydell Press.

Council of Europe (2005) *Faro Convention.*

Ferreira, I. & Duxbury, N. (2017). Cultural Projects, Public Participation and Small City Sustainability. In S. Asikainen, C. Brites, K.Plebańczyk, L. R. Mijatović and K. Soini (Eds.). *Culture In Sustainability, Towards A Transdisciplinary Approach*, University Of Jyväskylä, Finland, 45-61.

Harrison, R. (2011). Counter-Mapping Heritage, Communities and Places in Australia and the UK. In (ed) J. Schofield & R. Szymanski, Farnham: *Local Heritage, Global Context: Cultural Perspectives on Sense of Place*, Ashgate, 79–98.

Hawkes, J. (2001). *The Fourth Pillar of Sustainability: Culture's Essential Role in Public Planning*. Melbourne: Common Ground

Hewison, R. & Holden, J. (2006). Public value as a framework for analysing the value of heritage: the ideas, In (ed). K. Clark, *Capturing the Public Value of Heritage: The Proceedings of the London Conference*, English Heritage, 14-18.

Holden, (2006). *Cultural Value and the Crisis of Legitimacy: Why Culture Needs a Democratic Mandate,* Demos.

ICOMOS, 2014. *The Florence Declaration on Heritage and Landscape as Human Values*, Italy.

ICOMOS, 2017. *The Delhi Declaration on Heritage and Democracy*, India.

Jones, S. (2017). Wrestling with the Social Value of Heritage: Problems, Dilemmas and Opportunities, *Journal of Community Archaeology & Heritage*, Vol. 4 No. 1, February, 2017, 21–37

Knoblauch, H.. (2005). Focused Ethnography [30 paragraphs]. *Forum Qualitative Sozialforschung /Forum: Qualitative Social Research*, 6(3): Art. 44.

Erdenen, O., (1962). *Büyükada, Heybeli, Burgaz Kınalı, Kaşık, Tavşan, Sedef, Yassı ve Sivri Adaları Hakkında: (Harita ve resimler-Sokak planları-mukayese cetvelleri),* Belediye Matbaası, İstanbul, 88, 92.

Türker, O., (2003). *Halki'den Heybeli'ye Bir Ada Hikayesi*, Sel Yayıncılık, İstanbul, s.23.

Sani, M., Lynch, B., Visser, J., & Gariboldi, A. (2015). *Mapping of practices in the EU Member States on participatory governance of cultural heritage to support the OMC working group under the same name* (Work Plan for Culture 2015-2018). Brussels.

Soini, K., & Birkeland, I. (2014). Exploring the scientific discourse on cultural sustainability. *Geoforum,* 51: 213-223.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Importance of the Sustainable Planning in Campus Settlement – A Negative Example: Aleaddin Keykubat Campus - Turkey

Süheyla Büyükşahin Sıramkaya[1*], Dicle Aydın[2], Esra Yaldız[3]

[1]*Department of Architecture, Konya Technical University, Konya, Turkey, suheylabuyuksahin@gmail.com*
[2]*Department of Architecture, Necmettin Erbakan University, Konya, Turkey, daydin70@hotmail.com*
[3] *Department of Architecture, Necmettin Erbakan University, Konya, Turkey, mimaresrayaldiz@gmail.com*

Abstract: Sustainable planning is a process fulfilling the needs of today without conceding the opportunities of the next generation to fulfill their needs. The reflection of this process on urban settlements can be in the form of spatial and functional changes-transformations like land usage orders, distribution of urban functions on these orders, transport-communication systems and open-green area usages.

The sustainable planning in campus settlements, which are planned in the model of a small city, includes the development, change and transformation of the physical orders satisfying these functions in a way to fulfill the requirements. Turkey - Selcuk University Aleaddin Keykubat Campus represents a negative settlement in physical meaning. Rather than a sustainable physical order in transport, green area usage, communication and zoning; a pieced, scattered and disconnected understanding is formed by time. The aim is to discuss the factors preventing the sustainable campus planning on a negative settlement and obtain design criterion.

Keywords: sustainability, sustainable planning, campus settlements

Introduction

Sustainability can be defined as providing the existing, desired or approached positive situation or characteristics of any object, design or system to stay in the same quality for a determined period of time. The sustainability as a dynamic process includes concepts of time, continuity, conservation and livability with change (Sarp, 2007). Sustainable architecture – meaning built environment- is a totalitarian process aiming to provide and continue the harmony between natural and built environment while creating settlements which suit to human dignity and encourage economic justice (Hoşkara, 2007). The important issue in sustainable architectural design is the necessity to handle all three dimensions of sustainability namely ecological, economical and socio – cultural dimensions with a totalitarian approach in architectural design phase (Figure 1). So the sustainable planning is a process fulfilling the needs of today without conceding the opportunities of the next generation to fulfill their needs (Figure 2). The reflection of this process on urban settlements can be in the form of spatial

and functional changes-transformations like land usage orders, distribution of urban functions on these orders, transport-communication systems and open-green area usages. The spatial reflections of these aims in urban areas are in the form of designing healthy and livable urban spaces or environments to serve urban population, arranging the urban area usage in a way to increase social and cultural life quality and searching urban models which aim the ecological elements to be effective on urban forms (Özcan, 2006).

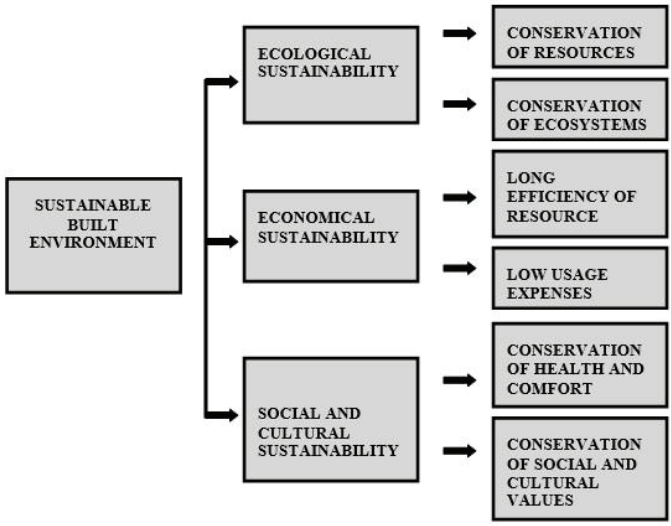


Figure 1. Three dimension of sustainable built environment (Evran, 2012)

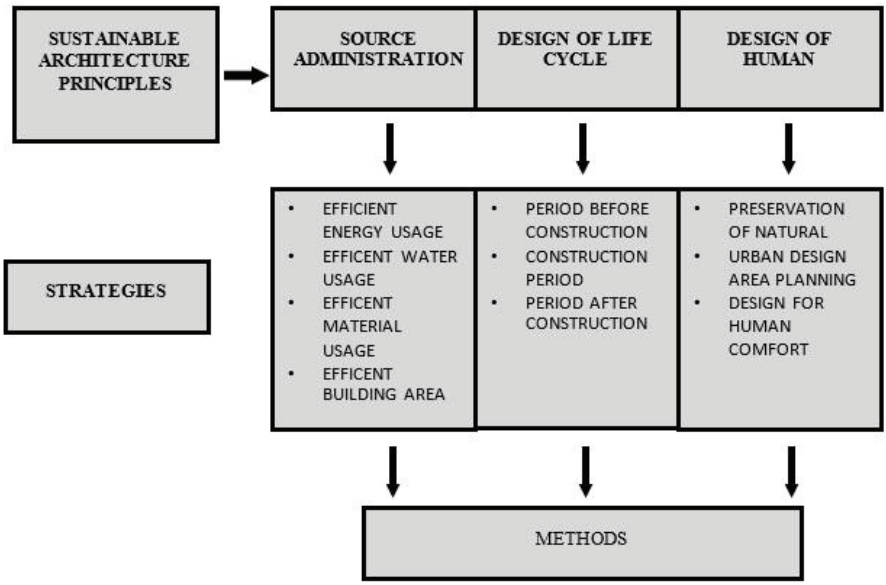


Figure 2. Conceptual framework for sustainable design and planning (Sev, 2009)

Contemporary campus settlements planned in the model of a small city are designed as providing the physical formations satisfying the functions like study, nourishment, shopping, entertainment, sports, recreation, and health along with the basic functions: education-research (Sıramkaya, 2005). The sustainable planning in campus settlements includes the development, change and transformation of the physical orders satisfying these functions in a way to fulfill the requirements. When the spatial changes in developing universities do not happen in the direction of sustainable planning, they cause the problems of usage. Konya-Turkey Selcuk University Aleaddin Keykubat Campus is determined as study area in this paper. There are a lot of faculty buildings, recreation area, dormitories, central dining hall, library, mosque, museum, shopping center, administrative building and dwellings for academic staff in this university campus. This campus represents a negative settlement in physical meaning. Rather than a sustainable physical order in transport, green area usage, communication and zoning; a pieced, scattered and disconnected understanding is formed by time.

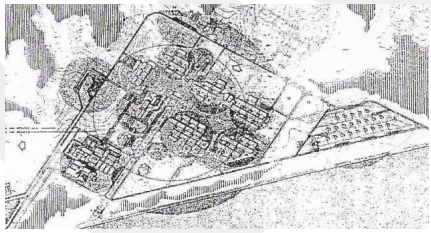
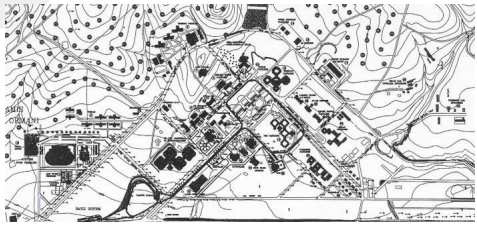
Methods

In the scope of the study, the land usage areas for pedestrian and vehicles, active green areas, passive green areas, open areas are identified on plans. Research methodology is based on the evaluation of the plans including both the first design decisions and current usage and the qualitative data obtained from case study according to the sustainable campus planning strategies. A relative analysis is done between the first plan and present usage on the technical drawings of the area about land usage, green area usage and transportation. Rather than a chronological analysis, a comparison from the point of first design decisions and present conditions is made.

Findings and Discussion

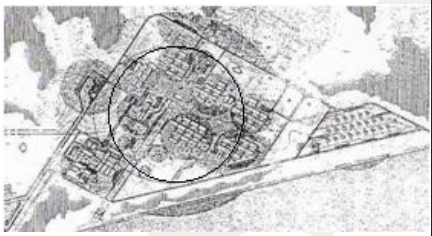
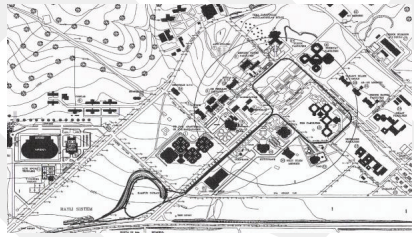
Land Usage

There is an area of 154 hm^2 land with pieced and scattered settlement. There was a definitive separation of education, shelter, common usage areas in the first plan. There were 4 faculty buildings in the first plan prepared in 1981, but there are 17 faculties in the campus in 2012. The campus today has a diffusive settlement scheme with low density of buildings in an accidental settlement unrelated with topography. As the university grows in quantity, the number of faculties and students increased by time, new solutions are searched but unplanned decisions created an unsustainable campus.

First Plan	Present
	
In the preliminary campus site plan, it can be seen that the academic area and common usage areas are planned around a main transportation axis and dormitories and sport areas are located away from the centre.	Campus planned as widespread type settlement system and it can be said that the buildings are located coincidently in low density and free from the topography. It is seen that common usage areas (cafeteria, rectorate building, cultural center, library) are placed in the centre and the academic area is planned around this centre.

Transportation

According to the first plan the access to the campus from the city center is offered by public transportation vehicles. In that period the campus was outside of the city for 30 km and disconnected. In time city grow towards the city-campus axis and they become connected. The built environment rapidly developed around the campus, land values increased and transportation network changed.

First Plan	Present
	
In the first plan the units were placed within the circle with diameter of 750 mt. There was a ring for vehicles going outside of this circle. This shows the planning concerned pedestrians as it should be in campus settlements.	However in development process new dormitories, sport areas and new faculty buildings were planned outside of this circle so walking distance to the center increased. The planning decisions related to pedestrian-vehicle separation disappeared in time. As there is no separation or arrangements for pedestrians on roads without sidewalks, the edges of the roadways or the paths are used.

Green area usage

There is a ceremonial green area in the central region of the campus. Although the location of the area is positive, the forestation is insufficient. If the whole area of the campus is considered the green area percentage is very low to be a sustainable campus.

Conclusion

Sustainable design is the whole of building activities which give priority to renewable energy sources usage, environmentally sensitive, protecting the health and comfort of the people in every condition and period of its existence. It is known that the most important element to prevent environmental problems is to make the society gain consciousness about

sustainable planning. It is obvious that consciousness in any subject can be gained in early ages. Therefore it will be more meaningful to make the users of campus settlements as young generations to gain consciousness through sustainably planned campuses. In sustainable campus settlements, providing the health and comfort conditions and minimizing the possible environmental effects of the buildings through design is the essence of sustainable design. In campus settlements which develop in an unplanned way, it is inevitable to have temporary and negative solutions as the physical reflections of change. Pedestrian – vehicle accessibility, green area usage, relationship of buildings with each other and the rest of the campus and distribution of common usage areas in the whole and the accessibility of them are extremely important issues for a campus. Wrong decision given in time will complicate the usage and bring along the negations in the point of providing sustainability and continuity. So in campus settlement planning, there should be development plans for 5 years, 10 years and 20 year, physical alternatives stipulating the future should be prepared and sustainability must be the foundation of planning decisions.

References

Evran, A. (2012). A research on sustainable construction and education buildings. Master Thesis, Uludağ University, IAS, pp:14.

Hoşkara, E. (2007). A Strategic Management Model for Appropriate Sustainable Construction for National Conditions. Doctorate thesis, Istanbul Technical University, IAS.

Özcan, K. (2006). The Role of The Open – Green Areas in Sustainable Urban Development Kırıkkale, Turkey Sample. Ecology Journal, 15, 60, 2006, pp. 32-45.

Sarp, A., (2007). A Model Proposal for Sustainability Process of Healthy Building. Doctorate thesis, Yıldız Technical University, IAS.

Sev, A. (2009). Sustainable Architecture. YEM Publishing, March, pp: 33-88.

Sıramkaya, S. (2005). University Campus Settlements and Common Usage Areas. Master Thesis, Selcuk University, IAS.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainable methodologies for stability assessment of masonry vaulted structures

Daniela Cacace[1], Claudia Cennamo[2], Concetta Cusano[3], Gianfranco De Matteis[4*]

Department of Architecture and Industrial Design – University of Campania – "Luigi Vanvitelli", Aversa (CE), Italy
[1]daniela.cacace@unicampania.it; [2]claudia.cennamo@unicampania.it;
[3]concetta.cusano@unicampania.it; [4]gianfranco.dematteis@unicampania.it*

Abstract: The analyses carried out on damaged masonry churches, after earthquakes that affected Italy in recent years, highlighted that vaulted structures are among the most vulnerable elements. This paper analyses a methodology for stability assessment of masonry vaults and domes, using non-invasive methods to calculate their static equilibrium, without any destructive investigations. The survey is based on a knowledge process, which provides the researchers with a series of information, from the historical to the geometrical ones, accounting for peculiarities of each specific typology and related constructional techniques.

Keywords: masonry structures; vaults; seismic vulnerability, slicing technique; thrust line.

Introduction

Masonry structures often respect the main criteria of sustainability:

- zero-mile constituting material with high characteristic value (e.g. Neapolitan yellow tuff);
- adaptability of structures;
- excellent lifecycle, with the minimum consumption of raw materials.

To interpret the structural vulnerability of architectural heritage, non-invasive methods are necessary, respecting the construction history of the artefact and the interactions between its elements. To ensure that they remain in their initial configuration for as long as possible, it is advisable to provide periodic diagnostic measures and maintenance interventions, limiting the use of concrete and of all invasive methods of consolidation.

Considering their importance from an architectural, structural and artistic point of view, that of the vaulted structures, their construction techniques and their formal characteristics, is an ever-current topic, especially in the study of historical masonry churches.

To date, while the non-linear analyses are constituting an important branch of the structural analysis, several researchers are focusing on limit analysis, as an important tool for assessing the safety factors of masonry structures. The authors, which are focusing on the large-scale study of the seismic vulnerability of masonry churches (De Matteis et al., 2016), are developing such methods for the analysis of the behaviour of single masonry macro-elements, in particular the vaults.

Methods

Arches, vaults and domes can transfer loads to the ground, thanks to their geometric shapes, through the only compressive strength of the constituting materials.

It is possible to analyse complex vaults with reference to the masonry arch theory. To make the arch-system effectively stable, the thrust transmitted by the two ideal half-arches connecting at the keystone, must be counteracted at the base. Hooke intuited that an arch in compression has the same, reversed shape of a hanging chain under its own weight. The funicular of the loads (thrust line) represents one of the infinite equilibrium configurations for which the stability of the arch is ensured. In the Plastic Theory, it is important to verify whether the structure has a sufficient safety margin with respect to collapse. Heyman set the behaviour of the masonry arch in the context of plastic analysis and exposed the Safe Theorem: "if any one such position can be found for the line of thrust, then this is an absolute proof that the structure is stable, and indeed that collapse can never occur under giving loading" (Heyman, 1995).

The collapse mechanism of an arch is identified by the formation of hinges at the points where the line of thrust comes out of the middle third, under symmetrical or pointed loads. The limit analysis aims to evaluate the structural failure load.

Masonry structures can be analysed as an assembly of rigid blocks, in which the minimum and maximum thrust states can be determined through the Equilibrium Approach, as the most effective method for masonry structures assessment (Milani et al., 2008).

The ancient builders sensed the need to limit the thrusts through a proportional design, which bound the thickness of the arch (and of the vault) to its span and to the width of the piers.

The equilibrium approach permits the calculation of the thrust for the different types of vaulted structures. Dividing the vault in a series of arches, if it is possible to draw the thrust line within the boundaries of each arch, then a possible equilibrium solution in compression can be found and the structure is safe (Huerta, 2008). The slicing technique, which analyses two-dimensional sections to assess three-dimensional structures, dates back to Poleni, but was also studied by Heyman and Block (Block, 2005) and can be applied to analyse the equilibrium state of many simple (e.g. domes) and composite vaults (e.g. cross and cloister vaults), (De Matteis and Cacace, 2018).

Findings and Discussion

A dome can be considered as a revolution membrane generated by rotation of an arch around its central axis, compressed in key and in tension at the springer. In a masonry dome, once the tensile strength of the masonry has been overcome, the circling action carried out by the parallels are cancelled and lesions are formed in the meridians. The dome slices behave like struts. A dome can therefore be considered as a series of arches meeting at the crown, obtained by a slicing along the meridians. If in each of these arches you can draw a line of thrust, then the dome is safe, otherwise a collapse can occur (see Figure 1a).

The slicing technique can be applied to gothic vaults, as an intersection of two orthogonal barrel vaults. Each barrel vault is made of a series of arches resting upon the cross ribs. It is possible to calculate the thrust of every arch and then analyse the cross ribs under a system of loads formed by the reactions of every elemental arch. As in domes, cracks divide the structure in a certain number of blocks, which permit the movement imposed by the environment (see Figure 1b).

The cloister vaults are made up of arches that collaborate with each other. The thrust progressively reduces towards the springer, due to the contrast offered by the arches. In the absence of concentrated loads, the stress state can be considered of a membranous type. As the domes, the tensile stresses, parallel to the springer, exceed the strength of the masonry, cancelling the hoop actions and causing meridian cracking. The lesions are concentrated in the diagonals, at first in the springer area and subsequently towards the top of the vault. After cracking, each web behaves like a portion of arch collaborating with the others in the upper part: for certain loads and thicknesses, the thrust line cannot be contained within the middle third and cracks will form along the parallels (see Figure 1c).

The authors have carried out a wider reflection on the method for assessing the stability of historical masonry architectures, applied to two-dimensional (ogival arches) and three-dimensional scheme (cross vaults and domes), obtaining suitable results (Cennamo et al., 2017). Subsequently, an analytical process based on the simplified membrane theory, to evaluate the seismic vulnerability of the dome of St. Francesco di Paola in Naples has been developed (Cennamo et al., 2018). Results have been compared with the graphical methodology based on a derivation of the slicing technique.

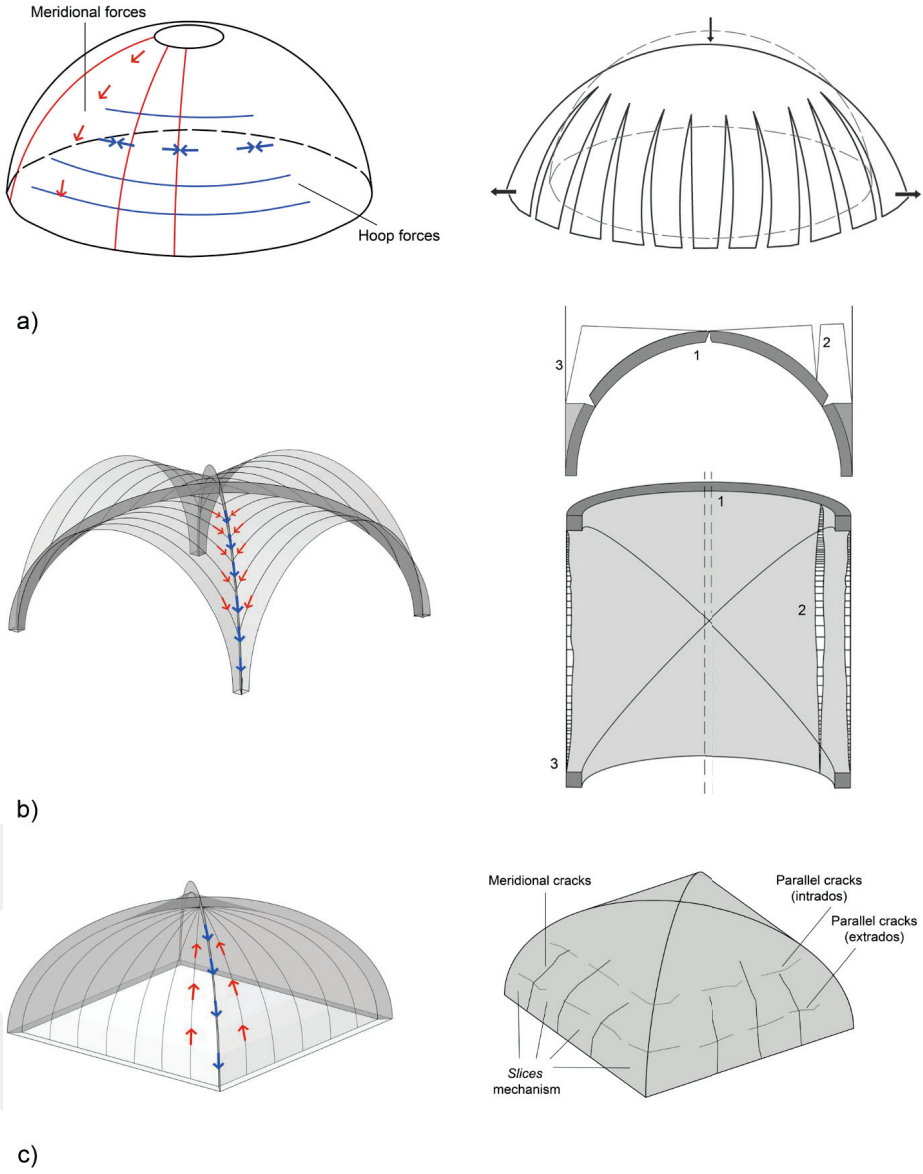


Figure 1. a) Dome, static scheme and cracks; b) cross vault, static scheme and cracks (1. hinging cracks; 2. Sabouret cracks; 3. wall cracks); c) cloister vault, static scheme and cracks. (De Matteis and Cacace, 2018)

Conclusion

This analysis derives from the ancient necessity to overcome the difficulties at interpreting the structural behaviour of masonry arches. Although of an empirical nature, the researchers of the past show a good understanding of the stability of vaulted structures under gravity loads, but this is not true in case of seismic actions. Therefore, looking at the large presence in cultural heritage buildings and the high vulnerability of the vaults revealed by recent earthquakes, this topic still represents an open issue, towards which new researches by the authors are oriented.

References

Block, P. (2005). *Equilibrium systems: Studies in masonry structure*. Master's thesis, Department of Architecture, MIT, Cambridge, MA.

Cennamo, C., Cusano, C., Fortunato, A., Angelillo, M. (2018). A study on form and seismic vulnerability of the dome of San Francesco di Paola in Naples, *Ingegneria Sismica* 35(1): 88-108.

Cennamo, C., Cusano, C., Guerriero, L. (2017). The slicing technique for the evaluation of the formal efficiency: a comparative study, *Proc. of the XXIII Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA),* Salerno, Italy, 1500-1511.

De Matteis, G., Cacace, D., (2018) Structural behaviour of masonry vaults according to architectural types in *WORLD HERITAGE and KNOWLEDGE, Representation, Restoration, Redesign and Resilience, Le Vie dei Mercanti, XVI International Forum, Napoli, Capri, 14 - 16 June 2018, Collana "Architecture, Heritage and Design|2"*, Gangemi Editore.

De Matteis, G., Criber, E., Brando G., (2016). Damage Probability Matrices for Three-Nave Masonry Churches in Abruzzi After the 2009 L'Aquila Earthquake, *International Journal of Architectural Heritage*, Vol. 10, Issue 2-3, pp. 120-145.

Heyman, J. (1995). *The Stone Skeleton: Structural Engineering of Masonry Architecture,* Cambridge. Cambridge University Press.

Huerta, S. (2008). The analysis of masonry architecture: A historical approach. To the memory of professor Henry J. Cowan. *Architectural Science Review*, Taylor & Francis.

Milani, E., Milani, G., Tralli, A (2008). Limit analysis of masonry vaults by means of curved shell finite elements and homogenization. *International Journal of Solids and Structures*, 45, 5258–5288.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Designed sustainability in Neapolitan Cultural Heritage. Some examples of *argot design*

Saverio Carillo[1*], Pasquale Argenziano[2], Carolina Campone[3]

[1]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, saverio.carillo@unicampania.it pasquale.argenziano@unicampania.it*
[3]*"Nunziatella" Military School, Naples, Italy, carolina.campone@gmail.com*

Abstract: The paper summarizes an in progress research on the characteristic elements of vernacular architecture and design (also called *argot design*) taking as reference the popular tradition in Campania region. With the loss of immaterial traditions, the memory of a series of manufactured objects is lost, precisely those objects that are the mirror of a spontaneous attitude to Sustainability. The aim is to raise awareness among young architects and designers to the Cultural Heritage preservation, and to its enhancement through new projects that take a cue from it. The authors use the method of the Italian historiography school, updated with the use of digital technologies. The case studies are classified and analysed in the macro areas of *Living* and *Food* (to which will be added the *Fashion* and the *Communication* in the future). The Neapolitan glazed tiles (so called *riggiole*), the terracotta, wooden and metal finishes are the case studies contextualized to the vernacular architecture. The knife for the pasta, the grindstones for the tomato, the testator and the grinder for the coffee beans, the Neapolitan coffee-maker are the most famous case studies of the argot design. [M.C.Campone]

Keywords: Heritage preservation/restoration; Vernacular architecture; Arts and Crafts; Drawing.

Introduction

This paper reports a research in progress on manufactured objects created through the transformation of natural raw materials, or designed by man to transform the materials from the natural condition to the most suitable to meet the daily needs. For some years, the authors have been discussing the issues of Sustainability in Architecture and Design, observing with interest the Cultural Heritage as a treasure chest of design solutions already tested and implemented by man, according to principles of low environmental impact, cost-effectiveness of resources, identity socio-cultural of the respective territories: synthetically principles of ergonomics. The *vernacular architecture* and the *argot design*, characteristic of the Neapolitan area, become the case studies through which the students of the Department of Architecture and Industrial Design of the "Luigi Vanvitelli" University are involved and sensitized to exceed the limits of the sustainability, enshrined in the Brundtland's 1987 report. The traditional architecture is universally made by transformation or modification of the soil or rocks; and again, the traditional objects of everyday life were made of wood, metal, glass, and terracotta until the industrialization of plastic polymers, about 50 years ago.

Away from the nostalgia, the authors have selected some emblematic examples of traditional Neapolitan architecture such as glazed tiles (called *riggiole*) or terracotta artefacts

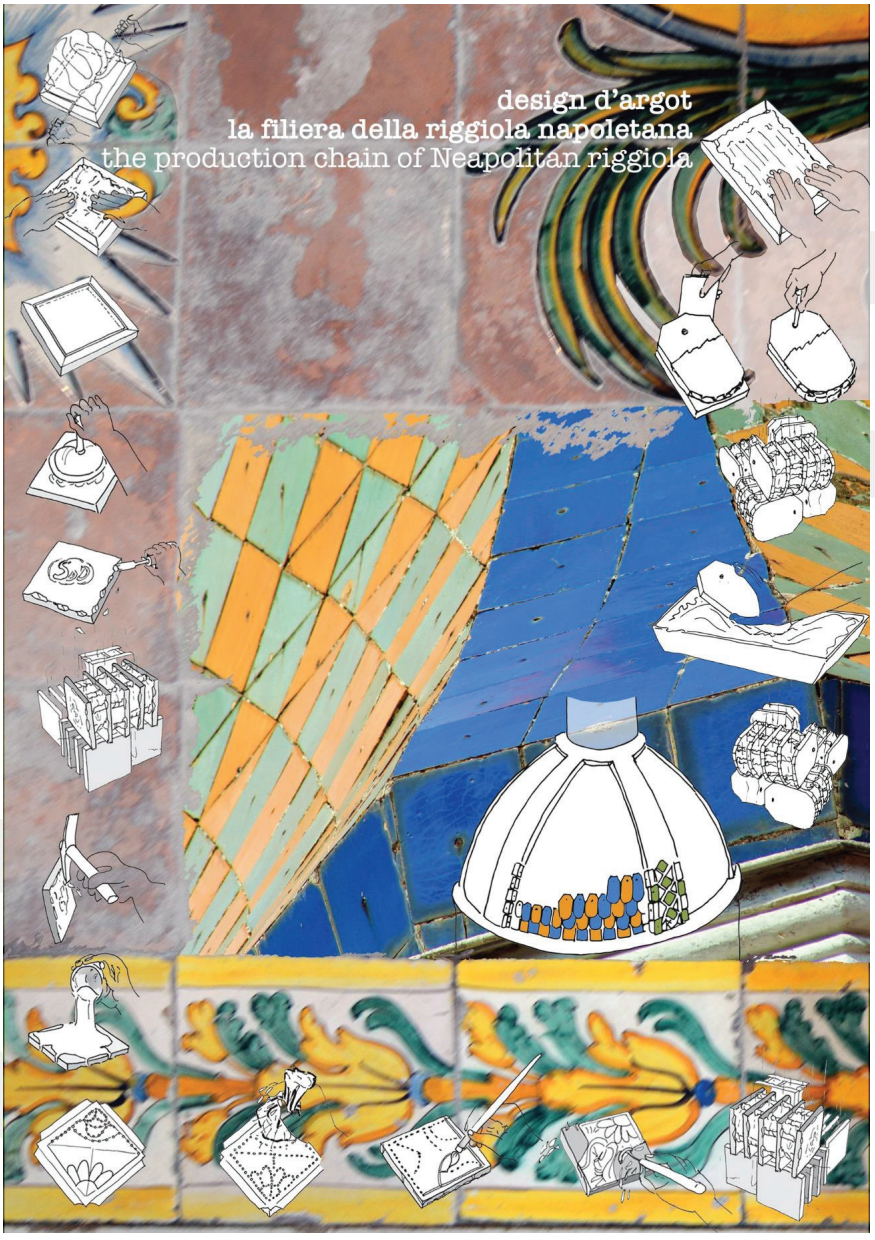


Figure 1. *Argot Design*: the production chain of Neapolitan *riggiola* tile. From top left to bottom right, the sketches illustrate the processing sequence from raw clay to the second final firing. On the right side, there is the graphic sequence of the nailed tile for the domes.

used for the construction and/or consolidation of structural parts of floors and light ceilings to better satisfy the habitat needs. Again, in the field of *argot design*, the case studies have systematized in the ranges of the transformation of agricultural products such as wheat, grapes, olives, and various other fruits of the earth, typical of the food culture of southern Italy. They have selected also in relation to the celebrations of "2018 Year of Italian Food" (http://www.beniculturali.it/annodelciboitaliano). [S. Carillo]

Methods

Vernacular architecture and *argot design* hold a material and immaterial value at the same time. Materiality consists of various sustainable design solutions that are waiting to be 'rediscovered' and updated through the careful analysis of the case studies. Immateriality, on the other hand, lies in the social and anthropological traditions linked to the implementation of partially forgotten building practices, or to the use of domestic and working objects, characteristic of everyday life that has not yet been documented in detail.

The case studies range from architectural to anthropometric proportions, with a wide variability of plastic forms and surface finishes, in the defined range of natural materials such as wood, metal, terracotta, stone, glass.

The scientific research method used by the authors is that of the Italian Historiographical School, and especially Neapolitan one, which proved to be very flexible with respect to the variety of case studies. It is essentially based on the integrated critical analysis of several information concerning:

- observation of the case study in its singularity, and in the contingent or proven environmental context;
- reading of bibliographic or archival sources directly related to it, or the comparison with other similar case studies
- study of the characteristics of size, plastic form, material, conservative state, functionality, use, through scale model designs;

The interpretation of this information is also systematized through the chronological, typological and morphological classification of several compared case studies - by digital Information Systems (GIS, BIM) - considering ergonomics as a key.

Figure 2. *Argot Design.* Comparative image of three models of *rasola*. The knife-spatula used by bakers and pizza makers to cut the dough into standard portions.

In the phases of preliminary systematization of the case studies, the research focused on the general areas of *Living* and *Food*, which do not have univocal and direct correspondence with the themes of vernacular architecture and argot design, respectively. The need to shelter and feed has in fact stimulated in man to the realization of elements that transversely go from the architectural scale to the minimal object. Embracing the fundamental issues of human life - which can be deduced from the use of specific artefacts - the authors are collecting other case studies concerning the fields of *Fashion* and *Communicating*, which will be the subject of a forthcoming text. [M.C. Campone]

Findings and Discussion

Among the significant elements of traditional architecture in Campania, the *riggiole*, the finishes in terracotta, wood, iron and similar metals are illustrated. The *riggiole* tiles are square, rectangular or hexagonal (sometimes with mixed boundaries), handmade in terracotta glazed on one side (*riggiole petenate*) or used rough (*riggiole spetenate*). This type of tiles are widely used over the centuries (the earliest examples date back to the fifteenth century) to cover the internal and external architectural surfaces, above all for their remarkable resistance to wear

and their figural variability, in relation to the polychrome decoration, and to the glaze reflection to the light. The examples shown in this text (fig.1), document the use in the floors and external vestments of civil and religious buildings, and again in the domes through the particular method of nail fixing to the inclined surfaces. Within the *Food*, the typical artefacts objects of popular culture bell are illustrated in relation to the main cultivation and processing of agricultural and livestock products, without forgetting that some objects can be used across in most working environments (such as containers, cups, blades, and so on). In this paper, a case study for each of the main work activities is illustrated in detail.

Among the human necessities, the Water deserves a specific treatment, and therefore is excluded from this text, although its containers of various uses, shapes and sizes - conceived at the beginning of human technique - have been gradually adapted to liquids of different nature and consistency.

In the Bread artisan production, the *rasola* (knife) used to make leavened dough is particularly interesting. It is a thin metal plate made from a small bar by hand forging; slightly sharpened at one end, while the opposite one is a handle. The specimen with the ends bent at right angles (fig.2) is the most singular, because its shape and the way of grasping let it be hypothesized that it was used to dose the volume of leavened dough to be processed later.

Among the various fruits brought by Columbus in Europe, tomato and coffee are certainly the ones that dominate Italian food, especially the southern one, more than any other one. As consequence, the greatest number of case studies refer to the transformation of tomatoes into preserves and sauces and coffee into hot drinks.

The two illustrated tomato mills are examples of two different stages of fruit processing (fig.4). The first grindstone is the cornerstone of the artisanal production of tomato preserves, and it is typical of the southern peasant reality especially Neapolitan. In the highly articulated artisan production chain - itself the object of study - the tomato has minced in the mill by a mechanism of helical blades, designed to separate the pulp from the coating and from the seeds. The tomato therefore assumes a granular consistency (solid / liquid), suitable to be bottled and stored for a long time in glass containers (classifiable as *argot design*, too), after a pasteurization phase. The second mill is used for the immediate extraction of the tomato pulp in the pot. The fruit is cut by a system of helical blades (different from the first ones) which, by rotating, press the pulp on the sieve which acts as the bottom; in this way, only the granulated pulp falls into the pot placed on the burning flame.

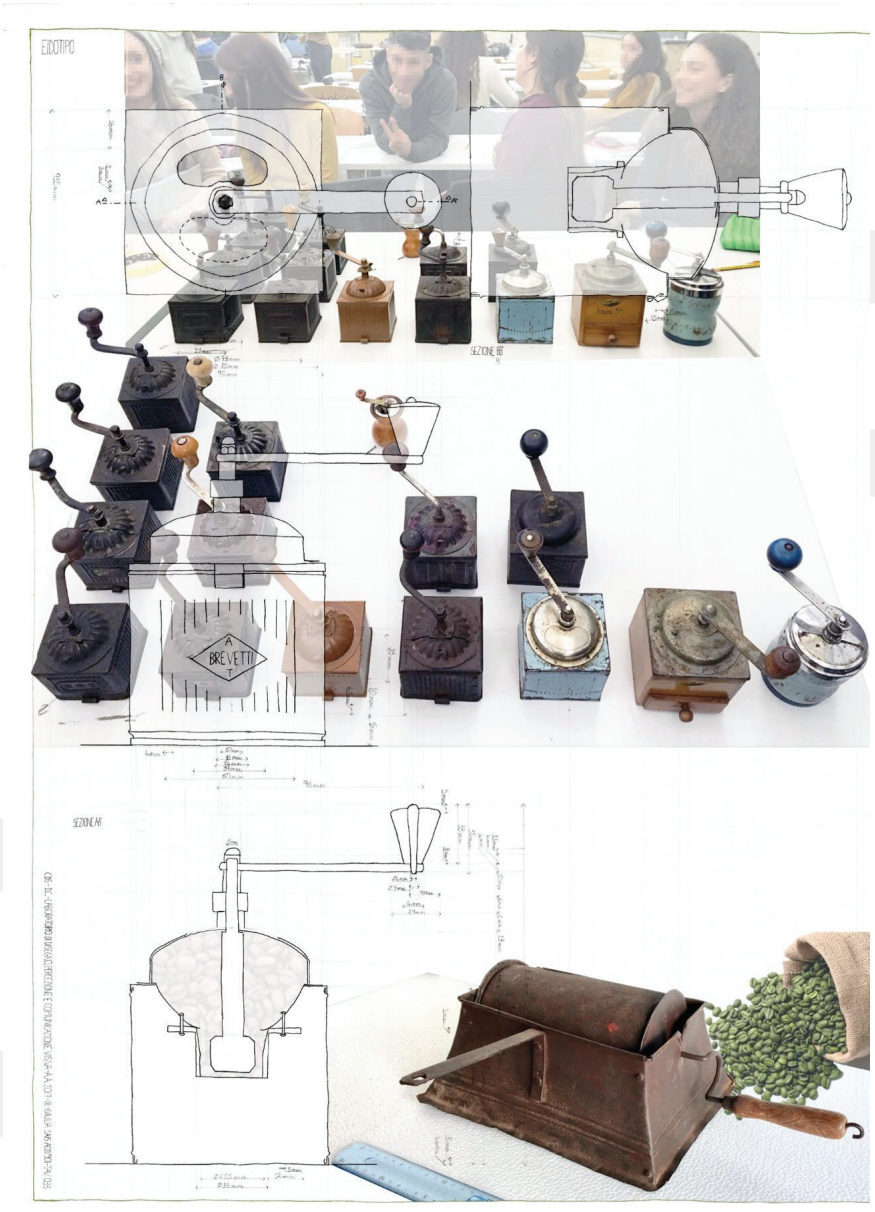


Figure 3. *Argot Design*: the production chain of domestic coffee. The device to toast the coffee beans (lower right) and the small grindstones; 15 specimens compared and freehand survey drawing.

Before the industrialization of espresso or instant coffee, the realization of the hot drink had lived more than today as a reflexive ritual, so much to be staged by Eduardo De Filippo (an actor and playwright, Napoli 1900-Roma1984) in some theatrical works.

From the sale of raw berries to the cooking of the drink, the authors are outlining the complete production chain in the domestic sphere, and below are three objects of *argot design* as an example: systems for roasting raw berries on the coals or on the flame; the mills to pulverize the roasted beans; the famous 'Neapolitan' coffee machine. Regardless of shape variety, the toasting the berries are generally composed of two parts: a rotating box by means of a hand-operated handle, in which the raw banks put, and an external and independent support serving as spacer from the fire. The essentiality of the device has embellished by a system of vanes - integral with the handle that goes beyond the casing and variously arranged inside - capable of continuously revolutionizing the beans during the rotation of the box to ensure a homogeneous cooking. The coffee chain continues with the grinding of roasted beans: starting from the same mechanical system, at least ten morphological and material variables have been classified. The container bulb of toasted beans with the gear blades driven by a mix line crank and the dust collection box are the two functional elements present in

Figure 4. *Argot Design.* Two traditional grindstones for domestic tomato sauce.

each specimen. The most complex examples have a lever spacer system which allows to vary the granularity of the ground coffee, moving the internal gears of the blades. The casings range from the carefully folded, creased and stiffened sheet metal by sequential bending, to the squared wood and worked like a box with a drawer (fig.3). The hot drink is finally prepared with the 'Neapolitan coffee maker'. A well-known design object that has often been redesigned in useful years, for example by Riccardo Dalisi. It is still used although it has been supplanted by the so-called "moka", a speeder device. [P. Argenziano]

Conclusion

The illustration of the selected cases is able to highlight the complexity of the know-how implicit in the design of argot that, combining materiality and immateriality, documents the complex relationship that man has established with Nature and its constituent elements. The implicit condition of sustainability connected to the design and use of these resources is an explicit guarantee of how useful and necessary a reflection on the neglected "matter" of argot design can be. [S. Carillo]

References

Alessi, C. (2016). *Design senza designer*. Bari: Edizioni Laterza.
Argenziano, P. (2008). *Influenze arabe nella produzione vascolare irpina*. In Spazi e Culture del Mediterraneo 2. (pp. 493-497). Roma: Kappa Edizioni.
Argenziano, P. (2014). *3D Surveying beyond Cultural Heritage*. In Development and Preservation in large Cities. Edition 2014 (pp. 33-34). Napoli: La Scuola di Pitagora.
Baudrillard, J., & Nouvel, J. (2003). *Architettura e nulla. Oggetti singolari*. Milano: Mondadori.
Brusatin, M. (2007). Utilità che piace, qualità utile. In *Arte come design. Storia di due storie* (pp. 3-17). Torino: Einaudi.
Carillo, S. (2014). Design come argot. Memoria come design. Restauro come progetto. In *Materia Cimitile. Didattica e Innovazione. Atti della XXI e XXII Settimana della Cultura Scientifica e Tecnologica del MIUR* (pp. 45-56). Napoli: La scuola di Pitagora.
Carillo, S., Muzzillo, F., & Violano, A. (2001). *Contesti minori di pregio*. Napoli: La scuola di Pitagora editrice.
Cocco, G. B., & Giannattaso, C. (2017). *Misurare Innestare Comporre*. Pisa: University Press.
Dalisi, R. (2008). *Lo schizzismo*. Mantova: Edizioni Corraini.
Dalisi, R. (2009). *Decrescita. Architettura della Nuova Innocenza*. Mantova: Edizioni Corraini.
Gambardella, C. (2005). *Radicalmente Napoli. Architettura e Design*. Napoli: Clean Edizioni.
Maldonado, T. (1976). *Disegno industriale: un riesame*. Milano: Feltrinelli.
Michaud, Y. (2007). *L'arte allo stato gassoso.* Roma: Idea.
Molotch, H. (2005). *Fenomenologia del tostapane*. Milano: Raffaello Cortina Editore.
Pasca, V., & Trabucco, F. (1995). *Design: Storia e Storiografia*. Bologna: Progetto Leonardo.
Pye, D. W. (1964). *The Nature of Design*. London: Studio Vista.
Pye, D. W. (1968). *The Nature and art of workmanship*. Cambridge: University Press.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Libya, colonial architecture and tourist propaganda in the fascist rhetoric

Marco Carusone[1], Michela Russo[2], Roberta Bellucci[3]

[1] Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, marcocarusone@yahoo.it
[2] Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, michelarusso.m@libero.it
[3] Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, roberta.bellucci7@gmail.com

Abstract: The significant urban transformations desired by Mussolini about the settlement of the Overseas Lands and the tourist propaganda, contributed to the emergence of the Italian fascist myth modifying the perception Italians had about colonies. In particular, Libya, that was a dangerous front during the early 1900s, with the end of the war in the '30s seemed to be a safe land, ready for the demographic colonization and the tourist experience.
Through analysis and comparison of iconographic sources, contemporary literature and direct sources of the 19th century, as La Rivista delle Stazioni di Cura, Soggiorno e Turismo, the aim is to analyze the importance that the colonial architecture in Libya and tourist propaganda had not only about the establishment and the stabilization of the fascist rhetoric but above all about Libya financial and social sustainability.

Keywords: fascist rhetoric; fascist architecture; sustainability; Libya.

Introduction

The tourist magazines, by the will of Mussolini, represented a strong propaganda instrument. Reading one of them meant to know the excellent results of the foreign policy, without the necessarily need of a movement. Since the 1930s, the Fascist government defined two directions about the colonial policy in Libya: the first encouraged the agricultural sector promoting the territory for the arrival of new colonists, the second aim at the transformation of Libya in a tourist and cozy land, able to provide for itself. Both the directions had in common the idea of a modern and avant-garde Libya. Using the tourist industry potentialities was a necessity rather than an auspice. Mussolini himself regulated the employment providing for vacation salaries to the workers, making them able to travel for simple pleasure.

Tourism developed in Italy and in the new colonies as establishment of the fascist magniloquence but also as new and important economic movement.

Section

Before Mussolini, the image of Libya was a primitive land, deprived in terms of culture and infrastructures (see figure 1). The focused foreign policy and a well-established urban transformation made it a modern colony. By this time, efficient connection systems and modern hotel accommodations didn't offer a dangerous adventure to the tourist, but a comfortable and safe trip. To confirm what was written, in 1927 by "Rivista delle Stazioni di Cura, Soggiorno e Turismo": «L'impulso al ritmo coloniale dato dalla volontà creatrice di S.E. Benito Mussolini, è l'impulso efficace, alla maniera fascista, che subito genera, produce, concreta. Chi da qualche anno vive nella nostra Tripolitania ne ha percezione precisa. Isolati, rari, giungevano i visitatori; si fermavano poco, o ripartivano dalle nostre città un po' disillusi. […] Oggi sono sorte come opere di miracolo bellissime strade di comunicazione con i centri più lontani dell'interno, si sono centuplicati i servizi automobilistici ed il passeggero che sbarca a Tripoli può scegliere tra quattro, cinque alberghi di 1° ordine, oltre al bellissimo "Grand Hotel", che fu costruito dal Comune di Tripoli, e recentemente ampliato con criteri di magnifica modernità». (Rivista delle Stazioni di cura, soggiorno e turismo, marzo 1927, p.65).

To illustrate this tourist accommodation project, it should be recalled the visit in Tripoli in March 1928 by a representation of Italian medical professors who evaluated the climatological and the accommodation conditions of the colonial city to include it in the climatic and touristic vacation spot list in North Africa (Rivista delle Stazioni di cura, soggiorno e turismo, marzo 1928, pp. 8-9).

The Italian architects called on to contribute in Libya, distinguished for their sensitivity about the context inverting the typical tendency of colonizers. If the Libyan culture was marginalized on magazines, architecturally, the recovery efforts of the local traditions weren't isolated.

In spite of the clear references to Classicism and Roman civilization, typical of the fascist period, an attempt was made to establish a dialogue with the vernacular local building.

The architects Carlo Enrico Rava and Sebastiano Larco, for example, in the Homs hotel realization (see Figure 2), founded the rationalist aesthetic postulates on the local building features.

The result was an architecture fully settled in the Mediterranean landscape, through the vernacular element conservation, such as the little square windows and the elongated doors articulation.

In addition to the major private companies realizations, the Government of Libya approved rural houses destined to privates, built with government subsidies. Some of them were entrusted to the architect Florestano Di Fausto who focused on the study of some mono-familiar and duplex typologies (Lemme, 2010, p. 95). The initial concession of lands to privates, then, was cancelled and exclusively transferred to E.C.L., the institution for Libya

Figure 1. An internal landscape of Tripoli in 1920s

colonization. The first measures took place between 1933 and 1934, those named *Luigi di Savoia, Primavera* and *Giovanni Berta.* Between 1938 and 1939 the E.C.L., supported by the I.N.F.P.S. (Istituto Nazionale Fascista per la Previdenza Sociale), achieved lots of trips for colonists from Italy. Remembering the intervention of architects Alberto Alpago Novello, Ottavio Cabiati, Guido Terrazza and Luigi Piccinato who, between 1931 and 1934, realized the I.N.C.I.S. district (Istituto Nazionale Case Impiegati dello Stato) in Tripoli. Eleven buildings and three hundred and twelve residences, allocated along the lot perimeter, with a big green area in the middle. Piccinato was one of the protagonists between the new colony architects, contributing also in terms of theory. Famous is the study of the Libyan colonial house, a

compact volume externally closed with the main spaces located around a central courtyard with a basin, surrounded by a portico, proposing again the typical "Mediterranean house" with characters of the local building tradition such as the jalousie windows and the jutting loggia of the living room.

Figure 2. The hotel in Homs designed by Carlo Enrico Rava and Sebastiano Larco

«L'architettura era ispirata ai volumi candidi dei piccoli centri urbani dell'area mediterranea, compresi alcuni elementi tipici, come le scale esterne, i portici e le terrazze» (Lemme, 2010, p. 95).

Among the protagonists, we remember Giovanni Pellegrini who carried on most of his activity here and whose greatest work is Villa Salvi, built between 1934 and 1935 in collaboration with engineer Vittorio Agujari.

The fascist propaganda and the tourist movement walked hand in hand, so much so that in 30s, ENIT, the Italian Tourism Company and the Tourism Commissariat referred to the Secretary about the press and propaganda.

The tourism organization was entrusted to the nascent public institution E.T.A.L. (Ente Turistico Alberghiero della Libia), which in 1935 replaced the suppressed Tourism Commissariat in Libya, founded only two years before. The orientation of the propagandist message was ample, magazines, a real indoctrination of the masses. The field trip, that would have been undertaken by the students of the Medical school of Naples, leaded by Prof.

Castronuovo, was commented in this way: «Far conoscere la colonia! Ecco la chiave di volta di molti successi venturi… E tanto meglio se i visitatori sono i giovani delle Università, i medici di domani, vale a dire i propagandisti per eccellenza…» (Rivista delle Stazioni di cura, soggiorno e turismo, 1928, p. 41).

The journalistic aim was clear, the colony should be considered as a land of work, in which the Italian emigrants enjoyed comforts and public assistance. Describing the agricultural industry progresses in Libya, magazines encouraged visitors to enjoy the amazing view of the rich verdant fields, where, before fascism, there was only red ground.

In fact, in '30s, Tripolitania was considered by collectivity as a land meant to be the Italian granary (Rivista delle Stazioni di cura, soggiorno e turismo, 1927, p. 66).

In Africa, tourism wasn't an adventure anymore, but a pleasant trip to discover an independent land.

The war broken out in 1939 and the consequent Italian involvement in the conflict, coincided with a growing propaganda, interrupted by the defeated of the regime against the English in the Mediterranean and the final loss of the colony in 1943.

Conclusion

The magazines published in the middle of '20s, contributed to the creation in the world of the myth of a powerful and fascinating Italy. They were able to raise in the reader pride and reverence feelings, because they allow to verify the socioeconomic progresses made by the regime in the new colonies.

The aim of the Italian ruling class was to make tourism as the most important source of earnings that, flanked by the agricultural sector, would have made the colony sustainable and without the need for assistance by the central government.

In spite of the fascist project failure, the architectural overview survived can't be analyzed separated from the socioeconomic conditions produced by the Regime that where illustrated by the incessant tourist propaganda presented in parallel in Italy and in the world.

Continuing the historical research considering the socioeconomic environment and the propagandistic environment, means to realize a new interpretation of the work and the tourist encouragement based on the fascist rhetoric.

References

Battilani, P. (2001), *Vacanze di pochi, vacanze di molti. L'evoluzione del turismo europeo*, Il Mulino, Bologna Dokmeci Yorukoglu, P. N., Harputlugil, T., & Tünger, C. (1967).

Cohen, E. (1974), *Who is a tourist? A conceptual clarification*, Sociol.

Del Boca, A. (1997). *Gli italiani in Libia Vol. 1: Tripoli bel suol d'Amore*, Mondadori, Milano.

Fantoli, A (1934), Le strade della Tripolitania, *Le vie d'Italia. Rivista mensile del Touring club italiano, aprile*.

Federazione Nazionale Fascista degli esercenti l'industria idrotermale (1927-1933), *Rivista delle Stazioni di cura, soggiorno e turismo,* Roma.

Lemme, R. (2010), *Le case degli italiani. La casa bene primario, l'evoluzione delle abitazioni popolari borghesi*, Gangemi Editore, Roma.

McLaren, B. (2006), *Architecture and tourism in Italian colonial Libya: an ambivalent modernism*, University of Washington press, Seattle.

Munzi, M. (2001), *L'epica del ritorno. Archeologia e politica nella Tripolitania italiana*, L'Erma di Bretschneider, Roma.

Pessina, A.F. (1935), Turismo d'avanguardia in Libia, *Le vie d'Italia. Rivista mensile del Touring club italiano, aprile*.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Campania Felix from rural landscapes to smart lands

Francesca Castanò[1]

[1]*Dipartimento di Architettura e Disegno Industriale, Università degli studi della Campania Luigi Vanvitelli, Aversa (Caserta), Italy, francesca.castano@unicampania.it*

Abstract: Changes in rural areas, such as depopulation and land abandonment, but also the decommissioning and spoilage of old production structures and original cultivation, are progressing gradually and often irreversibly. The University of Studies of Campania "Luigi Vanvitelli", in collaboration with the network of historians for productive landscapes and different municipal entities, are conducting an in-depth study to stimulate debate among local policy makers and strategies of the European Union on the future of European rural areas and the role of policy instruments. The aim of this contribution is to demonstrate the particular importance that the historical-environmental survey can have on the socio-economic future of the territories. The attention will be focused on small internal regional portions of Campania characterized by specific identities. Within this specific area, we can better understand the complementarity between the history of places, local identities and production processes.

Keywords: history of architecture; rural areas; productive landscapes; cultural strategies; cooperation.

Introduction

The discipline of history, within its scientific identity, moves today in an attempt to recover an active role in the public scene.

Its main objective is to establish a constructive dialogue with territorial policies and promote innovative decision-making procedures for the circulation of knowledge and for the purposes of collective choices.

The environmental, social, cultural and economical challenges can be faced with the cognitive tools typical of historical knowledge, stimulating the exercise of critical thinking essential to optimize the circuit that proceeds from theory to practice, from knowledge to action.

The territories now have a rich literature that has investigated them from many points of view, both for the monumental aspects and for the environmental and physical ones.

This great amount of information that the communities have, sometimes without even having full knowledge of it, facilitates the path of those who want to make their acquaintance with it, but still prevents the recombination of the many elements already known in readings and interpretations that can be used for the purpose of a process of effective relaunch.

The value of places, as they have been built around the essential themes of their history, now allow us to free ourselves from emergency or extraordinary policies, rediscovering and nurturing the ability to tell the future.

The objective of this contribution is to highlight the particular importance that the historical-environmental investigation of the government of the territory can assume in this perspective, even more if the level considered is the local one and if the attention is further focused on regional portions characterized by specific identities such as the internal areas (Borghi, 2017).

Rural areas between old cooperation and future sustainability

Within this specific area, the complementarity between local identities and production models is more clearly understood; as well as between ancient uses and prospects of sustainability; between public institutions and private entrepreneurship (Magnaghi, 2000).

On the other hand, these are territories which today, both in Italy and in Turkey, are characterised by a high degree of fragility, in terms of depopulation, if not abandonment, a lack of development forecasts and a growing state of isolation.

Fig 1. Ruviano(Caserta), De Angelis Farm, photo Gino Saracino, 2017.

However, at the present time we are witnessing a renewed and more constructive reflection on the theme of this same fragility, reinterpreted as a condition that is not pathological but structural, both for individuals and for communities and territories, to be brought back within the perspective of a precious heritage connected to relational capacities and networks.

The state of crisis affecting contemporary society has made it indispensable to connect the phenomena, dealt with separately in the past, identifying in an interdisciplinary way the nodes of a wider network of interacting fragilities.

And this in order to reveal the consciences of the territories, to highlight their historical characteristics, to promote the inclusion of civic knowledge and the skills of the people, to build projects for a shared and sustainable future and to star up again the territorial capital.

In the internal areas, the municipal context can be traced back to a physiological communitarian dimension characterized by peculiar natural elements, such as hills, mountains, vast productive or transit areas, which have made cooperation historically indispensable.

The collaborative paradigm deriving from common historical roots, strongly connected to the evolution of production processes and the solution of territorial problems, is expressed in a concrete commitment to the care of common goods and cultural heritage, awakening in citizens a collective intelligence that makes them active and competent interlocutors even in decision-making processes.

Methods

The methodology is based on the knowledge of the territory and the deepening of the historical features, combined with the interdisciplinary analysis of environmental, social and cultural aspects. Starting from the guidelines of the National Strategy for Internal Areas - SNAI 2015, we intend to frame the new short-term objectives of the Europe 2020 Strategy and the medium-long term objectives of the European Commission 2050 Objectives. From this perspective rural picture of the "Campania felix", or "Terra di Lavoro", still lacks a comprehensive analysis of reference.

One reason is to be found in the controversial terms of its very ancient history and a more recent political geography that has rewritten its borders (Musi, 2006).

As if to say that it is -in Galasso's words- «una creatura assai più della storia che della geografia».

(Galasso, 1978, p. 10).

Fig 1. Ruviano (Caserta), Arena wine cellar, photo Lucio Criscuolo, 2017.

This "felix" campaign has reached its maximum extension occupying for a long period about one third of the entire ancient Campania, including the lower Lazio and part of Molise. Only during the twentieth century it was reduced to the province of Caserta.

A narrowing of territorial boundaries that has caused a substantial loss of entire pieces of territory and their history recomposed into cultural and social frameworks of geographical contexts different from the original ones.

Campania felix has gone through many modern times and has experienced profound changes in its physical and cultural hinterland which cannot necessarily be traced back to the current configuration of its places and the dispersed identity of its inhabitants; these changes are essential components for the framing of the rural space.

The great reclamation works of the Regi Lagni, starting from the XVII century, increased the fertility of Campania felix, creating a new region between the river Volturno and the ancient regimented Clanio, with positive effects on the cultivable of the internal territories.

The full modernity was reached in the following century with the Bourbon policy that would transform the land of Work in a place of experimentation and conquest.

In the policy of Charles of Bourbon, the main functions of the Kingdom, from the directional to the management of the territory, were to be located in the hinterland of Caserta, rather than in the Neapolitan and Vesuvian area.

The Vanvitelli designed royal palace became the fulcrum of this new reorganization and all around, within the framework of the real sites, we proceed to the acquisition of the pre-existing land properties and their reuse in a far-reaching plan, to start experimentations in the agricultural and zootechnical field.

Findings and Discussion

This is one of the most studied and analyzed topics in historiography, for the high level of Bourbon programs reached to accurately highlight all the firsts in terms of introduction of new crops, modernization of production systems, land organization, the start-up of new industrial enterprises.

The decade of the French government also contributed greatly to the definition of land management bodies, in particular with the Society of Agriculture and the agricultural chambers, which in the years of the Restoration were transformed into real economic societies of "Terra di Lavoro".

In the post-unification structures the rural and productive vocation of this region and the entire territorial organization realized in the secular Bourbon domination will not suffer deep upheavals and the "Campania Felix" continued to be a privileged place from the nature and many certainly were the entrepreneurs who continued the previous activities.

With the end of the nineteenth century and the beginning of the new century, however, even specialist literature does not appear to be sufficiently interested in the evolution of that rural world that had been at the centre of the interests of the previous season. Historical studies favour the great territorial frescoes, following the traces and destinies of the monumental patrimony (Di Giacomo, 1924).

We would have to wait for the explorations of the geographers Mario Fondi, Luigi Pedreschi and Domenico Ruocco (Pedreschi, 1964). In the Fifties, they once again crossed the Campania felix, which had meanwhile been reduced to the province of Caserta alone, and they recorded, photographed and documented the rural dwellings of the most remote places from the vast plain of Campania to the hilly and mountainous hinterland, founding the Study Centre for

Ethnological Geography. Roberto Pane's analytical and detailed research, begun in previous years with the study of rural houses and then merged into the major exhibition on the regions of Italy in the expo of Turin in 1961 and in the mythical volume Campania and the tree, also document with great care the vast plain and the hills of Caserta (Fralliciardi, 2003).

Conclusions

It is only more recently that the paradigms of sustainability are once again drawing attention to an endangered rural environment (Senatore, 2013).

In fact, a notable historiographic interest is emerging towards the marginal or minor realities of the internal areas in which a new model of active citizenship emerges.

Remote and sometimes forgotten places still able to express and communicate identity values, carriers of ancient stories and immortal practices, but sometimes revealing new records still to be mapped and studied.

Invisible networks of spaces and knowledge that have traversed the many modern realities of history without ever being truly modern, connected to each other and integrated into the natural environment.

As in the case of Ruviano, a village of about 1600 inhabitants in the province of Caserta, where local authorities and citizens themselves, in agreement with the University of Campania "Luigi Vanvitelli", try to meet this challenge, starting from the history of production processes that have characterized its growth during the nineteenth century.

This small village is paradigmatic, both for the emergencies of its historic center but also for the vast countryside surrounding production (Magnaghi, 2007).

Completely restructured, thanks to European funding, it has launched an action to revitalise the entire agricultural sector, reorganising the network of services to citizens, improving the physical and digital infrastructure and involving the entire community of citizens in this process.

Around the many farm buildings in the territory new activities flourish, recovering the ancient cultivations and promoting a virtuous production chain that reaches the international markets.

A networked cooperation between public bodies and private companies that fully embodies, even within the margins of a smaller reality, the model of sustainable development as defined since 1987 by the Brundtland Report «Humanity has the ability to make development

sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs» (Borowy, 2014).

References

Borghi E. (2017), Piccole Italie. Le aree interne e la questione territoriale; Donzelli, Milano;

Borowy I. (2014), Defining Sustainable Development: the World Commission on Environment and Development (Brundtland Commission), earthscan/Routledge, Milton Park;

Di Giacomo S. (1924), Da Capua a Caserta, Istituto italiano d'arti grafiche, Bergamo;

Frallicciardi A.M.(2003), Tipologie dello spazio rurale in Campania: un'analisi preliminare, in G. Calafiore, C. Palagiano, E. Paratore (a cura di),Vecchi territori, nuovi mondi: la geografia nelle emergenze del 2000, Atti del XXVIII Congresso Geografico Italiano (Roma 18-22 giugno 2000), vol. II, Edigeo, s.l., pp. 1508-1519;

Galasso G. (1978), Storicità della struttura regionale, in F. Barbagallo, (a cura di), Storia della Campania, I, Guida, Napoli;

Magnaghi A. (2000), Il progetto locale, Bollati Boringhieri, Torino;

Magnaghi A., a cura di, (2007), Scenari strategici: visioni identitarie per il progetto del territorio, Alinea Editrice, Firenze;

Musi A. (2006), Storia sociale e politica: la regione della capitale, in Enzo Giustino, (a cura di), La Campania. Le radici e il domani, Guida, Napoli;

Pedreschi L. (1964), La casa rurale nella provincia di Caserta, in M. Fondi et al. (a cura di), La casa rurale nella Campania, Olschki, Firenze, pp. 23-110;

Senatore G. (2013) Storia della sostenibilità. Dai limiti della crescita alla genesi dello sviluppo, Franco Angeli, Milano; a

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Adaptive reuse in sustainable development: the case study of Ercolano (Italy)

Francesca Ciampa[1], Martina Bosone[2]

[1]*Department of Architecture, University of Naples "Federico II", Naples, Italy, francesca.c.16@hotmail.it*
[2]*Department of Architecture, University of Naples "Federico II", Naples, Italy, martina.bosone@gmail.com*

Abstract: The research develops in the context of processes of sustainable adaptive reuse on urban scale. The document proposes a participatory methodological approach that, integrating interviews with privileged interlocutors and performance analysis of settlement processes, is used as an investigative tool in the phase of knowledge of the reuse project. The outcome is embodied in the elaboration of a vulnerability matrix that integrates the needs of the social system with the limits of transformability of the settlement system. This approach was used in the case study of Via Pugliano in Ercolano (Italy), characterized by the second hand economy linked to processes of re-use of fabrics. In this case, the adoption of multi-actors participatory process determined the identification of a framework of shared needs based on which it was possible to construct alternative scenarios of sustainable adaptive reuse. The goal integrates the physical, social and economic values expressed by local community.

Keywords: vulnerability matrix; sustainable adaptive reuse.

Introduction

Many cities on international level are experimenting with innovative processes, on a shared basis, for the regeneration of urban spaces. These practices act on built heritage incorporating the needs of the community (Council of Europe, 2005) and of the actors involved in the transformation processes of contexts. In the design phases, the enhancement of existing building resources is necessary to safeguard both physical and cultural values. In this perspective, the reuse project represents a strategic action to promote the extension of life cycle of settlement systems. In fact, it allows defining interventions that satisfy the new needs of users and integrate the physical, economic and social values expressed by the manufactured products and their contexts. The designing process of a sustainable recovery of settlements (Caterina, 2016) includes of new functions that give a second life to the degraded and abandoned building. In this perspective, the degraded and abandoned buildings are considered as an opportunity for experimentation and a potential for the development of settlement systems.

The object of the research is participatory methodological approach as an analytical tool in the phase of knowledge of the reuse project. This approach lets to elaborate design line

guides that integrate the needs of the community (ICOMOS, 2017) and the actors involved in the transformation processes of the contexts (Fiore, 2013).

The case study is via Pugliano, a street located in the modern city of Ercolano, near Naples. It needs to develop a sustainable reuse project because of the presence of a severely degraded physical system, subject to spontaneous transformation processes by the local community, and thus becoming vulnerable.

Methods

The creation of new synergies for the recovery of the physical system becomes an opportunity to recast the ability to preserve specific identities by building new values, relating the quality of the built environment with the productivity and innovation of local communities. Experimentation activates a process of social innovation that involves different actors in all phases of the planning process.

The research methodology is based on the hypothesis of an operative model for the knowledge, planning and management of urban productive contexts. This type of experimentation proposes a sustainable and operational model elaborated for its replicability. It consists of five main phases (fig. 1).

The first phase concerns the definition of a model of knowledge of the historical urban landscape (UNESCO, 2011). This phase highlights performance over time to identify the pressures and agents that have driven transformations on a local scale and on shared identification values. This phase involves a multilevel knowledge system on different scales: from the building to the urban aggregate, from the municipal to the intercommunal, combining expert knowledge with local knowledge in a multi-sectoral perspective.

The second phase starts with the interviews with privileged interlocutors to elaborate a complex knowledge model framework based on needs and expectances of different stakeholders. First, the Regions will be interested in investing in the cultural heritage of settlement systems. The second is the Municipalities, which will have the aim of revitalizing the economic and social systems of the city through an urban regeneration project. The third is the University, which will play the role of technical consultant to manage the quality of the project and will increase communication and collaboration between institution and local stakeholders. The fourth is the local community, which will be interested in improving living conditions both through maintenance/recovery action on built environment and through the

valorisation of local identity and culture. The last are the traders, which will reactivate the local economy.

The third phase includes the aim of this methodological approach that, regards the identification of a framework of shared needs, construct alternative scenarios of sustainable adaptive reuse. From the comparison among the needs expressed from different stakeholders and the analysis of performances offered by the settlement it is possible to deduce what it is possible to deduce what are the limits set by the examined contest to suffer further transformation processes. This phase defines the new changes that depend on the ability of the community to manage urban spaces or to build new relationships between physical and production processes. The level of quality depends on the correspondence between the user's needs and the framework question.

The fourth phase is the elaboration of a vulnerability matrix as outcome of the previous analytical phase (fig. 2). This matrix integrates the needs of the social system with the limits of transformability of the settlement system. The matrix, of a replicable nature depending on the case, deals with the themes of social, technological and urban planning at the same time. Broader frameworks, relating the different units of the environmental built (space) system with the social dynamics of the site, define the work. The matrix analyses the different spatial elements based on the processes in progress, intervention processes and caused phenomena, obtained through the perception of the community in the participated project actions. The drafting of an interpretative matrix of the different aspects of knowledge allows the harmonious coexistence between the "identity" recognized for this sector. In this way is possible to protect the identity of the asset in relation to the settlement system, ensuring a significant growth of economic and social values.

The last phase coincides with the elaboration of an urban-scale adaptive and inclusive reuse project that, basing on multi actor participatory approach, is able to protects the identity of the settlement system, guaranteeing a significant growth of the site's economic, cultural and social values.

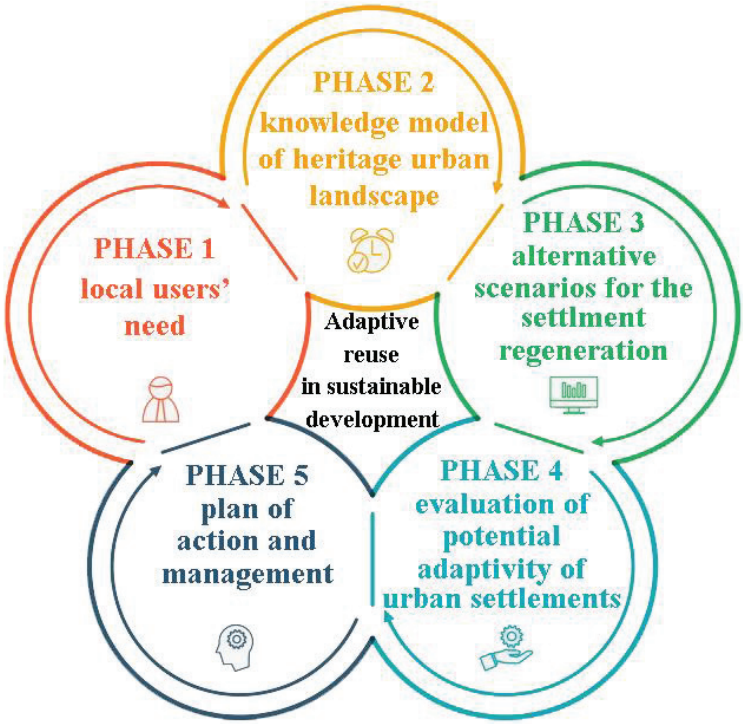


Figure 1. Sustainable and operational model for adaptive reuse in sustainable development: the case study of Ercolano (Italy) (Ciampa, Bosone).

Findings and Discussion

The result of the research is a replicable operating model in different contexts. The sustainable and resilient regeneration (Walker et al., 2004; Folke et al., 2010, Resilience Alliance, 2010) of cultural heritage is based on actions of adaptive reuse of urban aggregates with a productive vocation. The fundamental principles derive from the application of a matrix of vulnerability to the context in which it operates. The proposed approach is based on the idea of rethinking the public space as a place influenced by the population in every phase of its life, not only in its use but also in its design. The collaboration among different stakeholders guides the strategies to elaborate a shared regenerative project. The basic process

is influenced by the role of an active community, which builds and controls the actions of regeneration. This vision manages the cultural values produced over time (Cerreta and De Toro, 2010). The innovativeness of the model developed consists in the role of the new local communities on the interaction between decision makers, stakeholders, users and designers. In this perspective the design process is sustainable because every decision is the result of the comparison and the consultation among different stakeholders and is directly connected with the needs and the expectances expressed by local community.

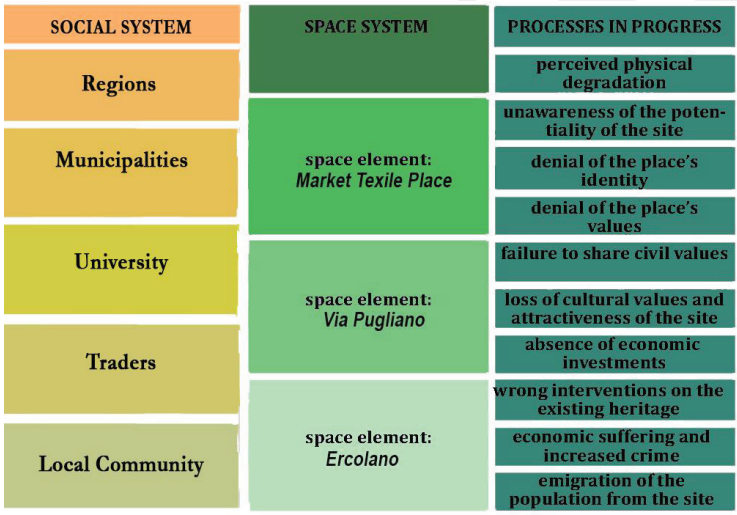


Figure 2. Methodological vulnerability matrix for adaptive reuse in sustainable development: the case study of Ercolano (Italy) (Ciampa, Bosone).

Conclusion

The new sustainable landscape policy has to provide for constant recovery and maintenance actions as a means of productivity (Pinto and Viola, 2016). As recommended by the UNESCO Recommendations Recovery and Maintenance Strategies for the Historic Urban Landscape, the aim to protect the identity of the territories is the active role of local communities in landscape management. Many decision makers participate in maintenance, recovery, re-use and redevelopment of the landscape. Stakeholders allow local authorities to enable, together with the populations, a sustainable circle of research and training for the management of the territory.

References

Caterina, G., (2016). Innovative strategies for the recovery of historic cities. *Techne*. (No. 12, pp. 33-35)

Cerreta, M., & De Toro, P. (2010). Integrated Spatial Assessment for a Creative Decision-making Process: a Combined Methodological Approach to Strategic Environmental Assessment. *International Journal of Sustainable Development* (vol. 13, No. 1 / 2, pp. 17-30). Napoli.

Council of Europe, (2005). Framework convention on the value of cultural heritage for society (Faro Convention). Web at: http://conventions.coe.int

Fiore, V. (2013). Technological potential / figurative potential: reading for the control of urban transformations. In *Regenerating the cities of the Mediterranean*. LetteraVentidue. Siracusa.

Carpenter S.R., Chapin T., Folke, C., Rockstrom J., Scheffer M., &Walker B. (2010). Resilience Thinking: Integrating Resilience, Adaptability and Transformability. In *Ecology and Society*. (vol. 15, No 4, pp. 20).

ICOMOS. (2017). Delhi Declaration on Cultural Heritage and Democracy. Web at : http: // ico mosga2017.org/delhi-declaration.

Pinto, M.R., & Viola, S. (2016). Material culture and planning commitment to recovery: Living Lab in the Parco del Cilento. *Techne*. (No. 12, pp. 223-229).

Resilience Alliance (2010). Assessing Resilience in Social-Ecological Systems: Workbook for Practitioners. Version 2.0.

UNESCO (2011). Recommendation on the Historic Urban Landscape. *UNESCO World Heritage Center*, Resolution 36C / 23, Annex, Paris, France.

Carpenter, S.R., Holling, C.S., Kinzig, A., & Walker, B. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*. (vol.9, No.2, pp 5).

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Weaving the contemporary

Actuality in the use of raw materials in the production chain of the fashion industry

Elisabetta Cianfanelli [1] Renato Stasi [2] Margherita Tufarelli [3]

[1]DIDA, University, Firenze, Italy, elisabetta.cianfanelli@unifi.it

[2]DIDA, University, Firenze, Italy, renato.stasi@unifi.it

[3]DIDA, University, Firenze, Italy, margherita.tufarelli@unifi.it

Abstract:

Observing the contemporary fashion phenomena, we can notice a growing need for conscience, contamination, sharing and dissemination on the multiple aspects of environmental sustainability. This study has examined the fashion segment in the context of the development and production of new materials, including fibers and fabrics generated from agri-food waste, from the replanting of traditional crops, reuse of materials, life cycle assessment and circular economy. The aim is to define, in this path, the designer role as a promoter for new strategies and production possibilities; this seems to embody in a hypothetical consumption model based on the ease of re-use of the materials used.

Keywords: fashion system, environmental sustainability, new materials, communication; traceability.

Introduction

The primary purpose of this study is to analyze what exists, in terms of environmental sustainability with regard to the raw materials used, in the production chain of the fashion system; in addition it aims at identifying future research paths in this area. The research had a philological approach in order to investigate the multiple variations of the concept of environmental sustainability in the fashion sector and the implications that are expressed both in relation to production and communication of the finished or semi-finished product.

Through the evaluation of some case studies, emerge the contrast between a well-established dynamics of fast fashion and a few new realities that, often with a commercial logic of communication, structure their productions with materials and processes that are sustainable for the environment. Thus, from the analysis of the Italian production chains we can observe that the fashion system is divided into two macro areas: one aimed at fast fashion supported by globalized brands of multinational companies; and the other "slow" that interprets the Made in Italy brand product for a smaller and more demanding public (Rullani, E. 2010) (Sacco, Blessi, 2005).

Moreover, the consumer has become *prosumer* (Kotler, 1986), a hybrid figure between producer and consumer that wants to be involved and informed on both the genesis and the traceability of the product he/she buys. This phenomenon has led to an increasingly strong binding between being and buying, taking the path of critical and participatory consumption (Ritzer, Jurgenson, 2010). As Francesco Morace (2011) wrote "sustainability can be an element of differentiation and advantage of a product, but over the next 20 years being 'sustainable' will be a necessary feature that every product will have to incorporate in order to access the market" (1).

In this scenario the figure of the designer as a "manager of creativity" takes an important role in the project and composition of materials in their first and subsequent life, as well as in the now consolidated need to generate, or in some cases support, the conscious criticism of the contemporary user in this fashion sector. The designer might have a vision about which tools can be used to orientate in this complex scenario.

Methods

The issue of environmental sustainability, for some time now, is investing the fashion system. This is a vast and complex subject since the very definition of environmental sustainability has evolved from a vision centered on purely ecological aspects, to a more global meaning that also takes into account how the social and economic dimension of a sector or a supply chain impact on the territory (McArthur, 2013, 2017).

It appears easy to understand that this new approach to environmental sustainability in the fashion system, that wants to fight what for decades the market has promoted with the creation of superfluous and ever new needs, collides with the increasingly fast fashion phenomenon of the recent years (Tartaglione 2013).

Narrowing our field of investigation to companies considered significant, the aim was to carry out a critical study of the context with qualitative parameters, observing the productive and communicative behavior in synergy with an analysis of the reference literature.

The concept of environmental sustainability in the fashion world is composed by multiple realities, the one that comes closest to the common imaginary, which is more linked to the history of dressing and to eco fashion, is the use of fibers of ancient production such as hemp, jute, broom, flax, nettle and others. All fibers with low environmental impact, deriving from crops that need a limited use of water and reduced use of chemical products for both cultivation and subsequent processing these new cultures restored in Italy are often traced. In addition to this, the idea of sustainability is related to the longevity of the product and the possibility of creating a second life through the recycling of the fibers (Ricchetti, Frisa, 2011). There are therefore more aspects that can be considered cornerstones of this sector, all strongly connected to each other.

Findings and Discussion

The analysis showed some trends in the reduction of chemical compounds in production processes that could be defined as techno-natural processes, oriented to the maintenance of tradition combined with the use of innovative sustainable materials such as biopolymers, including PLA and Ingeo.

This new product scenario represents a solid solution to the simplification of the textile recycling issues according to their degradability. The mechanical properties of these fibers are similar, for many characteristics, to those of the petrochemical derivation fibers, placing these materials today in a strategic and dynamic position.

Other noteworthy trends are those concerning natural-derived textile materials which, although obtained with chemical processes, provide for the re-use of substances used through modern purification systems. If over the years the presence of such fabrics consisted mainly of products derived from wood essences, now we find fabrics made with the reuse of food waste.

Among the most interesting, the one made with crabs shell, or the fabrics produced with marine algae or with citrus scraps. These fibers have strong aspects of environmental sustainability due their biodegradability and they are endowed with various intrinsic properties similar in performance with plastics, rubbers and leathers.

Moreover, we find some new interpretation of what could be a form of sustainability in the longevity of the product (Rinaldi,& Testa, 2013). The approach of some fabric manufacturing companies is now

based on the creation of high-performance products and durability, these solutions have been developed by several manufacturers of technical apparel that strategically base the promotion of their product on the durability and maintenance. In this phase, a design centered on the needs of the client certainly becomes part of the applied strategies.

Conclusion

The designer responsibility in the use and choice of such materials is becoming increasingly important. The designer covers a role of creativity manager who transforms an emotional idea into a product that is a synthesis between emotions and material content. The designer assumes a strategic decision-making role with systemic design skills, with the awareness of the possible reuse of these materials as well as theirs hypothetical degradability.

Thanks to the growing interest of consumers in a more ethical fashion, some brands are incorporating this desire for change, showing signs of a grower sensitivity, not only with regard to the choice of materials but also with respect to other values that go to the direction of social responsibility (Chan, Wong, 2012).

Sustainable fashion is a growing need especially facing the critical issues that have emerged in the fashion industry in the last decades. Hence, the term Eco-Fashion means a virtuous circle that includes all the steps: the design of a more durable product, the choice of materials, production and distribution of products, trying to achieve the minimum possible environmental impact.

The research has highlighted that Eco Fashion has a good media response, is a communicative force for a new life approach that allows ideas for a sustainable strategic design. Furthermore, the research aims to highlight that the design culture today should be able to give new value to a production waste.

The increasing presence of Eco Fashion collections on the market shows a growing awareness about these issues. This seems to be strategic and oriented towards more solutions made of transparency, traceability, certification, communication as a function of a possible recycling facilitation.

Notes

1. *Colloquio sulla sostenibilità con Francesco Morace, di Marco Ricchetti, in Il bello e il buono. Le ragioni della moda sostenibile, a cura di Marco Ricchetti e Maria Luisa Frisa, Marsilio Editori, Venezia 2011.*

References

Chan, T. Y., & Wong, C. W. (2012). The consumption side of sustainable fashion supply chain: Understanding fashion consumer eco-fashion consumption decision. *Journal of Fashion Marketing and Management: An International Journal*, *16*(2), 193-215;

Kotler, P. (1986). The prosumer movement: A new challenge for marketers. *ACR North American Advances;*

MacArthur, E. (2013). Towards the circular economy. *Journal of Industrial Ecology*, 23-44;

MacArthur, E. Foundation (2017) A new textiles economy: Redesigning fashion's future;

Morace, F. (2011). I paradigmi del futuro. Lo scenario dei trend;

Ricchetti, M., Frisa, M.L. (2011), Colloquio sulla sostenibilità con Francesco Morace, *in Il bello e il buono. Le ragioni della moda sostenibile*, Marsilio;

Ricchetti, M., & Frisa, M. L. (2011). Il bello e il buono: le ragioni della moda sostenibile. Marsilio;

Rinaldi, F. R., & Testa, S. (2013). L'impresa moda responsabile: integrare etica ed estetica nella filiera;

Ritzer, G., & Jurgenson, N. (2010). Production, consumption, prosumption: The nature of capitalism in the age of the digital 'prosumer'. *Journal of consumer culture*, *10*(1), 13-36;

Rullani, E. (2010). Modernità sostenibile: idee, filiere e servizi per uscire dalla crisi. Marsilio Editori spa:

Sacco, P. L., & Blessi, G. T. (2005). Verso un nuovo modello di sviluppo sostenibile: distretti culturali e aree urbane. Meridiana, 187-209;

Tartaglione, C., & Gallante, F. (2013). SoStenibilità: moda Cosa significa, come si applica, dove sta andando l'idea di sostenibilità nel sistema moda. A cura di Clemente Tartaglione;

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

TOWARDS AN IDEA OF COUNTRYSIDE

Gianluca Cioffi

[1]*Dipartimento di Architettura e Disegno Industriale, Università degli studi della Campania Luigi Vanvitelli, Aversa (CE), Italia, gianluca.cioffi@unicampania.it*

Abstract: Retracing the long journey of history, the city and countryside are two moments of the same process or constructive world, even when they express an obvious contradiction, as in the capitalist age, the city and countryside are two aspects of the same unitary world and therefore must be analyzed together.
Thus, if the quality of space is recognized for the city, for the countryside the quality of space, its being a produced by man with explicit aesthetic intentions is generally considered a random fact, to be analyzed and historicized to the maximum with landscape categories, which are not codified. There is, of course, a difference with architecture, but the basis of the phenomenon is of the same type.

Keywords: agricultural landscape design

Introduction

In the past, a study that dealt with the city or the countryside, urban and rural world, would have been difficult to clarify, because the distances were not as clear as they might seem today, with the clear distinction between the two given by the suburbs that can be defined a sort of rubbish belt; this difference is clearer when comparing big cities and small villages.

Methods

My interest in the rural world is *aesthetic*, as Agostino Renna would say, tending to investigate the characteristics that people impress on the environment in which they live, starting from their activities; in other words, it concerns the real, peculiar and significant space of values, emotions, memories for who lives, who experiences it, and is therefore a study that has to do with architecture (Agostino, De Bonis, Gangemi, 1979); think of the settlers of Magna Graecia who were both farmers and builders of the city; in the same way, and over time, men built the city like the countryside.

Retracing the long journey of history, the city and countryside are two moments of the same process or constructive world, even when they express an obvious contradiction, as in the capitalist age, the city and countryside are two aspects of the same unitary world and therefore must be analyzed together.

Thus, if the quality of space is recognized for the city, for the countryside the quality of space, its being a produced by man with explicit aesthetic intentions is generally

considered a random fact, to be analyzed and historicized to the maximum with landscape categories, which are not codified.

The search for the original elements of the construction of the territory introduces the problem of the meaning of things as well as of the analogies between facts that have been distinguished and separated during the course of history.

Permanence and change are in a reciprocal relationship; in the original structure, a potential tendency is expressed that develops over time and the successive changes are the concrete ways through which this tendency is gradually realized; often representing a mutual bond of permanence over time, they seem to override the conditioning of the historical periods.

It is therefore possible to state that the construction of the countryside, as occurred, for example, for the diffused city, is a process that takes place through its own vocation, lacking a technical-artistic mediation and a history of the *idea of the countryside*. The agrarian landscape, in synthesis, is built over time through two ways:

one through a social and collective process that has produced the very way of being a social man by means of its construction; the other comes from the sole desire for exploitation and robbery that has brought the sign of man's destructive capacity.

An analysis of the countryside cannot be conducted only in quantitative (aggregation – dispersion) or productive terms; the constructive process, also, occurs for episodes and main nodes.

The ways in which the territory is built come from a mutual bond between large divisions of the agricultural land and its use, both linked to the typology of the rural house as well as to the form of the settlement/farmland; whenever an instance of transformation moves from the legitimate will of the men who live and work these lands, the original nature, inherent, ends up being re-proposed, as if, unconsciously, men recognize only those forms that most effectively express them, while alternatives thought out of context and abrupt changes always indicate the violence of imposed and non-shared ways; the reference is clearly aimed at the failure of the peripheries that began with the views of *rationalist* architects.

There is, of course, a difference with architecture, but the basis of the phenomenon is of the same type; in the home as in the fields, the conception of space springs from first "relatively abstract and general" relationships between men and from living a space that

considers their own space, with these relationships subsequently becoming "richer in social determinations".

The opposition between the Mediterranean garden and fields and grass is that:

the first is an interior space par excellence – a first instinctive movement and gesture of appropriation of the natural space through a fence – a place of man's dominion over nature through a refined technique, expression of his aesthetic sense, the latter are external space, a place of nature being used but not anthropized.

The Mediterranean garden looks like a suburban built countryside; it is interesting to highlight, on the one hand, the nature of the built countryside that the garden possesses, and its explicit aesthetic intentionality, while on the other, its development linked to the possibility of multiple individual initiatives, internal to a common culture, to a "democracy" in the use of the soil and in the relationships that are founded and developed.

The description of the construction of the garden shows not only that it is a piece of nature minutely and expertly constructed, but that it is an *interior space*, this space is defined as it is enclosed in an exterior that distinguishes it from the surrounding exterior nature.

The concentrated settlement is founded as a place built at the centre of cultivated fields, as occurred in Roman times; the concentrated nature of these settlements, the determined and specific relationship with the fields, allow to draw the guidelines in the understanding of the *founding* process of the settlement which, over time, has been enriched and articulated; in the installations traced after the 16th century, rules and regulations that guided the evolutionary process can be found. Starting from the unifying rule, every settlement achieves uniqueness through the specificity of typology, orography, etc., making the result unrepeatable over time.

Upon analysing the old rural villages in the province of Foggia, they have the important characteristic of being a collective work even if formed by public buildings and partly by housing; another aspect concerns *the limited size*, in some cases very small, of the urban part built. The image that emerges is that of an oasis in a sea of countryside, an evocative and suggestive image.

Another aspect concerns the *systemic nature* of all the founded centres. This nature should not be understood only in a functional sense, from this point of view every centre, even if small, could be a completed and self-sufficient reality, but the enormous potential that the centres in question could have if really set up should be explored.

If it is true that aggregation, in itself, is not synonymous with the collective trend, it is not

automatically true that dispersion represents progress.

It is also important to highlight the *complex nature of the meanings* that a city expresses at the very moment in which it is built, the *indissoluble link with the countryside*, its being part of the territory, from which it was born and which continues to underline its existence.

Findings and Discussion

Figure 1. Segezia (Foggia-Puglia-Italy) village.

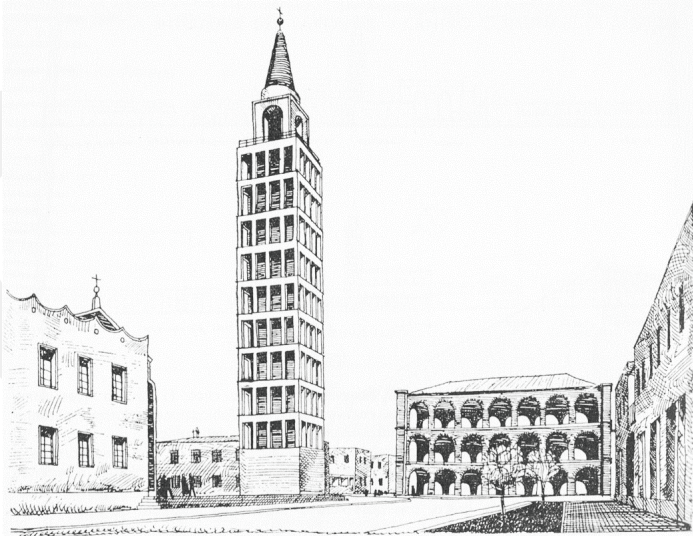


Figure 2. Segezia (Foggia-Puglia-Italy) village, perspective view.

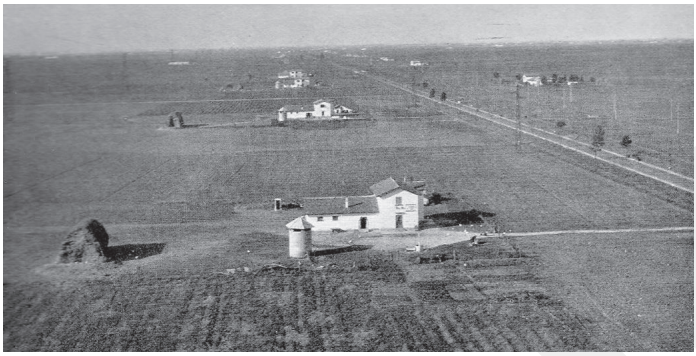


Figure 3. Tavoliere di Puglia (Incoronata-Puglia-Italy) road to be built.

Figure 4 . Incoronata (Foggia-Puglia-Italy) village, building of the municipality.

Conclusion

In conclusion, the cities founded in the 17th and 18th centuries are founded along with the ways of using of the land, they presuppose them; the new ones ignore them completely, relying on the spontaneous ways of building this relationship. They relate to the most

miserable aspect of the city, to its desire to be a city without being able to be, to its being a simulacrum of a true city.

If the agricultural centre starts from a rural house, the rural house can start from its garden. The same type of settlement is measured and specified with the needs of the home. The process that led the agricultural centres to shrink can be critically re-discussed starting from a certain and non-ideological condition.

The projects of modern city workers are, above all, a formal expression of the ideology of the petty urban bourgeoisie, due to the class affinity of most of the designers with the aspirations of this same class.

Settling in a given environment means delimiting an area or a place (Norberg-Schulz, 1984), referring to the act of fencing.

Looking at a village from the street, at first sight, it is possible to see its contours and perhaps even a dominant element like that of a bell tower, the image that comes out changes according to the way in which the settlement is approached; coming from a wood is different than coming from the countryside or from the sea.

The rural settlement functions as a centre and invites man to live; the houses are designed to be inhabited in relation to the *space/non-space* of the countryside.

Taking care of the architecture of the past, and in the case of those of rural villages, does not mean leaving things as they are, but cultivating them and then enabling them to reveal themselves.

References

Agostino, Renna, De Bonis, Antonio, & Gangemi, Giuseppe. (1979). Costruzione e progetto: la valle del Belice. Clup.

Norberg-Schulz, C. (1984). L'abitare L'insediamento, lo spazio urbano, la casa.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Design as a critical interpretation of the world

Alessandra Cirafici[1*], Fabrizia Ippolito[2], Caterina Fiorentino[3]

[1]DADI, University of Campania Luigi Vanvitelli, Aversa, Italy, alessandra.cirafici@unicampania.it*
[2]DADI, University of Campania Luigi Vanvitelli, Aversa Italy fabrizia.ippolito@unicampania .it
[3]DADI, University of Campania Luigi Vanvitelli, Aversa Italy caterinacristina.fiorentino@unicampania .it

Abstract: Among the fields indicated by the conference, this paper refers to architecture and urban design, and is presented from two disciplinary points of view. The first is that of representation/communication, while the second is of design. It deals with all the aspects of sustainability indicated by the conference, covering both economic and environmental aspects as well as social and cultural (transformation of built space and social space, reuse and critical interpretation of the existing, processes of adaptation, vernacular architecture, heritage conservation, vagueness and local identity, social cohesion) ones. However, it is the aspect of "social and cultural sustainability" that represents the main aim of the considerations, which unite the reasons of representation along with those of design thought in a process of critical interpretation of reality that holds space and society together. Against the background of these considerations, the contribution presents some projects-manifestos that, starting from significant situations, proposes re-visions of current urban conditions.

Keywords: design; representation; participatory planning; communication; contemporary city; manifesto

Introduction

Understanding the project as a critical interpretation of the existing (of the built, of the context, of the society...) represents the starting point of this contribution, and defines its approach, in some ways eccentric with respect to the individual disciplines of reference, but well centred in the contemporary debate that concerns the relationship between architecture, the city and society. The contribution is part of an ongoing didactic and research experiment currently being carried out at the Department of Architecture and Industrial Design, presented through two degree theses (prof. Cirafici/Ippolito, degree course in Architecture) that addresses themes and contexts emblematic of the current condition (the contemporary periphery - Scampia; "borders" as a place of conflict - Mexico-United States), testing the tools of representation and design of architecture and the city, as instruments of critical interpretation of an urban space in continuous evolution, intended as a space of relationships and connections, interference and conflict. These approaches contradict the descriptive anxiety that has characterized the analysis of urban processes in recent history, and which has assumed the paradigm of zenithal morphology as almost exclusive. The latter is a paradigm that only gives meaning to figures that express themselves in a complete form within a two-dimensional surface, and that considers the position of the point of view in an absolute position, far from the observed object, as desirable, almost as if this impersonal and synoptic observer's gaze ensured

in some way "objectivity" to the investigative process on the city. Such a visual paradigm recognizes with difficulty that the urban reality is not a simple superimposition of levels of information referable to flat two-dimensional representations, but rather is a "collective way of thinking about space" to represent which, never as today, is absolutely necessary to hybridize languages, adopt new forms of representations, other visual conventions, alternative investigative strategies. The construction of modern landscapes and urban spaces, in which planning strategies and tactics of daily action and reaction confront and clash, requires a rethinking of the very sense of collectivity and collective space, which finds in these confrontations and clashes the occasion to rethink the tools and design visions.

Multiple representations and designs: the starting point

The choice of themes to be considered is not by mere chance and reflects the desire to experiment forms of dialogue between representation and design, working on a terrain in which the path of reading and critical interpretation (and therefore representation) of reality is configured as a significant part of a design action that moves through the meshes of the existing trying to interpret needs for renewal, development prospects and possible vocations of use.

It is a matter of understanding urban space as a network of relationships and therefore in a broad sense as a "living space", an interesting intertwining of signs, symbols, codes, metaphors of living. A complex system of which it becomes interesting to intercept signals, to understand the meaning of those individual or collective actions that have the power to modify the physical structure and relational components through a process that often spontaneously, activates tactics of behaviour, which give the living new possibilities of meaning.

In this critical horizon, representation stops interpreting the exclusive role of "documentation" and description of reality and assumes that of a powerful narrator of its complexity and therefore an activator of imagination and critical thought, working in perfect harmony with the project of which it proves to be an integral part. Representation thus understood is shown as a critical tool, of interpretation, of discretization and synthesis, of arbitrary but conscious reduction of complexity in the elements of a visual synthesis that is in itself a design act, the outcome of which is first of all to decode the syntax of the elements of the existing, sometimes to propose a new one that is able to take into account the forces and reasons of an urban space understood, as a "living space" in which to design new attributions of meaning. A work of "unveiling" of reality that interprets the truest meaning of "representing". The entire disciplinary apparatus of the Representation with the almost obvious reference to geometry, understood as a structure of thought, methods of representation and graphic conventions, expands to include in itself the evocative power of the narrative dimension that manifests itself by favouring rather than the final outcome of the process (the completed image in itself), the staging of the process as it takes place, meaning, therefore, the act of representing as an event that comes to life in a temporal dimension, and therefore in a sequence whose "traces" not only outline an effective spatial narrative, but often conceal in themselves the inspiring elements of possible strategies of actions on the built space.

The theme becomes even more interesting if it is interpreted in the context of the current dynamics of "open design" in which the author dimension of representation gives way to forms

of sharing and participation in which the representative outcome takes the form of the construction of a gigantic collective fresco that takes place at the time and in the places of the participation in the network. This is what Carlo Ratti defines as Open Source Architecture, defined by the new models of open participation, a revolution that is worth reflecting on to identify the non-marginal changes that it triggers in the very understanding of the dynamics of design and representation.

In such a perspective, the communicative aspect of representation takes over, making it possible to create real "posters" in which critical thought finds expressive forms and becomes a potential project. At the same time, as in past eras of mobilization, the project itself is manifest, exasperation of selected aspects of reality, taken to its extreme consequences in foreshadowings of possible worlds, desirable or terrible, present in the world we live.

In this sense, the communication design of urban spaces and practices becomes one of the tools of planning, as well as of narration: we find ourselves having to consider the communicative project as an interlocutory instrument for the negotiation between several actors and, at the same time, as a spokesperson for requests born from different cultures and different origins and, therefore, expression of a debate in continuous evolution that includes political, strategic and diplomatic responsibility in making explicit and mediating different arguments, requests and visions. From this point of view, it becomes clear that formal solutions and the choice of languages have a single large space that is the place of interdisciplinarity and multiculturalism, that is, that cultural place in which to gather opinions, sometimes judgments, and often motivations to proceed to the formulation of a common code. The functional, sensorial or communicative expressions suffer, therefore, from the need to escape the transitory objectives, – fruit of the current eagerness to provoke surprise, change and, at times, amazement – to confront the social and political contents of the transformation that are difficult to find according to a univocal vision, but that – depending on the perspectives and the aims – are to be interpreted with the objective of sharing. The complexity of these processes becomes even more intricate if we leave theoretical experimentation behind and arrive at concrete results, also because the communication tools have shattered images and cultures into shreds of meaning, for which reconstructing the plots, without cultural research and intermediation, becomes risky. Even for these reasons, the role of communication design have to contribute, more and more, to the reconstruction of an iconography, that is authentic in the respect of the mixing, and that avoids the senseless eclecticism of form and meaning, in favour of the research of new collective languages.

Discussion on case studies: Projects-manifesto

In coherence with the premises, the two case studies presented are highly expressive of a work carried out around a project idea that draws its reasons from the critical interpretation of reality.

The Vele di Scampia and the wide debate that arose around their demolition, were an opportunity to consider a possible re-functionalisation starting from their reintegration into the circuit of "housing possibility" through a sort of colonization of space with a hypothesis of

participatory design. The physical and conceptual structure of the building was synthesized to the essence through representative schemes and hypotheses of reduction of the concept of housing unit from sign to symbol. A possible intervention of the "collective colonization of space" was hypothesized through functional choices responding to several specific design "moves": adding, expanding, inserting, reducing.

> Demolish to be reborn. Bring to grade zero to allow a radical reconstruction of what has been. Re-codify the symbol with the force of those who attacked the Bastille to dismantle and destroy, but at the same time remain a warning and historical memory to recognize what you could be and what you need to become.

The possibility of using the project as a powerful detonator of social denunciation through a refined intellectual work, all played on the limit between reality and imagination, focused on the controversial theme of physical and/or immaterial "borders", was the occasion of the second case study. This is a hypothetical participation in the call for the construction of the "wall" between the United States and Mexico, hypothesized several times by President Trump. Starting from an in-depth reconnaissance of the idea of the wall as a "control device" and as a device of active separation and a reconstruction of the history of the idea of the wall between the USA and Mexico as it was conveyed by the international media, it was then imagined to create a process first conceptual and then physical to activate spatial devices that in the "thickness" of the conceptual wall are able – through a subtle game of the absurd – to neutralize the sense of separation and exclusion that it underlies. *American Transracial Agency. Widespread spaces of conflict - Pervasive Architecture*[1] is the project of a computer platform upon which to virtually operate in the definition of spatial devices that make it possible, while crossing the wall, to change race and therefore render the presence of the wall ineffective.

In both projects, the strength of the design provocation is resonated in the representative choices in which the project description assumes the evocative power of declaration of intent through the communicative capacity of the image and its staging in the visual presentation of the project.

[1] *American Transracial Agency. Widespread spaces of conflict - Pervasive architecture* is the title of the thesis discussed by Carmine Errico on July 25, 2017 (supervisors: prof. A, Cirafici and F. Ippolito).

References

Cirafici A. (2014), Rilievo, narrazione e processi di significazione. La rappresentazione dei paesaggi urbani, Roma, Gangemi.
Ippolito F. (2012), Tattiche, Genova, il melangolo.
Koolhaas R. (1978), Delirious New York. A Retrospective Manifesto for Manhattan, New York, Oxford University Press.
Koolhaas R. and Zenghelis E. (1971), *Exodus*, or the V*oluntary Prisoners of Architecture*, London project.
Lefebvre H. (1968), *Le droit à la ville*, Paris, Éditions Anthropos.

GCRIS

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Social & cultural sustainability: Street Art In Italy

Vincenzo Cirillo[1*]

[1]*Department of Architecture and Industrial design, University of Campania "Luigi Vanvitelli", Aversa, Italy, vincenzo.cirillo@unicampania.it*

Abstract: Since antiquity the walls have been through for communication until the first examples of Mexican muralism and, in Italy, in the fascist propaganda wall painting. The roots of *street art* are therefore ancient even if, in a modern sense, its references date back to the seventies of the last century when in the poorest and most degraded neighborhoods of the main American cities young people give life to the so-called *writing* or *graffiti art*. Born from the need to oppose the system through artistic expression, graffiti are aggressive and often incomprehensible graphic signs, expression of social marginalization. From this form of rebellion also develops street art that uses walls and artistic languages to communicate more clearly messages of a social or political nature. In Italy street art arrives at the beginning of the eighties in Milan, Bologna, Rome, Turin, and from the first years of the XXI century in all the national territory.

Keywords: drawing; street art; Italy.

Introduction

In 1981, the art critic Francesca Alinovi (1948-1983) started her studies on street art in South Bronx and in 1984 took care of the exhibition *Arte di frontiera: New York graffiti* at the GAM Modern Art Gallery in Bologna. This peculiar artistic ferment animates the American streets through the (often illegal) activity of *writers* and street artists, who are committed to start a social upheaval of the most degraded places in the big cities.

The objective of redeveloping abandoned or degraded areas of large cities and / or smaller centers through the art of mural and to associate these images of considerable dimensions with a message of political and / or social protest according to an underground culture, parallel to the world of institutional art, it also arrives in Italy. The Italian cities protagonists of the diffusion of this alternative form of art are identified first in the large metropolitan centers (Milan, Bologna, Rome, often associating the artist with the city) and then extending the sharing like wildfire on the national territory. This diffusion involves a change of cultural order and, although the action of *street art* does not prescind from its most salient element (the subalternity to the rules), it is less and less seen as a vandalism and the interventions, from blocks, are always more promoted within institutional festivals or themed exhibitions in places dedicated to artistic expression. Furthermore, judgments and judicial chapters issued in favor of street art lead public opinion and the legal institution to recognize street art as an art form.

Street art in Italy

In general, the artistic panorama of Street Art consists of many artists, each of which presents techniques, styles and messages to be transmitted. Emblem of graffiti is the spray can (a tool favored by artists like Alice Pasquini and Pao), whose versatility is perfect for every representation but requires considerable manual skill. The stencil technique (used by Banksy and the Italian Orticanoodles), a cardboard or acetate mask that, after being applied to the wall and sprinkled with color, makes it possible to create works (and copies) with an impressive realism.

Another very prevalent technique is the use of posters, large prints applied directly to walls and/or elements of street furniture. The posters allow an extraordinary speed of action and thanks to their versatility they are widely used. Examples of the use of posters are evidenced by the experiences of the American Shepard Fairey as well as of JR for his photographic installations. Another very prevalent technique is the use of posters, large prints applied directly to walls and/or elements of street furniture. The posters allow an extraordinary speed of action and thanks to their versatility they are widely used. Examples of the use of posters are evidenced by the experiences of the American Shepard Fairey as well as of JR for his photographic installations. A reduced version of the posters are stickers which are easily printable and applicable in copious quantities. However, the form par excellence of Street Art is the mural, a single large piece made with more types of technique and often with the aid of scaffolding, mechanical lifts, telescopic arms to reach with brush and painting the farthest points of the building.

In Italy, in recent years street art, from a marginal phenomenon, has become a widespread cultural movement throughout the nation. Among the first street artists, protagonists for relevance on the public, there are: Bros, Tresoldi, Ozmo, Pao, Tvboy; the Bolognese Blu (now world famous), Ericailcane (known for the hybrid man-animal) and Eron (active between Rimini and Bologna); Sten Lex (known for the exclusive use of the stencil).

Erilcane (Fig.1) is an Italian street artist originally from Belluno, known for his illustrations and installations. From his *Facebook* profile (opened in 2008), in the personal information we read: «*Ericailcane, has no physiognomy numeric, nor birthday. He is young. He lives and works between Bologna and his mind*». His artistic language is distinguished by the type of subject, a hybrid between men and animals, and a melancholy, unreal and restless atmosphere. More original than its style is the impressive illustration made on the two twin silos of the former cement factory of Vignole, where the image of the lion of San Marco

admonishes a skeleton in prayer crossed by goldfish, showing an open book on whose pages is written: «*The work ennobles man making it similar to the beast*».

In Terni is known the activity of the illustrator-cartoonist, set designer and Roman street artist Mp5 (Fig. 2), whose bichromatic works are characterized by thick strokes. Among his most interesting works, the mural *Playing Upstream*, which is located along the river Nera, depicts the fish against the current in a fluctuating trend. The mural is an example of environmental installation.

The work of Peeta (Manuel De Rita), Venetian painter, sculptor and writer, is particularly interesting from the point of view of the perspective construction and use of graphic effects with a three-dimensional impact. In this city, in the abandoned space of the Teatro Marinoni in Lido di Venezia, the artist represented an evocative interior characterized by a soft turquoise atmosphere and skilful play of light and shadow (Fig. 3).

The street artist Millo signs a work articulated in a series of thirteen murals, located on the blind fronts of the popular buildings in the Barriere district of Milan in Turin and realized with funds from the B.ART call (Fig. 4). The murals introduce the inhabitants to a narration around the relationship between man and the metropolitan city. The artistic language hybrid the curved lines, with which he draws the children, with the straight lines of the metropolitan buildings. In general, the murals are black-white and only in some cases the children's clothes are colored.

Bologna has identified with the art of the street artist of Senigallia known under the pseudonym Blu. A particular work painted on the front of a building depicts an emblematic mixture of people and policemen, enclosed by the walls of Bologna and the shadow of the Torri dell'Asinello, compete for the struggle against power symbolized by the conquest of a ring. The scene deliberately refers to Tolkien's famous fantasy masterpiece, *The Lord of the Rings* (Fig. 5).

The *Blind Wall* is the work signed by Agostino Iacurci in Rome in the district of San Basilio. On one of the blind fronts of the popular buildings a metaphor of day and night is illustrated. An elderly man represented in the mural portion of the day takes care of his spaces with the dedication of those who love the place in which he lives (fig 6).

Protagonist of many events related to urban renewal, the street artist Ozmo realizes one of his murals in the city of Palermo. A homage rich in history, the mural is realized with the representation of a perspective that introduces into a sacred place (fig 7). The work,

created with cold tones and yet received by a two-dimensional support, introduces a mystical spatial narration.

Inspired by the colors of the pre-existing surroundings, the artist Jeroen Erosie in the popular district of Catanzaro, realizes on the blind fronts of the houses a triple mural entitled *Universal Language* (Fig. 8).

The INSA English artist in his work *Facing Immortality* realized for the Outdoor Festival in Rome, has staged a huge four-color vortex represented in front of one of a human skull with the same colors (fig.9).

The striking new mural of *Men Like Cows* by NemO, painted in Vedriano (Italy) for the Street Art Festival event, covers the abandoned facades farm and depicts two characters, half cow and half human, that seem to follow while they stare the viewer with a rather sad look. The mural shows that animals are exploited to provide food for humans (fig. 10).

Pixel Pancho, street artist from Turin, realizes in Sicily for the *FestiWall Street Art Festival* in Ragusa a couple of orange picker farmers, who stages the theme of vision between the mechanical and the human world through the representation of them as robots (fig. 11).

Conclusion

The world of street art is constantly changing. It is a still young reality, which is developing in recent years and which, therefore, makes difficult the critical interpretation of this form of art. However, if on the one hand this art attracts and fascinates an ever wider and more varied audience, which stands in its defence or in charge, the analysis by analogy and difference of the different ways of working of these artists allows us to grasp their skills and originality. but above all it allows us to bring out the ethical and aesthetic value of their projects.

Figure 1-11. Street art in Italy.

References

Alinovi, F. (1984). *Arte di frontiera: New York graffiti*. Milano: Mazzotta.
Perfetti, J., Sgarbi, V. (2007). *Bros20e20*. Milano: Skira.
Riva, A. (2007). *Street Art Sweet Art*. Milano: Skira.
Penati, F., Perfetti, J., Benelli, D. (2009). *ivan PoesiaViva*. Milano: Skira.
Ciotta, E. (2011). *Street art. La rivoluzione nelle strade*. Lecce: Bepress.
Fekner, J., Schacter, R. (2013). *The World Atlas of Street Art and Graffiti*. Sydney: NewSouth Publishing.
Powers, S. (2014). *A Love Letter to the City*. New York: Princeton Architectural Press.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Continuity and discontinuity in the drawing for the protection of religious heritage in the Balkans

Luigi Corniello[1*], Andrea Maliqari[2], Carla Mottola[3], Enrico Mirra[4]

[1]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, luigi.corniello@gmail.com*
[2]*Departmentof Architecture, Polytechnic University of Tirana, Tirana, Albania, amaliqari@upt.it*
[3]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, carla.mottola@unicampania.it*
[4]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, mirra.enrico@libero.it*

Abstract: The research proposes the study of the territory of Balkans focused the analysis on religious architecture on island in Slovenia, Croatia, Montenegro, Albania and Greece. It proposing its knowledge through the survey of places and structures. Regarding the research themes related to the disciplines of representation, the research agreements with the drawing of architectural heritage and vegetation with particular reference to the problems concerning the natural territory and the individual architectural artefacts with religious characteristics. Before illustrating the religious factories taken as a model of an itinerary of possible environmental knowledge. It should be emphasized that they express shapes and figurative contents tending to the representation of art in the Balkans with references to other examples for design intended as a means of elevating life moral in the field of decoration and construction of popular religious forms.

Keywords: drawing; survey; religious heritage; Balkans

Introduction

The research is relate to the study, knowledge and enhancement for sustainability to tourism impact of religious architecture on island in the Balkans. Regarding the research themes related to the disciplines of representation, the research deals with the drawing of architectural heritage and vegetation with particular reference to the problems concerning the natural territory and the individual architectural artefacts with religious characteristics. This place, whether natural or artificial, are constituted by the layering of remote and recent transformational continuity – evident or concealed, present or lost. Over time and in their entirety, continuity has shaped the relative features of their identity. Investigation of these features; knowledge of the different layers; recognition of their value as historical records; distinction between relevance and irrelevance; and awareness of the modification choice aimed at the logical connectivity between existing and future situations: these are the conceptual assumptions that support the sustainability of the drawing of continuity.

Methods

The representation activity of religious heritage in the Balkans was set up, providing, at an early stage, the execution of a survey extended to the architectural bodies and surrounding territories in order to define a primitive geometrical model; subsequently, in a second survey and restitution campaign, measurements of architectural details, structures and geo-referencing of the digital model were carried out. Appropriate photographic documentation was also produce in addition to bibliographic, archivist, iconographic surveys. In this system of representation, the photographic image, in addition to constituting a database value that can be use even after the survey phase, appears to be able to interpolate this static figurative datum with informatics elements of the type dynamic. For the activities of knowledge of the territory for sustainability of place, we took into account the laser instrumentation Ryobi applied on portable computer support, both tablet and smartphone, which allows an immediate view of the relevant data on the photographic image taken by the support, transforming it into a dynamic datum. The use of this photographic technology becomes the main instrument of relevance because it contains both the measurement data and the geographical coordinates connected to the device used, as well as information on the date and time of the execution of the survey campaign.

Findings and Discussion

Before illustrating the religious factories taken as a model of an itinerary of possible environmental knowledge and sustainability, it should be highlight that they express shapes and figurative contents tending to the representation of art in the Balkans. The references to other examples for design intended as a means of elevating life moral in the field of decoration and construction of popular religious forms. The considerations collected are intend to acquire some aspects and values of the landscape and monitoring the sacred architecture. The research proposes the study of the territory subdivided by geographical areas, from north to south, concentrating the analysis on religious architecture on island in Slovenia, Croatia, Montenegro, Albania and Greece proposing its knowledge through the survey of places and structures. In Slovenia, it is propose the planmetric study of the Bled Island and the survey of the Church of San Martino, in Croatia the object of the research are the Island of Kosljum with the Franciscan Convent, the Church of the Annunciation of Mary and the Chapel of San Bernardino and the Island of Visovac. The itinerary of the research deals, with the territory of Montenegro, with the study of the island of Madonna dello

Scalpello with the relief of the Church of San Nicola, the Island of San Giorgio with the Monastery of San Giorgio, the Island of Scoglio of the Convent, of the Island of San Michele. The Island of San Nicola with the homonymous church, of the island of Santo Stefano, today a prestigious resort, of the island of Santa Domenica, of the island of Kom and of the island of Vranjina. In Albania, the research proposes the study of the Island of Zvernec and the Orthodox Monastery, while for Greece the subject of this research is the Island in the lake Pamvotida, the Island of Panagia, the Island of Ai Nikolaos, the Island of Pontikonissi, Stamfani Island and Elafonisos Island.

Conclusion

The theme identified is an important scientific and cultural research proposal able to confront both the issues related to the knowledge of places and for sustainability of architectures and the concept of protection and enhancement of heritage. It propose a critical analysis aimed at conservation and to the sustainability of a heritage, architectural and landscape of considerable interest and strong deterioration. The reading and survey activity of the religious complexes located along the coast has concentrated on the collection of general data, historical elements, many of which are traced from unpublished sources, historical and current photographic documents and manual and instrumental surveys on individual architectural artefacts.

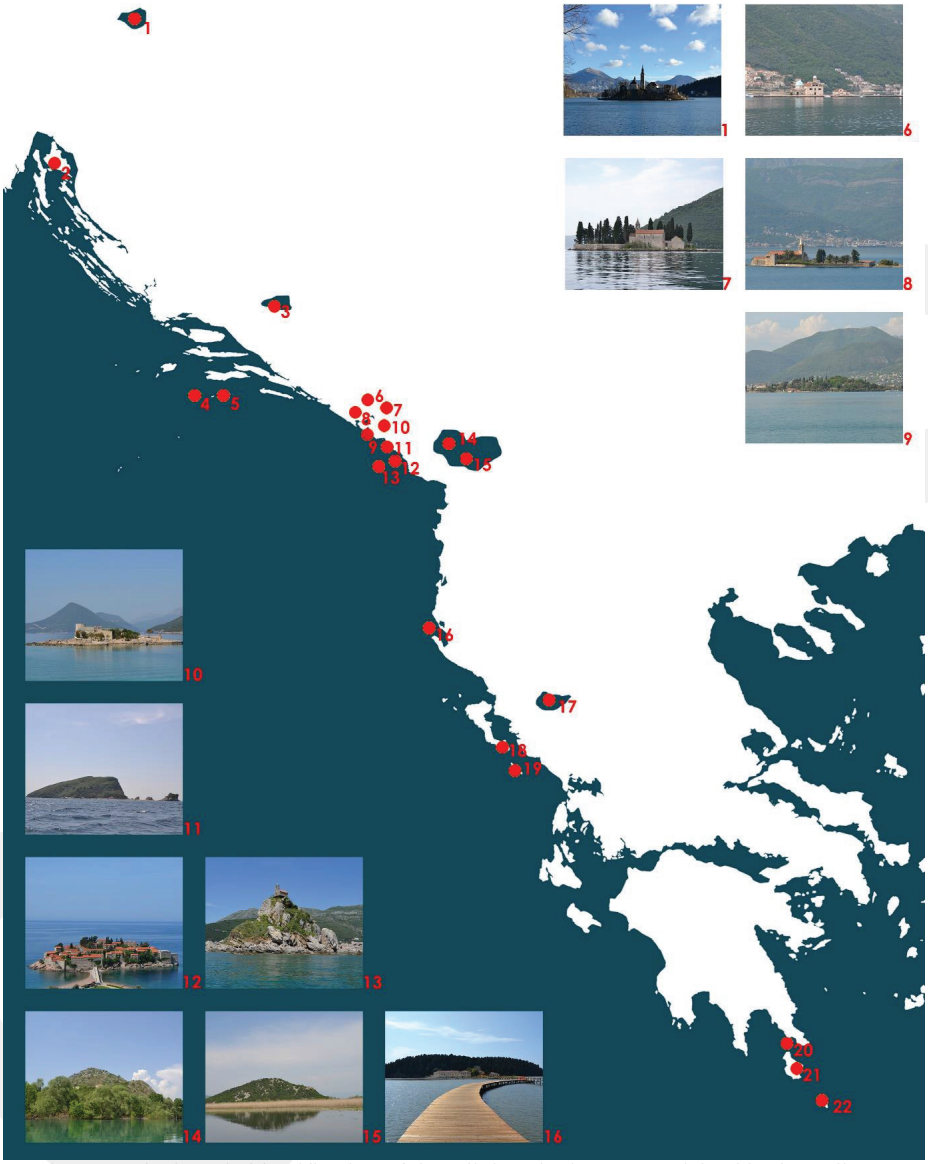


Figure 1. Planimetric identification of the religious heritage on an island in the Balkans.

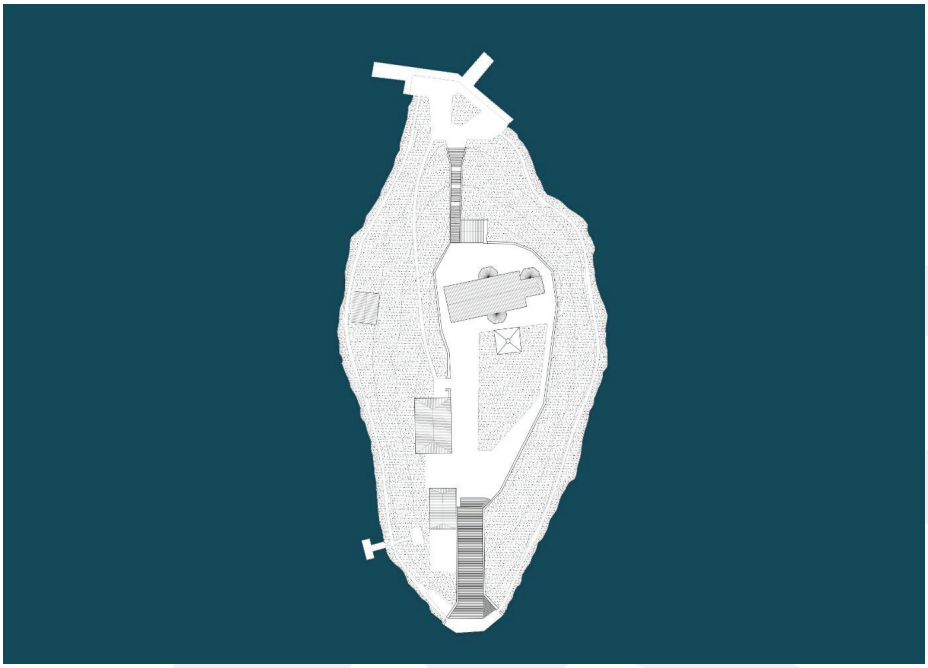


Figure 2. The survey of Bled Island in Slovenia.

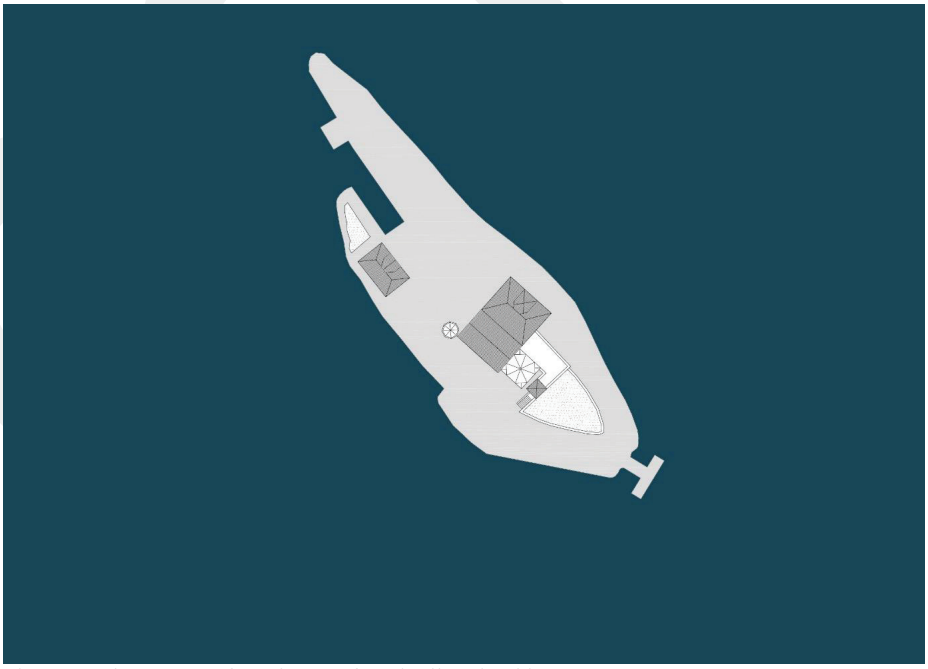


Figure 3. The survey of Madonna of Scalpello Island in Montenegro.

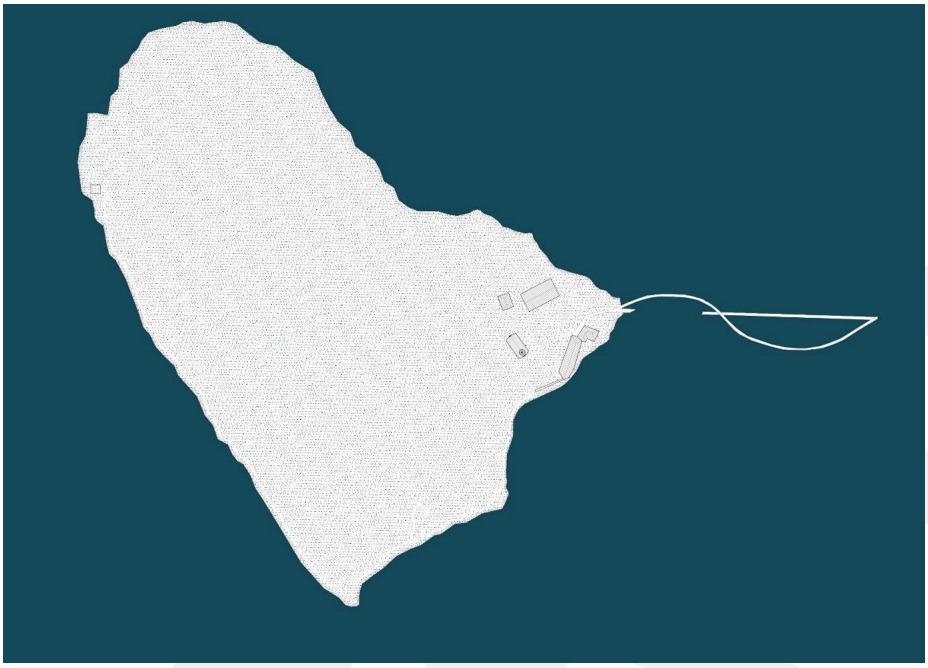


Figure 4. The survey of Zvernec Island in Albania.

References

Corniello L., Maliqari A., Vozza V. M. B. (2016). Il disegno delle strutture religiose tra Montenegro e Grecia settentrionale. In: Bini M., Bertocci S., Le ragioni del Disegno. The reasons of drawing, Roma, Gangemi Editore.

Docci M., Gaiani M., Maestri D. (2011). Scienza del Disegno, Novara: Città Studi Edizioni.

Giordano P. (2012) Il disegno dell'architettura costiera. Napoli: La scuola di Pitagora editrice.

Giordano P., Corniello L. (2014) Atlante Grafico e Teorico Amalfitano. La conoscenza e la modificazione del paesaggio costiero. Napoli: La scuola di Pitagora editrice.

Maliqari A. (2013) Management Plan Historic Center and Buffer Zone of Berat. Tirana: PEGI.

Vitta M. (2005) Il paesaggio. Torino: Einaudi.

Zerlenga O. (1997). La forma ovata in architettura. Rappresentazione geometrica, Napoli, CUEN.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

In terms of structure and expression. The possibilities of re-composition project

Francesco Costanzo[1]

[1]*Department of Architecture and Industrial Design, University of Campania "L. Vanvitelli", Napoli-Caserta, Italy, francesco.costanzo@unicampania.it*

Abstract: Looking for a brand-new relationship between innovation and memory, inside the framework of dichotomy continuity/discontinuity, we can find ways for updating sustainability practices of last thirty years. Productivist and quantitative nature under these practices can be overcome by redefining a "tradition of the new", focused on super-temporal reasons that oversee the construction of the city (correspondent structure, measure and order) and that contemporary hypodense city denied. The Aalborg Commitments have been central in the evolution of the concept of sustainability fifteen years ago, but they mechanically responded to the pathologies of diffusion by prescribing densification and mixed use. For an advancement of these requirements, which still consider architecture as a de-contextualized in vitro object to be tested, the possible categories are traceable within a necessary work on the transformation of this low-density urban landscape, which often appears in incomplete forms. Here re-composition techniques can work on the separation of architectural elements and architectures themselves: a Rogers' discontinuity opposed to the return of an idea of compactness and continuity, but also a discontinuity in compositional and figurative modes that we find in research about formal structure and that express the "decomposable nature", an original attribute of modern architecture.

Keywords: continuity/discontinuity; structure; architectural and urban non finiteness; expression

Introduction

The affirmation of the idea of sustainability, which we lived in the last thirty years, was strongly linked to the concept of "measurability" that we has - likewise the spirit animated the nineteenth century city - of a productive and quantitative nature. We therefore ask ourselves what are the possibilities for an updated definition of this concept according to actual aspirations. They can be found in a critical research about qualities of architecture and the city, with an approach that does not see architecture and the city as objects, as in-vitro samples to be tested and measured. On the contrary, architecture and the city must be seen again in continuity, as in every moment of history: as elements of a specific knowledge - the urban construction - strongly anchored to a tradition and identity. But this discourse does not inhibit the idea of innovation, it also includes discontinuity: it concerns tradition understood in its etymological meaning of "tradere", a betrayal elevating the concept to the definition "tradition is what transform itself" that is part of the more advanced modernist manifestos.

In the search for a "tradition of the new" we can act. Here we trace the investigation about relationship memory/innovation and, referring to this subject, we think about the still living lesson by Ernesto Nathan Rogers (Rogers 1961). On the basis formed by this premise,

the updating of the idea of sustainability can take place only if, moving in the dialectic continuity-discontinuity, it pursues generalizable methods addressed to autonomous results (Semerani, 2009) that express specific times and places where the project comes to life.

About post-modern territories

Working today on these conditions means dealing with the legacy of post-modernity. Here, by synthesis, we do not want to refer to the cultural legacy of this philosophy but to a material heritage that is an expression of this legacy. This heritage is materialised in hypodense and incomplete territories determined new dimension of contemporary city, that did not find a recognizable and compliant measure within which to build and act. In these territories, that an outdated literature defined as "sprawl", the most advanced principles of sustainability - the Aalborg Commitments, codified in 2004 (Aalborg Commitments, 2004) - have found inspiration (as a negative model) and an useful field of application. Here the categories of reuse, densification, mixed use - specified in the fifth commitment dedicated to "Planning and Design" - established themselves as the unique response to counteract the strong presence of abandoned buildings and territories, low density, residential or productive mono-functionality. As we know, these categories strongly influenced project and planning practices in recent years (Grima, 2005)

For an advancement of the concept of sustainability, however, these general principles must now intersect with some issues concerning the “urban structure”, that is a corresponding order in which every part and element contributes to the implementation of city - even in the complex and "broken" conditions of contemporary city (Cacciari, 1992).

Figure 1. Incomplete hypodense contemporary landscape.

In this sense we want to underline that the densification (the concentration of volumes and uses) has been improperly used, contradicting a goal pursued during twentieth century - with the motto "concentrating for the liberation of the ground" -. Densification was the pretext for infill practices tending to saturate the urban space without an overall rethinking in terms of free space "compensation" and without redefinition of the whole urban system. A pretext hiding speculative activities, but also pursued by who used to cultivate the nostalgic dream of a compact city inspired by nineteenth-century city. A completely outdated and inadequate dream considering the hidden potential of contemporary city.

The question is therefore: how do we act on the contemporary urban landscape, that is this existing ordinary patrimony, so different from the noble "historical heritage", when fertile themes of hypodense city meet pathologies of incompleteness and the absence of urban structure? This issue was faced in recent years in researches (Costanzo, 2017) about architectural and urban non-finiteness, where the condition of the “non-finiteness" brings the problem of architectural and urban incompleteness - so recurring in some European areas and not only – back to an issue of architectural composition.

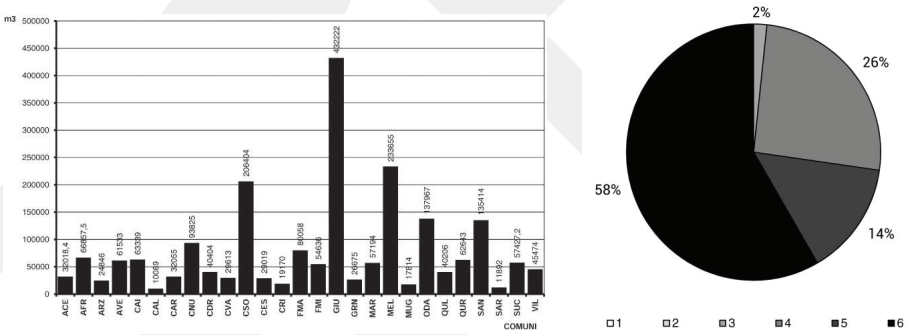


Figure 2-3. Volumes of non-finiteness (27 municipalities in Napoli metropolitan area), istogram (right) and diagram (left) with different finiteness degrees.

Reasons for this study, which is based on an analytical research about the Neapolitan metropolitan area, has only apparently specific implications. These reasons can be brought back to two fundamental questions concerning with a specific sustainability policy, anchored to the concept of recovery and reuse, we translated into "re-composition" practices. The first issue is about the geological safety of the territory and the consolidation of its urban and building structure, because the non-finiteness includes weak geographic areas recently expanded with

labile urban structures. The second question concerns with the theme of "land consumption": the aspiration to fill the differences compared to the normal standards (of space and equipment, social housing, ...) does not involve, if not through equalizing operations, further soil occupation.

We describe two design elaborations, carried out within the research, that deal with the issue of re-composition in contemporary city in non-finite situations, defining some general reasoning categories such as the "permanence" and the "compliant size. The first elaboration (edited by M. Pellino) concerns with re-composition operations in order to investigate programmatic variations. The project therefore works on a simulation of the problem. By

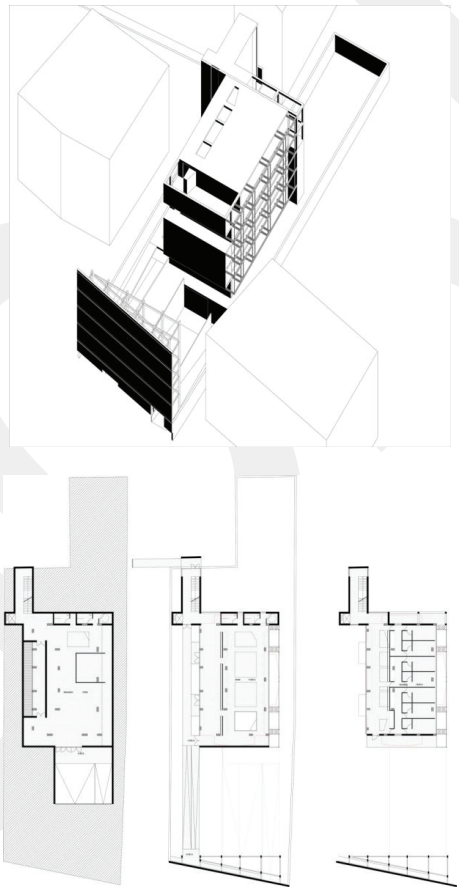
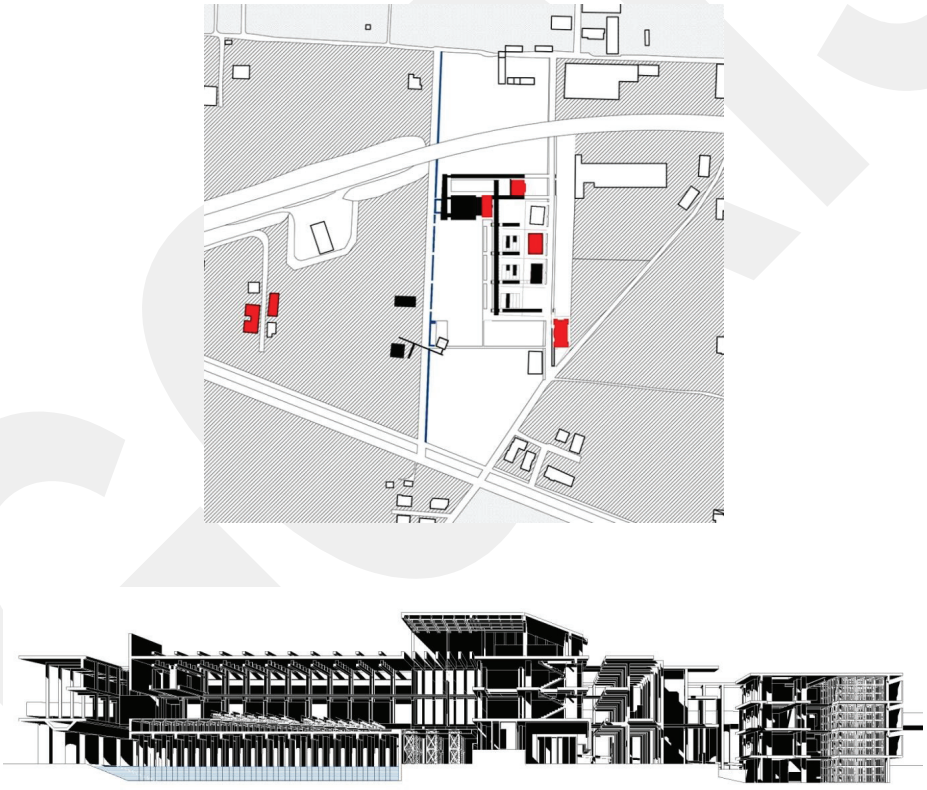


Figure 4-5. Transformation project of an incomplete building in Aversa (edited by M. Pellino). Axonometrical view, Plans lev. 0, +2, +4.

preparing different programs to be changed in time, the application verifies the nature of the architectural elements and the ability of the design operations to absorb these variations. In this way, the elaboration works on the definitions of conditions of "permanence" and "stability" within a generic quality of architecture (thus, indirectly, it reflects about the actual idea of "monument"). The second elaboration (edited by A. de Chiara) deals with an incomplete urban area with a big concentration of incomplete artefacts and it is about reconfiguration operations to determine a complex architectural unit with a "compliant dimension" (an outil for cultural production). This unit brings some existing artefacts inside and relocates existing elements, constituting "spolio" architectures.



Figures 6-7. Transformation project, incomplete urban sector in Giugliano in Campania (edited by A. de Chiara). Plan (incomplete buildings in red), perspective section.

Expression and tectonic in re-composition project

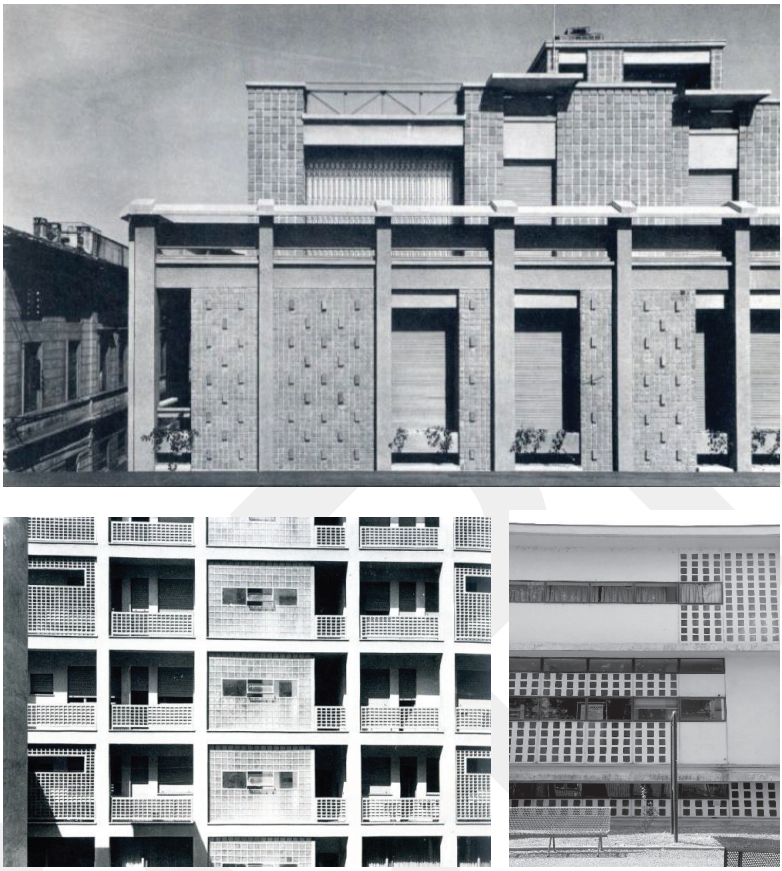
The researches on the non-finiteness articulate aspects of architectural and urban re-composition that, from the standpoint of energy sustainability, are normally faced from the technological point of view.

Instead, these researches concern with interventions addressed to definition of an adequate characterization of the building and the city, in the perspective of a translation of a thematic specificity (architectural and urban). This fact happens starting from the "tectonic condition" strongly manifesting the "decomposable nature" (Martì Arìs, 1990) of modern architecture (Borbein 1982; Frampton 1999), an "elementarism" (even if unintentionally) exalted and expressed in the building's non-finiteness, showed by rudimentary unfinished constructive reality of its floors, pillars, beams ...

In this disassociation - in which, for example, the notions of structure and closure are separated - we find procedures for revealing the physical and temporal disunity (Venezia, 2011) of the building, deriving from the construction carried out in different times. The expressive possibilities can therefore deal with diachrony: a condition that concerns with "the life of the building" - paraphrasing Rafael Moneo (Moneo, 2004) - but also its truth and its transformation possibilities.

Tending to finiteness, the architectural artefact can therefore refer to a "coexistence of times" (Calvino, 1967) expressed in the research about stratification, often limited to the linguistic aspects, we can find in the post-war works by Carlo Scarpa, Franco Albini, Ignazio Gardella, BBPR (Canella, 2010). It is addressed to an architectural characterization and it can also land to a representation of syntactic-linguistic conflict.

In non-finite architecture – where constructive system are given and immutable, eventually integrable – this compositional re-consideration of the structural role can happen in terms of a waiver of a claim of exactness (Linazasoro, 2015), as in façade of Via Circo building by Figini and Pollini (Gregotti, 1996) with significant misalignment pillar-opening, that is one of the technical devices for architectural stratification. As we know, different device expressing the same tension is the "double façade", one of the most interesting contributions by Italian Rationalism in the development of modernist figuration (Terragni, Cattaneo, Figini and Pollini). We think about the loggias of Via Broletto building, by Figini and Pollini, but also the Gardella's Dispensary.



Figures 8-9-10. Front details. Building in via Circo, Milano (L. Figini e G. Pollini); Building in via Broletto, Milan (L. Figini e G. Pollini); Antitubercular dispensary, Alessandria (I. Gardella).

This discussion, concerning the transformative project, is based on a particular theme: "the façade in architecture". On this limit of architecture the concept of sustainability has been expressed only from the technological point of view and according to a simple performance evaluation, mortifying the properly expressive issues of the architectural project and above all, concealing the truth of the building.

Conclusion

The specificity of the sytus, the difficult correspondences between the "given" structural orders (in the case of non-finiteness) and the internal re-configurations, a stratification of signs (from the "planimetric figure" the dominant lines in the composition of the artefact), lead to the loss of modeling anxiety for the benefit of the project that – in the framework of re-use – tends to express this complex system through corrective procedures. The outcomes of these procedures can sometimes be quite imperfect, but they are part of a reunification attempt standing at the base of composition actions. Sustainability is therefore the use of existing signs, even if they are in conflict with the exactness, and the tendency to a convergence of all the elements - including those ones guaranteeing a new "performance" of the building - compared to this stratified condition of the contemporary city's reality.

References

Aalborg Commitments (2004), retrieved in: http://www.sustainablecites.eu/fileadmin/repository/Aalborg_Commitments/Aalborg_Commitments_English.psf

Borbein, A.H. (1982). Tektonik, zur Geschichte eines Begriffs der Archäologym*, Archiv för Begriffesgeschichte* XXVI, n. 1.

Cacciari, M. (1992). *Sul metodo di Polesello,* Introduction to Zardini M., *Gianugo Polesello*, Milan: Electa.

Calvino, I. (1967). La compresenza dei tempi*,Galleria* XVII, 3-6 (pp. 237-40: 239).

Canella, G. (2010). *Architetti italiani nel Novecento.* Milan: Marinotti.

Costanzo, F. (2017). *L'architettura del non finito. Il progetto per gli edifici incompleti*. Melfi: Libria.

Frampton K. (1999). *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture.* Cambridge-Massachusetts: MIT Press.

Gregotti, V. & Marzari G. (1996). *Luigi Figini Gino Pollini. Opera completa.* Milan: Electa.

Grima, J. (2005). La difficile arte del sottrarre, *Domus* 879.

Linazasoro, J.I. (2013). *La memoria del orden. Paradojas del sentido de la arquitectura moderna*. Madrid: Abada.

Martí Arís, C. (1993). *Las variaciones de la identidad : ensayo sobre el tipo en arquitectura*. Barcelona : Ediciones del Serba.

Moccia, C. (2012). *Architettura e costruzione*. Firenze: AION.

Moneo R. (2004), La solitudine degli edifici in *La solitudine degli edifici e altri scritti*, vol. II, Torino: U. Allemandi ed.

Rogers, E.N. (1961). *Gli elementi del fenomeno architettonico*. Roma-Bari:Laterza.

Semerani, L. (2009, april). Continuità e discontinuità, *Giornale IUAV* , 65.

Venezia, F. (2011). *Che cosa è l'architettura*. Milano: Electa.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Design research models for territories: local resources for social inclusion.

Vincenzo Cristallo[1*], Ivo Caruso[2]

[1*]*Department of Planning, Design, and Technology of Architecture, Sapienza University, Rome, Italy, vincenzo.cristallo@uniroma1.it*
[2]*Department of Planning, Design, and Technology of Architecture, Sapienza University, Rome, Italy, ivo.caruso@uniroma1.it*

Abstract: To Design culture is nowadays required to provide a strategic contribution to elaborate for territories – and in support of local communities - design actions aimed to put in relation natural and artificial resources, products and services. A target that, in order to be concretely sustainable, must be pursued by connecting the interdisciplinary nature of scientific knowledge to the typicality of local heritage, whether tangible or intangible. Only in this way it is possible to proceed towards social inclusion, considered as an inalienable condition, and the ultimate goal of every possible project for the territory.

Keywords: design for territories; local resources; social inclusion; strategic design; environment protection

Introduction

The paper presents two researches. Two "projectual trajectories for the territory", which are diversified in the instruments we adopted but which are complementary in the method which pursue the common final target of a concrete local sustainability.

Methods

The project "Medonia. Design for the protection of Posidonia Oceanica" concerns the sustainable use of beached marine biomass. The research "Sunway. Design for linear energy systems" concerns the design of components for the regeneration of railway paths through energetical sustainable practices. The two activities are distinct in the premises that generated them and in the objects of study, but they are complementary in describing a research method that employs the complexity and the problematic nature of local resources as conductors for social inclusion**.** The first one defines a sustainable management strategy in a context characterized by high naturalistic value**;** the second one proposes and tests solutions for the regeneration of railway infrastructures, so acting in a strongly anthropized context. The two researches have been conducted in collaboration with specific research institutes, environmental protection authorities, institutional and private subjects, always balancing “desk” and “field” activities and so demonstrating that the project for the territory requires, to be such, shared and inclusive actions, able to involve different knowledges and figures expression of the territory.

Findings and Discussion

Design for territories. A social “local action”

Local self-sustainability is closely related to the concepts of independence and of energy and food self-government in respect of territorial and environmental issues. The fundamental principle of a territorial project - a project in which the territory concretely and rhetorically is a co-author within a "situated action", that is inseparable from the material and social circumstances in which it takes place – is that it has to be a choral project; it has to be shared by a large system of authors-actors (local administrations and institutions, public and private organizations, companies, researchers and professionals, private citizens).

Although it is a kind of leitmotif too often recalled, the sequence that establishes that planning for the territory means recognizing and preserving the identity of a "local culture" that gives rise to "local products" through its own "local resources" remains inalienable. So it is possible to state that the "local product" is everything that has a close relationship with the territory and with the community that has induced it.

The local project can not therefore avoid to consider from a sustainable perspective the use of local resources. A sustainability that is equivalent to "reading the territory, interpreting it, visualizing it, constructing areas of meaning and shared visions, promoting forms of participatory planning, transforming visions into actionable initiatives, designing the interfaces of the services deriving from them, promoting and implementing a effective communication of the whole process". It is evident that such a sequence of actions contains a strong social character, but it is a foreseeable consideration because there can be no territory without sociality. It is an inevitable clarification because, although design for the territory firstly defines its practices in the fields of strategic design and services, its project is a philosophically holistic "project path", according to which the properties of a given system can not be determined by the sum of its components because it is the system in general that determines the behavior of the parts.

Medonia project. A research for an "eco-social" environmental protection

Medonia (Mediterraneo / Posidonia) is a research born from the collaboration between the PDTA department (Planning, Design, Architectural Technology) of the University of Rome "La Sapienza", the research center of Casaccia in Rome of ENEA and the Protected Marine Area "Egadi Islands" and it concerns of one of the most critical environmental emergencies afflicting the Mediterranean sea: the beaching of Posidonia Oceanica. The heaps of plant biomass are a source of inconvenience for seaside tourism because they cover stretches of beaches so impeding a proper fruition. These aspects in many cases require the transfer to landfill with an increase in costs and environmental consequences also referring to the protection of native species of the Mediterranean area. However, as a "natural product", biomass is a fundamental resource for the marine and coastal habitat; it can be considered a detector of the health of the sea and its ecosystem.

The strategic objective of the Medonia project is to give value to Posidonia by defining a "new meaning"; no more just a passive biomass, but a precious natural element aimed to an active use by the bathers. The role of design in Medonia research is not simply attributable, as it can easily appear, to the themes of eco-design, it is instead supported by the principles of "design for the territory" in its vocation to support initiatives for local development that acts in the direction of environmental protection. It means to employ peculiar resources of a particular bio-system but to do so by combining the eco-social dimension of the project with that of service through the product.

Sunway project. A research aimed to produce energy through a sustainable regeneration of the territory

Sunway is a research that has been carried on in the international PhD course in Design and Innovation of the University of the Studies of Campania "Luigi Vanvitelli", in collaboration with Sapienza University of Rome and Bauhaus Universität of Weimar[1].

To the abandoned railways it is recognised a strong functional, and cultural potential and they are today at the center of a lively debate concerning the methods for the study,

[1] Supervisors: prof. Vincenzo Cristallo (Sapienza University of Rome), prof. Renata Valente (l'Università degli Studi della Campania "Luigi Vanvitelli"), prof. Jürgen Ruth (Bauhaus Universität of Weimar).

regeneration and management of these enormous assets. One of the most widespread practices is the transformation of these routes into greenways; linear paths defined as "green" because they are located in areas of naturalistic interest or simply organized to form urban park extensions or links between them, or because they are dedicated to "slow" mobility, so excluding motorized vehicles. Today the greenways can assume new and strategic roles including the control and protection of the natural and cultural heritage of a territory, the regulation of urban expansion, the fight against degradation, the incentive to socialize and the education to healthy behaviors and lifestyles. The greenways in fact work only if they are really recognized and experienced by local communities and not only destined to occasional users.

The goal of Sunway is to transform a huge, fascinating, but unused and problematic asset into an innovative tool for the sustainable development of territories. In this scenario, research analyzes urban regeneration practices as an opportunity to contain energy needs, to restore the identity of places and to relocate energy production. A model of "photovoltaic linear infrastructure" is therefore introduced which is based on a radical change in the way of conceiving the places of energy production (which thus become shared, linear, open, socially accepted, low-risk, multifunctional, regenerative and not invasive).

Conclusion

Considering the premises and the achieved outcomes, in a general sense the case studies presented are two examples of the indispensable role of interdisciplinary research. As it is anticipated in the paragraphs concerning methods, both were conducted in close cooperation with different research institutes, environmental protection authorities, institutional and private subjects; so demonstrating that the project for the territory requires, to be such, shared and inclusive actions, able to involve different knowledges and figures expression of the territory. Any territory. That is, every context, whether it is uncontaminated or strongly anthropized, has its identity, its historical and value-bearing, peculiar material or immaterial "deposits". In relation of these conditions, the Design sciences can take on a strategic role in redefining priorities, anticipating transformations, giving new meanings to places, artefacts and technologies, involving different actors in a research-action path oriented towards sustainability and the enhancement of territory. In this operation Design do not have to provide only "constructive practices", but strategies of resemantization and refunctionalization to create true models of social inclusiveness.

References

Bistagnino L. (2009), Design Sistemico. Progettare la sostenibilità produttiva e ambientale, Bra (Cn), Slow Food Editore, ISBN 978-88-8499-270-3.

Cristallo, V., De Simone, C., Cappucci, S., Donati, S., (2017). Medonia. Il design per la salvaguardia della Posidonia oceanica, in: Bisson M., (a cura di) MDA 2017. Mediterranean Design Association, II° International Conference On Environmental Design, by MDA - Mediterranean Design Association. Milano: De Lettera Publisher, pp. 229-240.

Gang J. (2010), The Cook, the Prospector, the Nomad and their Architect, Three Approaches to Building with Local Resources, in AAVV, Re-inventing Construction, Ruby Press, Berlino, 2010.

Magnaghi A. (2010), Il progetto locale, verso la coscienza di luogo, Bollati Boringhieri, Torino, first edition 2000, new edition 2010.

Manzini E. (1997), Ripensare l'habitat sociale, Impresa & Stato n°37-38.

Parente, M., (2010). Il design per la valorizzazione territoriale. Il caso del Rione Sanità a Napoli, in TAFTERJOURNAL N. 22 - APRILE 2010, http://www.tafterjournal.it/2010/04/01/il-design-per-la-valorizzazione-territoriale-il-caso-del-rione-sanita-a-napoli/

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Impacts of Recently Developed Squatter Settlements Transformation Projects on Urban Heat Islands: A Comparative Study in the City of Ankara

Çakmaklı Ayşem Berrin[1]*, Baş Bütüner Funda[2]

[1]*Department of Architecture, METU, Ankara, TURKEY, cakmakli@metu.edu.tr*
[2]*Department of Architecture, METU, Ankara, TURKEY, fbutuner@metu.edu.tr*

Abstract: Urban redevelopment projects, in various scales and scopes, have recently emerged as major operations that have (re)shaped urban fabric of Turkish cities. The city of Ankara, being the capital of Turkey, has dramatically experienced urban redevelopment projects including squatter settlement transformation that has raised large scale clearances and constructions in different parts of the city. Squatter settlements, lacking of infrastructure and basic urban services, were replaced by residential blocks. The newly proposed housing development has been raised as a model with upgraded infrastructure, designed landscape and paved roads; and quickly became an ideal for all squatter settlements in Turkey. However, the effect of these newly developed residential districts on urban heat island (UHI) has been rarely discussed. In this regard, this paper intends to discuss the impacts of the urban transformation projects on urban climate by particularly focusing on Yeni Mamak housing development district in Ankara. The paper will be grounded on a comparative study based on the former and current settlement fabric of the area. In doing so, it is intended to reveal the critical role of the newly developed housing areas in mitigating the impacts of the UHI.

Introduction

As highlighted in recent environmental studies, there are few areas in the world that can be considered "natural". Nearly half of the earth's surface is (in)directly affected by human interventions (Milliga, 2010), and covered by the gray surfaces especially in urban areas. Since increased urbanization, compared to rural areas, introduces a population growth; creating a sense of sustainable community has emerged as a critical agenda.

Due to certain conditions, the energy used by the human is scattered in the form of waste heat. This and the heat from solar radiation can be entrapped by urban structures which causes the rise in temperature of densely built-up urban zones. This effect is known as Urban Heat Island Effect (UHI) (Gago, Roldan, Pacheco-Torres and Ordonez, 2013). UHIs which are directly related to climate change and global warming affect negatively not only occupants of urban zones but also their connected ecosystems located far away. As a result of this, a multidisciplinary-

agenda which necessitates strategies in various scales from planning to architectural details should be raised.

Multi-scale Framework on Urban Heat Island (UHI)

Urbanization introduces a built environment that mostly results in UHI;

- Canyon radiative geometry (loss of long-wave radiation and decrease of effective albedo of the system) due to exchange between buildings and skyline, multiple reflections of shortwave radiation
- Thermal properties of materials (albedo characteristics)
- Anthropogenic heat released from combustion of fuels
- Urban greenhouse (increase in incoming long-wave radiation from the polluted and warmer urban atmosphere)
- Reduction of evaporating surfaces (more energy for sensible heat and less energy for latent heat)
- Reduction in turbulence of heat within streets

The term 'urban canyon' characterizes the set of streets that cut through dense blocks of buildings, especially skyscrapers, resembling the natural canyon. The variation of urban geometry can influence the increase or decrease of temperature, the wind speed and direction, the form of radiation received by shortwave and released heat through long waves. The urban geometry is measured the maximum intensity of urban heat islands by H/W ratio. (H= Height of the building, W=Track width related to a street) (Nakata-Osaki, Souza and Rodrigues, 2015)

Regarding this argument, adaptation and design of the green and open spaces for mitigating the undesirable impacts of the climate change, have been developed as one of the prevailing tasks in architecture, landscape architecture and urbanism fields. Recently emerged landscape-based approaches -"Landscape Urbanism", "Green Infrastructure" or "Landscape Infrastructure"- have raised fresh lenses in the (re)programming of urban lands to mitigate the negative effects of UHI (Allen, 2012; Benedict and McMahon, 2006). Urban strategies and practices developed for different world cities –such as Berlin and London- clearly demonstrate the need for an integrated green infrastructure that operates in various scales and that collaborates

with architecture. Green infrastructure strategies are being developed, even in cities where green areas cover a considerable amount of surface. Such strategies basically aim to generate a porous urban surface that highly contribute to the control of urban climate.

From green to gray: UHI and Urban Redevelopment Project in Yeni Mamak

Housing areas and transportation infrastructures have been prevailing in the development of a continuous and integrated green infrastructure in cities. Their critical contribution to urban climate strategies become undoubtedly evident when the recent investments in both fields – housing areas and transportation- are considered. In this scope, the city of Ankara, experiencing numerous urban transformation projects by 1990s, is a noteworthy case to discuss the impacts of housing areas and infrastructures on urban climate issues.

Yeni Mamak housing development area, neighboring the Sincan-Kayaş commuter line and canalized Hatip Creek, is situated on a peculiar terrain at the east part of Ankara. Formerly, as presented in 1957 Ankara map, the site was part of a green corridor that was extending from Demirlibahçe to Kayaş. This green fabric was identifying a characteristic landscape, which was formed by orchards, truck gardens and creek, and was serving as recreational field (*mesire*) in the city. However, the landscape of the site was dramatically changed by 1950s, the time when the city was faced with rapid urban growth. At that time, the housing demand of the migrants triggered the development of squatter settlements, which were lacking infrastructure and basic urban services, in Ankara (Uzun, 2005). Natural reserve areas in and at the periphery the city -valleys, hills and slopes- became favorable grounds in the construction of squatter settlements. The increased number of squatter settlements[1] generated an unfavorable environment, and has dramatically changed the urban landscape. By 1990, urban redevelopment and urban transformation projects, which introduced new residential blocks in the place of the squatter settlements, have raised. By introducing an upgraded infrastructure and designed environment, these projects quickly became a model for squatter settlements all around the country. However, the impacts of the changing landscape of the newly planned housing blocks on urban climate have been barely discussed. Spontaneous landscape and permeable ground of the squatter

1 As stated by Uzun; “In 1980, more than 75% of the urban population lived in Ankara’s squatter settlements” (Uzun 2005, 186)

settlements were replaced by paved surfaces that cause a disadvantageous environment in terms of UHI.

At that point Yeni Mamak urban transformation project, which is analyzed in Table 1, covering 14 neighborhoods, is a noteworthy case in Ankara. However, this paper concentrates on a particular fragment of the project area, which was bordered by rail track and canalized Hatip creek at the north, and by 19 Mayıs Boulevard at the south in Üreğil neighborhood.

Table 1: Changing built and landscape fabric of the selected housing development area in Yeni Mamak between 1957 and 2013 [The table was developed based on the 1957, 1982, 1993 and 2013 Ankara Maps (1:25.000) and aerial photographs of the time].

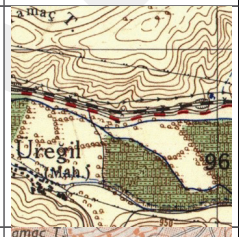
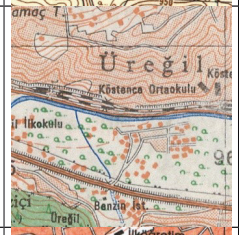
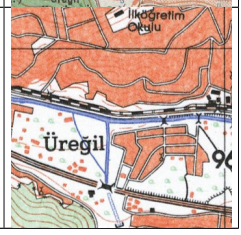
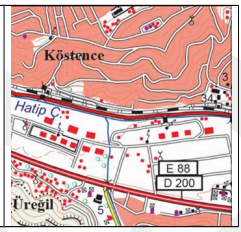
	Built & Landscape Fabric	Main Building Typology	Field/Surface Condition	
1957	Rural landscape *Mesire*	-	Truck garden Deciduous trees Hatip Creek	
1982	Sub-urban zone (low density built fabric, spontaneous landscape)	Single/ low-rise units	Decidous trees Partially paved paths/streets Canalized Hatip Creek	
1993	Sub-urban zone (medium density built fabric, spontaneous landscape)	Single low-rise units, low-storey buildings	Decidous trees Canalized Hatip Creek Paved vehicular paths/streets	

Table 1 (continued):

2013	Yeni Mamak Urban Transformation Site (high-rise housing and public services: school, regional places, health center, etc)	High-rise blocks	Housing landscape Canalized Hatip Creek Densely paved (asphalt and concrete) surfaces	

Conclusion

This article concentrates on establishing the strategies of mitigating the adverse effects of the UHI in the design of Yeni Mamak urban transformation project which directly affect urban temperature on local scale. Being aware of the potentials offered by landscape-based strategies in the (re)programming of housing areas will be –undoubtedly- valuable for professionals who are responsible for decision-making on the design phase of such projects. The selected housing area, comprising a spontaneous landscape, transportation infrastructure and canalized Hatip Creek, has an undervalued/undiscovered potential within the urban fabric of Ankara. In this regard, the examination of the selected housing area in terms of UHI will introduce a critical data and argument for many studies that can be developed in the future.

References

Ahern, J. 2007. Green infrastructure for cities: The spatial dimension. In: V. Novotny and P. Brown, eds. Cities of the future: Towards integrated sustainable water and landscape management. London: IWA Publishing.

Allen, W.L. 2012. Environmental Reviews and Case Studies: Advancing Green Infrastructure at All Scales: From Landscape to Site. Environmental Practice, 14 (01), 17–25

Benedict, M., & McMahon, E. 2006. Green infrastructure: Linking landscapes and infrastructures. Washington, London: Island Press.

Erol, O. (1976) Ankara şehrinin gelişiminde doğal koşulların etkisi, Ankara Üniv. Dil ve TarihCoğrafya Fakültesi Yay.No:257, 45-55.

Gago E.J., Ordonez J., Pacheco-Torres R., & Roldan J. (2013) The City and Urban Heat Islands: A Review of Strategies to Mitigate Adverse Effects, Renewable and Sustainable Energy Reviews 25(2013): 749-758

Milliga, B. (2010) Corporate Ecologies, Journal of Landscape Architecture, vol. 5, issue 1, 6-23

Nakata, O., Souza, &Rodrigues. (2015) A GIS Extension Model to Calculate Urban Heat Island Intensity Based on Urban Geometry, The 14th International Conference on Computers in Urban Planning and Urban Management, July 7-10, 2015, MIT, USA

Shannon, K., & Smets, K. (2010) The Landscape of Contemporary Infrastructure, NAİ Publishers, Rotterdam

Uzun, N. (2005) Residential Transformation of Squatter Settlements: Urban Redevelopment Projects in Ankara, Journal of Housing and Built Environment 20(2005): 183-199.

Waldheim, C. (2011) 'Reading the Recent Work of SWA' in C. Waldheim, Y. Hung, J. Czerniak, A. Geuze, A. Robinson, M. Skjonsberg (Eds.) Landscape Infrastructure: Case Studies by SWA (Birkhauser Basel) 8-13.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

An investigation on indoor soundscape in high school environment

Sıla Çankaya Topak[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, silacankaya@gmail.com*

Abstract: This study presents an evaluation of the students' preferences and acoustic comfort perception to understand the indoor soundscape in a computer laboratory, Ankara, Turkey. To understand the existing acoustical conditions, sound level (L_{Aeq}) was measured. In subjective survey, 43 students participated an acoustic comfort and sound preference questionnaire. Results showed that motorized transport sound sources are perceived as annoying sound sources whilst human-based sound sources are evaluated as relaxing sound sources. Although sound levels were measured higher than recommended, students evaluated sound levels as both high and low. Therefore, it is found that soundscape cannot be evaluated by only physical indicators as sound levels, it should cover the information about the context which sound is heard.

Keywords: soundscape, high school environment, auditory perception

Introduction

Soundscape is one of the important topics in the acoustic field to present the effects of aural factors on space perception and to propose the sustainable space definition based on these aural factors. Soundscape deals with the interaction between objective acoustic environment and individuals or society as firstly proposed by Schafer (1977). The identification of sound sources, which is referred as soundmarks in soundscape studies, is necessary to present related aural environment. Brown, Kang & Gjestland (2011) proposes a common framework to standardize the identification of soundmarks for indoor and outdoor acoustic environment. Apart from the identification of sound sources, soundscape studies depend on the context (Brown *et al.*, 2011; Truax, 1984), socio-cultural background of the listener (Schulte-Fortkamp, 2010).

This study aims to study soundscape analysis in an educational space to understand the sound preferences in both with the definition of wanted and unwanted sound sources and acoustic comfort evaluation. As a limitation of the study, the study remained limited in 10^{th} and 11^{th} grade students due to the unavailable lecture hours of 9^{th} and 12^{th} students. In addition, objective measurements conducted during a single-class hour because of the occupied hours of the computer laboratory. For more accurate results, it would be better to measure sound level during the day.

Methods

This study is conducted in a computer laboratory, which is located between the schoolyard and corridor in the ground floor of high school. The 43 participants are selected as 10^{th} and 11^{th} grade students to evaluate the perceptual differences between grades. As a method of the study, objective and subjective survey were applied. Objective survey was conducted to present the existing acoustical conditions of the high school. Sound levels were recorded as the 10-minute time intervals during the 40-minute class period via Bruel & Kjaer 2230 sound level meter. A-weighted sound pressure level (L_{Aeq}) was measured as around 70.5 dB in occupied situation of the computer laboratory.

In subjective survey, an acoustic comfort and sound preference questionnaire was prepared that examines both students' perception regarding sound preferences in an educational space. The questionnaire consists of ranking questions, which include the basic socio-demographic information, sound preference and acoustic comfort evaluation. Basically, six sound source groups were defined as voice-instrument, motorized transport, natural, human movement, other human, and electro-mechanical considering the existing situation of space. In acoustic comfort evaluation, students were asked to evaluate the effect of sound level on both their concentration and their aural perception. Subjective data was evaluated with statistical analysis program, SPSS V.20.

Findings and Discussion

First of all, socio-demographic characteristics of the students were analyzed to understand the characteristic distribution of sample group. Majority of the participants were recorded as female (56% of the sample group). 44% of the participants were found as below mean (mean value=16.6) while 56% of the participants were found as above mean.

As a second step, frequency analysis was used to evaluate the perception towards each sound source. In 10th grade of students, results of frequency table show that motorized transport sound sources as roadway traffic sound source (70%) and siren-ambulance sound source (65%) were evaluated as negative sound sources. On the other hand, 75% of the students perceived the sound of prayer call as a positive sound. Human movement sound and

electro-mechanical sound groups were perceived as neither annoying nor relaxing (See Figure 1).

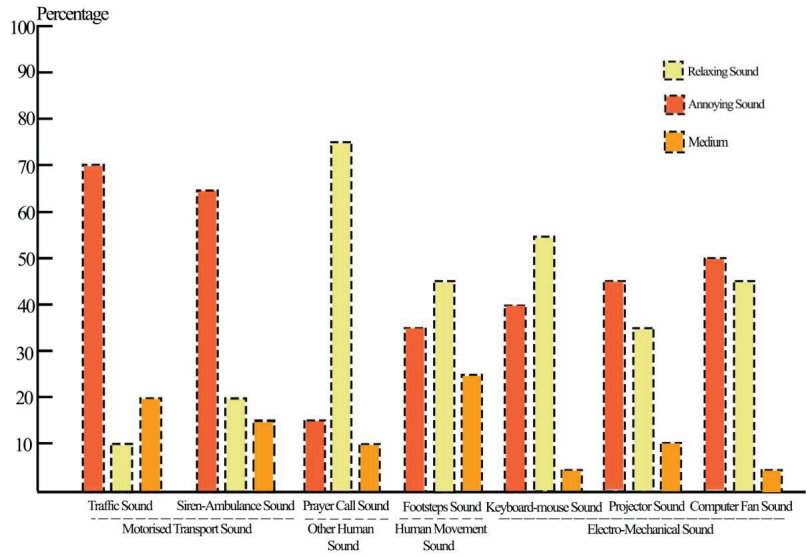


Figure 1: The distribution of the sound preferences in 10th grade students

In the 11th grade of students, results of frequency table showed that the negative sound sources are the siren-ambulance sound (65%) and the traffic noise (65%) as motorized transport sound source group. On the other hand, projector sound source (74%) and the sound of prayer call (61%) were evaluated as positive sound sources. Similarly, footsteps sound, keyboard-mouse sound and computer fan sound were recorded as neither annoying nor relaxing sound sources (See Figure 2).

It is parallel with this study that many of the accepted findings on soundscape studies declares that motorized transport soundmarks are evaluated as negative annoying sound sources (Yang & Kang, 2003). Moreover, electro-mechanical sound sources are also evaluated as negative annoying sound sources in literature (Axelsson, Nilsson & Berglund, 2010; Yang & Kang, 2003). However, this study showed that students evaluated them neither annoying nor relaxing. It can the reason that electro-mechanical sound sources belong to the identity of computer laboratory because if a person expects to hear a sound in a particular

environment, he/she can develop more positive sound perception towards that environment. Human-based activities are generally evaluated more pleasant than technological sounds, or more neutral in terms of pleasantness (Axelsson *et al.*, 2010), which is also present in this study because both student group accept sound of prayer call positively. Moreover, it also can be related with the information that sound carries and the context that the sound is heard.

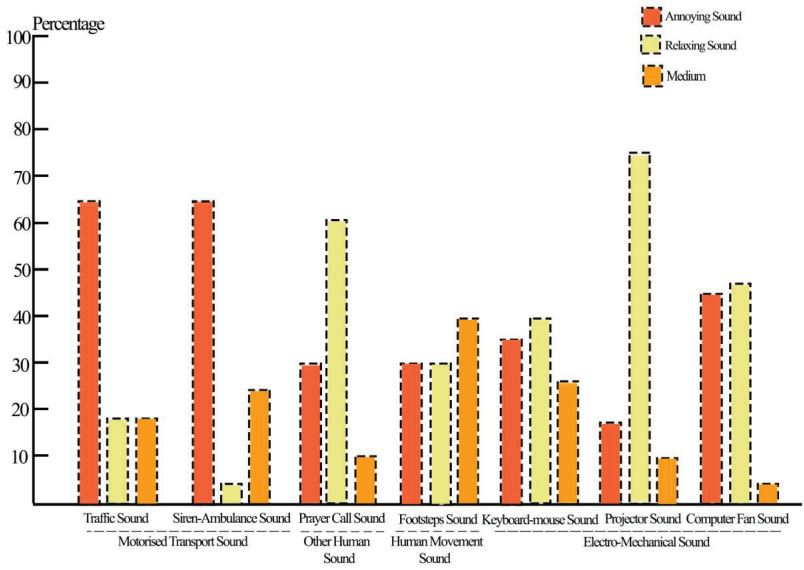


Figure 2: The distribution of the sound preferences in 11th grade students

In acoustic comfort evaluation part, questions were firstly evaluated with independent samples t-test to understand the different perceptions between 10th and 11th grade students. Question related with sound level (p= the exact probability, p value = 0.015, $\alpha < 0.05$) were recorded significantly different in both grades. According to that, whilst majority of 10th grade students (63.2%) evaluated sound level high, 11th grade students mostly evaluated it low (56.5%). In order to understand the general evaluation regarding the acoustic comfort evaluation and the effect of sound level on the students' concentration, frequency analysis was conducted. According to that, students felt unsatisfied with their acoustic environment (41.9%) and they think that the sound level in laboratory affects negatively their concentration during the lecture (59.5%).

The acoustic measurements recorded high sound levels in computer laboratory when thinking the situation that noise level above 55 dB results in the attention deficit in lectures (Zannin & Marcon, 2007). It is quite interesting to see that students both evaluated sound levels as high and low although they are not satisfied with their acoustic environment and evaluated high sound level as a negative effect on their lecture concentration. It means that sound level is not only indicator to evaluate the sound quality of an environment as parallel to the studies in the literature (Rey Gozalo, Trujillo Carmona, Barrigón Morillas, Vílchez-Gómez, & Gómez Escobar, 2015). In that sense, soundscape depends the context, the information in the sound and individual perspectives rather than physical indicators as sound level or the exclusion of level (Brown, 2011).

Conclusion

To sum up, this study shows that students generally prefer to hear human-based sound sources as sound of prayer call, and not to prefer to hear motorized transport sound sources as traffic sound and siren-ambulance sound. Although the students evaluated sound levels as both high and low, they are not satisfied with the acoustic environment. It means that soundscape does not depend only physical descriptors of sound, depends on the personal dimensions, context which sound is heard, and the information that sound carries. Socio-demographic results did not show any dependency to the questions due to the similar demographic background of the students. For further researches, the study may be conducted in different places of high school or with different users (teachers, workers) to understand the all-possible combinations of negative and positive soundmarks.

References

Axelsson, O., Nilsson, M. E., & Berglund, B. (2010). A principal components model of soundscape perception. *J Acoust Soc Am, 128*(5), 2836-2846.

Brown, A. L. (2011). *Advancing the concepts of soundscapes and soundscape planning.* Paper presented at the Acoustics 2011, Australia.

Brown, A. L., Kang, J., & Gjestland, T. (2011). Towards standardization in soundscape preference assessment. *Applied Acoustics, 72*(6), 387-392.

IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.

Kang, J., & Zhang, M. (2010). Semantic differential analysis of the soundscape in urban open public spaces. *Building and Environment, 45*(1), 150-157.

Okcu, S., Ryherd, E. E., Zimring, C., & Samuels, O. (2011). Soundscape evaluations in two critical healthcare settings with different designs. *J Acoust Soc Am, 130*(3), 1348-1358.

Rey Gozalo, G., Trujillo Carmona, J., Barrigón Morillas, J. M., Vílchez-Gómez, R., & Gómez Escobar, V. (2015). Relationship between objective acoustic indices and subjective assessments for the quality of soundscapes. *Applied Acoustics, 97*, 1-10.

Schafer, R. M. (1977). *The soundscape : our sonic environment and the tuning of the world*: Rochester, Vt. : Destiny Books.

Schulte-Fortkamp, B. (2010). Soundscape and sound design -Tuning the new ecology using the expertise of people's mind. *Proc. Digital Audio Effects*.

Yang,W. & Kang, J. (2003) A cross-cultural study of soundscape in urban open public spaces: Proceedings from Tenth International Congress on Sound and Vibration, Stockholm.

Zannin, P. H., & Marcon, C. R. (2007). Objective and subjective evaluation of the acoustic comfort in classrooms. *Appl Ergon, 38*(5), 675-680.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

From Badlands of Plastics to "Up-cycled" Objects: "Tertium Non Data"

Rabia Çiğdem ÇAVDAR[1]

[1]*Architecture, Çankaya University, Ankara, Turkey, rccavdar@cankaya.edu.tr*

Abstract: Roland Barthes (1991) stated, "A miracle is always a sudden transformation of nature." Originally, plastic could be seen as a man-made material (thing) transformed from a natural material. Plastic is a new "perfect" material-object produced from earthly raw material. Although its discovery time is not very long, it is obvious that it has a long lifetime after once produced. That is why it is needed to find sustainable ways to manage the world of plastic objects. There are many re-cycling projects related with plastics, but here I would like to mention an "up-cycling" project of plastics. It is a "revaluation process" of plastics, it is "Tertium Non Data" done by Gülnur Özdağlar. In this miraculous process, useless-epidemic-uninspired plastic things transformed into something endemic and unique. "Tertium Non Data" could be a sustainable way of living with plastics.

Keywords: badlands; Tertium Non Data; up-cycling; plastics; artworks

Main Text

Relations between human and nature have been changing since the human history. In this dialectic process human changed positions and aimed that determined the direct relation with nature. Every determination of the relation with nature designated the phase of sustaining the sources. All human activities affect both human and nature in time. After possible effects of humans absorbed or erased by nature, depending on the conceiving the nature, human designated a type of relation with nature. It is possible to say that every radical change of perception to understand the nature during civilization history brings new type of activating style on/in/with the nature.

Humans' activities on nature create "badlands", which are the places where natural sources are used. A badlands (also badland) is a type of arid terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water. It can resemble malpais, a terrain of volcanic rock. In Spanish, the word "Malpais" used as the badlands, the area as unusable. Canyons, ravines, gullies, hoodoos and other such geological forms are common in badlands. They are often difficult to navigate by foot. Badlands often have a spectacular color display that alternates from dark black/blue coal stria to bright clays to red scoria. It is the place, which is not fertile and not suitable for agriculture. If a land is not fertile for usage of Mankind, that land could be defined as "Badland". Actually it is possible to mention two types of badlands, one is natural badlands, which are not fertile, such as Volcanic

rocks and Deserts, and the other one is that artificial badlands, which are created by human beings for using the natural sources, such as oil fields, junkyards and tire piles/lands.

For artificial badlands, it is possible to say that human created new landscapes as "badlands". Civilization used industry for constructing new living environment. Especially after 1950s, oil based and iron based materials were on the stage. When Fordist production turned into flexible accumulation, productive society was forced to be consumer and consumer society has a habit that is being throw- away society. In addition, human began to create new landscapes in far geographies or very near the big cities with new job systems. That are junkyards, scrap yards, ship breaking yards and so on. Development countries prefer uneven countries as junkyards of technology, or they prefer the deserts, which could be already labeled as "natural badlands".

After human created new landscapes as "artificial badlands", the question is that what kind of behavior he improved to manage with this new type of land, created badlands as junkyards, scrap yards. As David Clarke (2008) cited from Jameson that "Junkspace means no more than perpetual renovation… perpetual recycling". (1) Is that the "new understanding of badland aesthetic"?

In current life systems, the fatal flaw is extremity in consumerism. Non-stop consuming with high-speed production both in service system and in mass production line turns everything and every value, even human himself, into a waste material. In this disintegrated and blurred value system, to give meaning life and to find a way managing vast lands of throwaway materials is not much more than being individual attempts. This unbreakable rigidity cycle of the system, production then consuming –reproduction- consuming reproduction, change the perception on understanding of badlands from the last quarter of twentieth century up to now.

Here it is possible to see two different kinds of aesthetic understanding to conceive the badlands. The first one is an early approach which claimed by Jean Baudrillard (1989) as "badlands or the desert as the end of the end of aesthetic." This is more universal, eternal and systematic approach. The second one is more close to recent, a new pursuit for giving meaning to synthetic (man-made, artificial) badlands. This one is more individual, naïve and an approach of resistance.

Baudrillard's (1989) main claim is that desert is the fascination of disappearance of aesthetic. With this claim, he posed the culture of consumer society as desert that does not have an aesthetic. Here it is possible to mention a dichotomy that desert have an aesthetic of disappearance or disappearance of aesthetic. Actually, Baudrillard made them united and

associated with the negative emptiness. It is possible to read badland as dystopian reflection of consumer society, emptiness of aesthetic and emptiness of value system even the badland have its own aesthetic of disappearance.

In the second type, another form of aesthetic is pursuit; individual associations and attempts to find a new form of reproduction of synthetic badlands. World have to face to face a new type of "synthetic badlands" which affect all natural environment and that have irreversible changes on natural life. Speed and extreme consuming of plastics and chemical materials creates new badlands like Great Pacific Garbage Patch in Pacific Ocean or waste chemical tubes send to space as new satellites of earth. Huge amounts of Plastic waste materials have been collected in oceans like swimming "bad islands". Natural time of earth is not race with the time of civilization that produced waste material, so it accumulated as lands.

Recycling and reuses processes do not bring radical solutions, they are kind of reproduction of produced waste. Artists try to find an associated form between meaning and waste via artworks. This attempt- "up-cycling method" is more sustainable than a recycling process, because it suggests not a raw material but a finished and meaningful object. In this understanding, waste material turns into something new under intellectual forces, and it brings a new aesthetic, which carry the beauty of waste material in artist mind.

The hidden thought behind the reproduction of waste material could be transformative while constituting new approach that human have to find an intellectual way to manage with the waste badlands more than economical one. These individual attempts could be seen naïve and personal resistance but they carry radical thoughts through the waste material. For huge waste lands and junk yards, human add to something more than concept of recycling.

In this respect, it is important to remember how Barthes (1991, p:97) describe the plastic; "Plastic remains impregnated throughout with this wonder: it is less a thing than the trace of a movement." Although it is not a reversible movement, plastic is the second version of "oil". Moreover, "Tertium Non Data" could be seen the third version of the natural material oil. Via material-intellectual forces on plastic objects, a new "up-cycled" object created.

The works of Gülnur Özdağlar, "Tertium Non Data" could be evaluated as "revaluation of plastics"; her works are the sign of movement from valueless thing to invaluable objects. Özdağlar's subjective intervention on plastic object causes to create an artwork. Her creativity interacts with the plastic material for generating a tertiary category on raw material come from nature. This transformation carries alchemical, mystic and unexpected qualities.

Figure 1, 2, 3. *Cthulhu Bowl, made by plastic pet bottles, by Gülnur Özdağlar Güvenç, http://www.gulguvenc.blogspot.com/*

With the radical changing on the logic on production and consumption process and limiting it in a rational level, human find new forms to live with the synthetic badlands. World is in crisis today, every deep and global crisis brings groundbreaking thoughts to the world. Human learned extreme production could not be solved with the extreme consuming; extra consuming brought more problems, accumulated money brought accumulated waste. New systems will be came to scene with the transformation in capitalist development if human wants to find a land out of waste.

References

Barthes, Roland (1991), "Plastic", **Mythologies**, translated by A. Lavers, The Noonday Press, New York, p: 97-99.

Baudrillard, Jean (1989), **America**, translated by Chris Turner, Verso, New York.

Clarke, David B., (2008) "The Ruins of the Future on Urban Transience and Durability", **Consuming the Entrepreneurial City: Image, Memory, Spectacle**, edited by K. Hetherington and Anne M. Cronin, Roudledge, New York, p: 133.

Özdağlar, Gülnur (2009), **Tertium Non Data**, Pagev Yayınları, Ankara.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Energy Effectiveness and Daylight Performance of Office Venetian Blinds

N. Mine Çelebi Yazıcıoğlu[1]

[1]*Interior Architecture, Cankaya University, Ankara, Turkey, micelebi@cankaya.edu.tr*

Abstract: The influence of venetian blinds on the office building located at 41° 53' latitude (Rome) in terms of energy and daylight use performance was analysed. The MIT Design Advisor simulation program was used with four different sets that included four different model simulations for energy and daylight analysis. Direction parameters were taken into consideration while the effect of the blinds angle on the building's energy usage was evaluated. The use of venetian blinds effected the energy efficiency of the building and the efficient use of daylight. The venetian blind span angle is the most important element that affects energy efficiency. The best span angle is 75° for a south-oriented office zone. The venetian blind is the worst solution both energy efficiency and efficient daylight usage for all directions except for a south-oriented office zone.

Keywords: venetian blind, span angle, energy efficiency, daylight usage

Introduction

In discussions of economic growth, sustainability and environmental protection, it is essential that policies for energy efficiency be a part. Energy is extensively used in the world for lighting, heating, and cooling. Daylight is the most important that decreases energy usage. It should be noted that the daylight usage alone can reduce total energy consumption by 25-30% (Köster, 2013; Gago et al., 2015). This should be considered one cost and energy efficient solution, if properly designed. However, attention is drawn to the link between daylight and total building energy use, which is highly likely to avoid costs at the early stages of design and, at the same time, to clearly consider the potential benefits of an effective daylight design on the benefits of building life (Guglielmetti et al., 2010).

A low daylight illuminance level of the interior increases the lighting, cooling, and heating loads and, at the same time, causes an unhealthy and unpleasant atmosphere (Mardaljevic et al., 2009). Prevailing climate and latitude-related variations affects the availability of daylight in an interior space (Mardaljevic and Christoffersen, 2016).

Thermal comfort conditions according to the ASHRAE Standard 55-2004 are defined as 23.5°C--28°C for summer and 19°C--26.5°C for winter. According to the ISO 7730

standard, 24.5°C ±1.5°C for summer and 22°C ±2°C for winter are accepted (ASHRAE, 2004)In 2013, the minimum standard for acceptable levels of illumination in the workplace was defined by the standard "Lighting of Workplaces" by the Turkish Standards Institute. It was determined to be 500 lx in the fields where reading, writing, and CAD are used in the standard which began to be used as TS EN 12464-1 (EN, 2002).

Day et. al. reported blind occlusion values for five days ranging from sunny to overcast in an academic office building with private perimeter offices. Exterior photographs of the windows on each façade were taken five times a day and occlusion values reported by façade. The north façade maintained a mean of approximately 25% occlusion, the west façade averaged 50% occlusion, and the south façade averaged 70% occlusion. Window blinds were generally used more frequently in the south and west façades.

The venetian blind is an optically complex shading device that transmits, reflects, and scatters direct sun, diffuse skylight and reflected light from the ground and surrounding obstructions. The resulting illuminance distribution within a room is, therefore, a complex function of solar conditions and the venetian blind angle.

Methodology

Simulation programs ensure that a building's design and implementation decisions affect the building's performance in the easiest, most economical, and fastest way possible. Unlike many simulation programs, the information that the MIT Design Advisor needs to provide performance analysis reports is fairly simple, while the resulting reports are highly detailed (Lehar & Glicksman, 2007) (see Figure.1). The MIT Design Advisor was presented as one simplified tool for quickly exploring the energy requirements of competing design concepts. A rapid thermal model was described for computing and graphically displaying monthly and annual energy loads. Comparisons with industry accepted software tools (EnergyPlus, radiance, and Window 5) and analytic models were made with similar results (Urban & Gliksman, 2007). This program was designed at the Massachusetts Institute of Technology for architects and non-technical users. Four different directions and four different venetian blind orientations were simulated for energy and daylight analysis, and the effects were investigated.

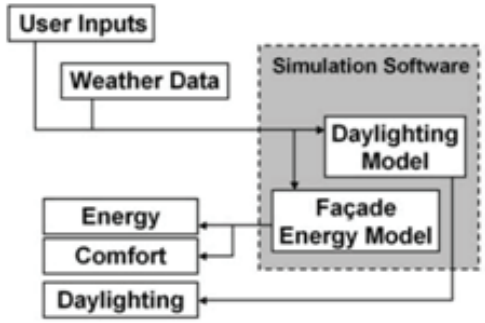


Figure 1. Schedule of program operation (Lehar & Glicksman, 2007)

Case study

The effect of venetian blinds on building energy and daylight performance was analysed using a MIT Design Advisor simulation program. The case study includes a four model set based on the four directions, south, east, west, and north. A 25 mm thick, white Venetian blind was used on the inside of the window. Options included venetian blind closures with span angles of 45°, 75°, and 90° (angles that MIT Design Advisor allows) as well as a no blind option (see Figure 2). The type of window used is double double glass. Within these criteria, a total of 16 different models were evaluated annually and monthly. The dimensions of the office zone were 5m x 7m x 3, 5m (h). Within the scope of the standards, the heating and cooling system (HVAC) of the office zone was mechanically changed between 18 degrees and 26 degrees according to the seasons. The program's design problem was that, due to the use of the special constraints of the MIT Design Advisor program for locations, an appropriate location in Turkey was not found, so the simulation took place in Rome, which had the most similar climatic property.

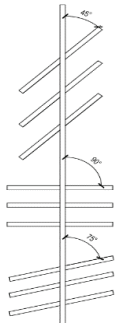


Figure 2. Venetian Blind Span Angles for study

Energy performance analysis of the case study

The study was designed as four sets and has variable directions. Within the sets, the effect on the energy performance of the venetian blinds with different closure angles was observed. the venetian blind in the first model had 45° span closures, the second one had 75°, and third one had 90°.The fourth one had no venetian blind inside the window.

South facade set

It was seen that the lighting energy of the first model was used at the highest level of the year from August to November, and the heating energy was not needed at all except in the winter months.The use of cooling energy was higher in the period of July to September than in other months. The model with which the lowest total energy load was seen to be the one with the highest energy use, the second model, where 75 degree closed venetian blinds were for illumination.The third model had the most effective daylighting in winter. The highest energy use was for cooling. In model four, the highest energy values were required for cooling (see Figure.3).

In the south facade, the total energy usage rankings are in ascending order: 75°< 45° < 90° < no blind. No blind > 45° > 75° > 90° were observed in descending levels of sunlight utilization (see Figure 4).

Figure 3. South facade oriented office zone models

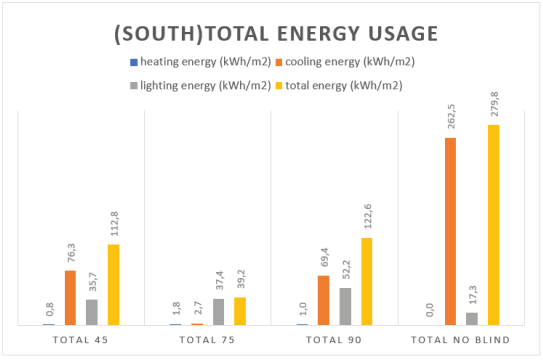


Figure 4. Total energy use in the south facede office zone

West facade set

It was seen that the lighting energy of the first model was used at the highest level of the year in the period of August to November. In the second model, more energy was used between November and March for heating and between June and September for cooling than

in the other months. It was seen that the highest energy usage in the second model was for cooling. In the third model the highest energy usage was found to be for cooling. It is seen to benefit from daylight between May and October. In the fourth model, which did not use venetian blinds on the west-facing window, it was seen that the highest energy was used for cooling followed by heating (see Figure 5).

Figure 5. West facade oriented office zone models

In the west facade, the total energy use rankings are as follows in ascending order: no blind < 45°< 75° < 90°. The following is the observed rankings in descending levels of daylight utilization: no blind > 45° > 75° > 90° (Figure.6).

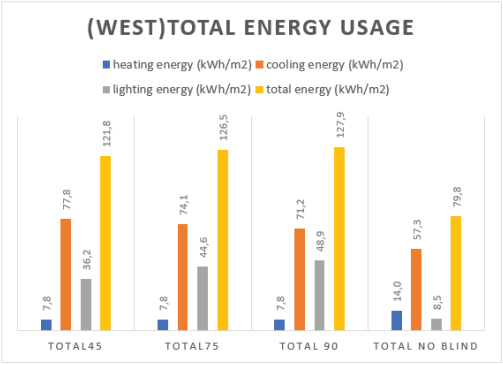


Figure 6. Total energy use in the west facade office zone

East facade set

In the first model, the highest level of lighting energy was in the September-January range. Energy is not used for heating except for winter months, and cooling energy is used more in the June-September period than the other months. It was seen that the highest energy use in the second model is for cooling. It was observed that daylight is most benefited from in the period of February to March. The third model showed that the most beneficial season for daylight is the winter season, which means that the least energy for lighting was used in this season. In fourth model, the highest energy was used for cooling, and, in general, energy was not used for lighting.

In the east facade, the total energy use rankings are in ascending order as follows: no blind < 75°< 45° < 90°. The following was observed in descending levels of sunlight utilization: no blind > 75° > 45° > 90° utilization (see Figure.8).

North facade set

45 degree closed venetion blinds were used in the first model at the highest level lighting energy of the year in December and January. It is seen that was energy is used at a higher level in November-March range for heating, and cooling energy is used more in July August than in any other month. It is shown that the highest energy use in the second model is for lighting. For model three, which has a 90 degree closure, the most beneficial months for

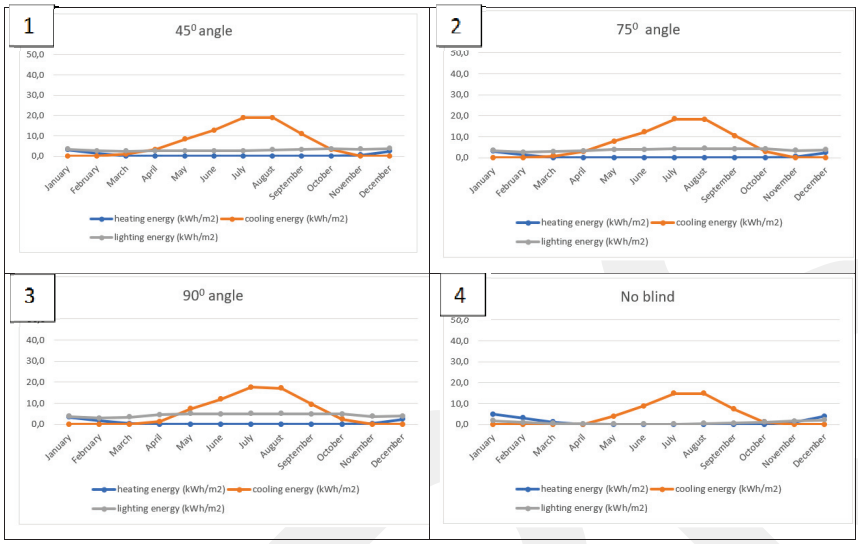


Figure.7 East facade oriented office zone and 4 window type models

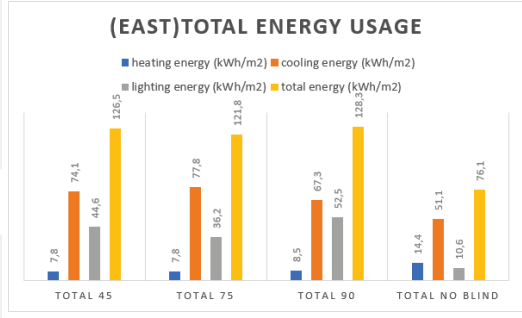


Figure 8. Total energy use in the office zone

daylight seems to be February, March, and April. Most of the lighting energy is used in summer. In model four, the highest energy is seen to be used for cooling (see Figure 9).

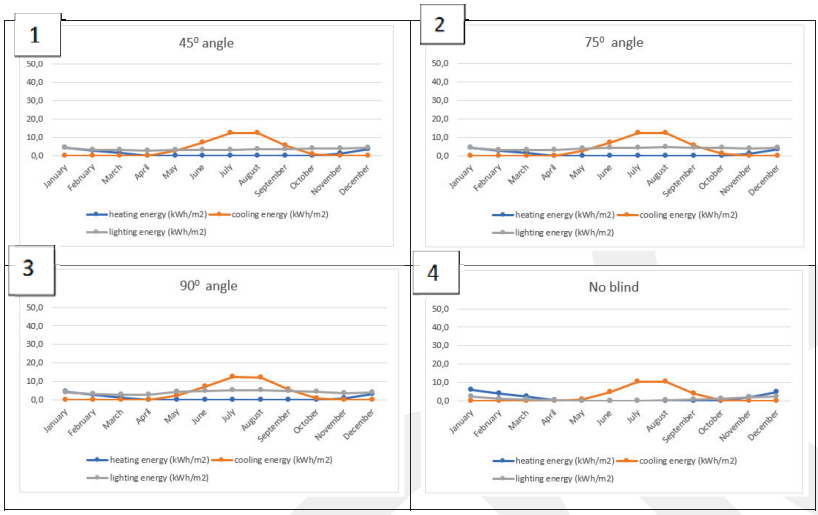


Figure 9. North facade oriented office zone models

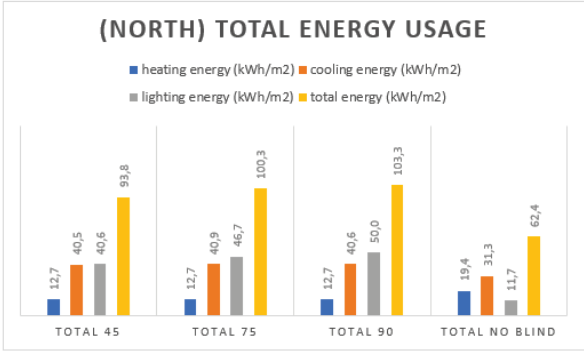


Figure 10. Total energy use in the north facade office zone

In the north facade, the total energy use rankings are as follows in ascending order: no blind < 45°< 75° < 90°. The following was observed in descending levels of daylight utilization; no blind > 45° > 75° > 90°.

Conclusion

The results of this study indicate that for energy efficiency in the south, 75° closed venetian blinds are suitable. It also emerges as a model in which daylight is used effectively. The most suitable model for the west side to be energy-efficient is that no venetian blind

should be used with a total energy load of 57,1 kWh / m2, but discomfort glare also occurs for daylight. The most suitable model for the eastern facade seems to be model four where no venetian blind is used. The most ineffective angle for energy efficiency is 90°. On the northern facade, again it appears that the most suitable model is model four in which no venetian blinds are used (see Figure 11).

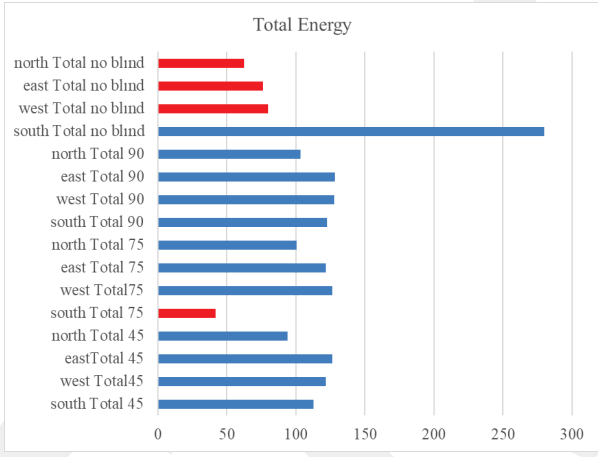


Figure 11. Total energy usage

While the venetian blind with a 75°-closure angle on the south façade gave positive results, the use of the venetian blind is not a correct solution on the other facades; it increased the energy load and adversely affected the use of daylight. Not only energy efficiency but also daylight usage is important for the early stage of energy efficient building design. Architects should be find the relevant solutions by using simulation programs.

References

Lehar, M.A., and L.R. Glicksman., (2007), "Rapid algorithm for modeling daylight distribution in office buildings." *Building and Environment.* 42(8)2908-19.

Baubekri, M., Hulliv, R., Boyer, L., (1991), "Impact Of Window Size and Sunlight Penetration on Office Workers' mood and satisfaction, A novel way of assessing sunlight", *Environment and behaviour*, 23/4: 474- 493.

Day, J., Theodorson, J., & Van Den Wymelenberg, K. (2012). Understanding controls, behaviors and satisfaction in the daylit perimeter office: a daylight design case study. *Journal of Interior Design*, *37*(1), 17-34.

Köster, H. (2013). Daylighting Controls, Performance and Global Impacts. *Sustainable Built Environments(1),* pp. 112–62.

Gago, E. J., Muneer, T., Knez M., & Köster, H. (2015). Natural Light Controls and Guides in Buildings. Energy Saving for Electrical Lighting, Reduction of Cooling Load. *Renewable and Sustainable Energy Reviews(41)*, pp. 1–13.

Guglielmetti, R. J., Pless, S. D., & Torcellini, P. A. (2010). On the Use of Integrated Daylighting and Energy Simulations to Drive the Design of a Large Net-zero Energy Office Building. *Proceedings of Fourth National Conference of IBPSAUSA* (pp. 301-309). New York City, NY.

O'Brien, W., Kapsis, K., & Athienitis, A. K. (2013). Manually-operated window shade patterns in office buildings: A critical review. *Building and Environment*, *60*, 319-338.

ASHRAE, A., (2004), Standard 55-2004, *Thermal environmental conditions for human occupancy*, 744.

EN, T., (2002), 12464-1, *Işık ve Aydınlatma–Çalışma Yerlerinin Aydınlatılması–Bölüm*, 1.

Mardaljevic, J., Heschong, L., & Lee, E. (2009). Daylight Metrics and Energy Savings. Lighting Research and Technology(41), pp. 261–283.

Mardaljevic, J., & Christoffersen, J. (2017). „Climate Connectivity" in the Daylight Factor Basis of Building Standards. *Building and Environment*(113), pp. 200-209.

Urban, B. J., & Glicksman, L. R. (2007). A simplified rapid energy model and interface for nontechnical users. In 10th ORNL Thermal Performance of the Exterior Envelopes of Whole Buildings International Conference (Vol. 3501, pp. 2618-2626).

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Functional Continuity of Historic Cumhuriyet Square – Ayaş

Gülşah Çelik Başok[1]

[1]*Architecture Department, Çankaya University, Ankara, Türkiye, gulsahcelik@cankaya.edu.tr*

Abstract: Urban plans and living spaces which were developed in consideration of these plans in many historical cities, in which the present urban fabric is not sufficent to respond the population growth and the necessities of the growing population have started to destroy the traditional urban fabric. Alternative spaces are needed as a result of inadequate, contemporary comfort requirements. Within scope of this study, effects of alternative solutions to the historical city center of Ayaş will be discussed.

Keywords: Ayaş, Historical Continuity, City Center, Cumhuriyet Square

Introduction

Ayaş is located in the Central Anatolia Region, at 58 km northwest of Ankara. It is surrounded by Polatlı in south, Kızılcahamam in north, Sincan and Kazan is east, Güdül and Baypazarı in west. Town, which is settled in a rippled area, is surrounded by hills. Ankara-Beypazarı Road divides the settlement in to two and the settlement which is located in the north is determined as "Upper Ayaş" while the settlement in the south is determined as "Lower Ayaş"

Figure 1. Location of Ayaş

In "Upper Ayaş", which is also known as "Karakaya Mahallesi", traditional fabric was not conserved as a result of frequent landslips and the movement of the settlement to "Lower Ayaş" and Ankara with the Republic Period. From the extant fundament traces, it is understood

that, settlement was bigger than its current situation. Economic structure of the town is particularly based on agriculture. After 1950's, by virtue of the economical situations, a major part of the local residents has migrated towards Ankara

History of Ayaş dates back to prehistoric ages and since BC 2000, it has been under the dominance of Assyrians, Hittites, Phrygians, Cimmerians, Lydians, Persians and Galatians. (Erzen, 1946).

However, it is not certainly obvious when and by whom Ayaş was established. But it is accepted by some researchers as continuance of Mnizos (Minizos) which was one of the eparchy centres of the ancient periods.

The first location where Turks settled in Ayaş is the Karakaya region which is located in the north of present settlement. This region was preferred for settlement because of its defence advantage with its peak overlooking the valley. Second advantage of the region is the healing water which is present in the territory. Residents have constructed a city wall and a thermal spring in the region. Later on, they have extended their settlement towards the Ayaş Creek. Thus, settlement has developed in two different areas as Upper and Lower Ayaş like it is also referred today. (Gültekin,2010)

Ayaş name, which was one of the important stops of famous Baghdad Road, was first met in 1942 dated and 9 numbered foundation records. (Karaman, 2006)

For Ottoman Period, Faroqhi says that Ayaş can be named as a "town" instead of a "village" andpopulation of Ayaş wasapp. 21000. (Faroqhı, 1981)

In Ottoman cities, urban fabric generally comprises of settlements which are grouped around the religious structure. In the beginning, these settlements were disconnected from each other. However, by time, free spaces between the settlements were filled as a result of structuring. Accordingly, disconnections between the settlements have disappeared. During the foundation years and the whole Ottoman Empire period, urbanization means establisment of new settlements. (Cerasi, 1999)

In standard Ottoman cities, small squares were present, which were used as market places in determined days of the week. Though, these squares had more than one function. Social and cultural activities of the city were realized in these places. It can also be said that, these squares constitute the city center. In Ayaş, there is also a small square named as "Cumhuriyet Meydanı" which is used as market place in determined days of the week.

Figure 2 View of Ayaş Cumhuriyet Square

"Cumhuriyet Meydanı" is the center of the historical urban fabric of Ayaş. Square is limited with the Ayaş Creek and Şeyh Muhittin Mosque in South. Square is reached by crossing the bridge on the Ayaş Creek which was constructed at the intersection point of Hükümet Caddesi and Akpınar Sokağı. In the east of the square, municipality building and in the west municipality office block are located. In the north of Square, Eski Camii, Paşa Hamamı and Çarşı Çeşmesi are situated. In Cumhuriyet Meydanı, generally commercial units are present and as mentioned above, public market is set up in determined days of the week.

On the inscription panel of the Çarşı Çeşmesi which is dated Ottoman Period, it is mentioned that the area was also used as a bazaar in that century. (Aldan, 1965) Today, the area, Cumhuriyet Meydanı, is used as the commercial center and bazaar of Ayaş which shows the continuity of a specific function.

Figure 3 **a. View of the Cumhuriyet Square from mid of 19th b. Photograph of using as a bazaar**

But, unqualified structures which were built on Cumhuriyet Meydanı ruin the physical characteristic of the square, which has been the city center and market place of Ayaş since centuries. Accordingly, city silhouette is effected negatively.

Figure 4 New additions to the area

Figure 5 incompatible images with the traditional texture

Conclusion

In Turkey, insistent and conservative conservation understanding which cannot establish economic and social balance causes failures in conservation of historical surrounding and common use areas as well as traditional residential fabric. As a result of this understanding, losses in cultural values occur with the desisting from conservation of traditional fabric or disposing it as a result of utilization required by function changes.

In addition to this, applications which aren't compatible with the urban historic fabric and realized in the traditional urban areas under the name of 'contemporary applications' also cause degeneration in the urban spaces which have conserved their sustainability for centuries.

According to the principles of sustainable conservation, maintaining of authentic function of cultural heritage depends on its conformity with contemporary utilization criterias. "Usability" is a common provision for "conservation" and "sustentation", in other words sustainability which require different circumstances and dimensions. With this postulate, as minimum interventions to the authentic state of the historical structures are conducted for providing the comfort conditions of time, while making additions to the historical sites which are common use areas of the public, "conservation of authentic physical and spatial features" should also be the most important criteria.

References

Aldan, Mehmet (1965), *Türlü Yönleriyle Ayaş (Bir Meskun Yer İncelemesi)*, Ayyıldız Matbaası, Ankara

Altan, Mustafa Kemal (1984), *Paşa Hamam, in Ayaş-Ankara*, Unpublished Master Thesis in METU Faculty of Architecture, Department of Restoration, Ankara

Aktüre, Sevgi (1978), *19.yy Sonunda Anadolu Kenti Mekansal Yapı Çözümlemesi*, İTÜ Mimarlık Fakültesi Doktora Tezi

Erzen, Afif, (1946) İlkçağlarda *Ankara*, Ankara, Türk Tarih Kurumu Press, 9-10.

Bayartan, M., (2005) ‘‘Tarihi Coğrafya Çalışmaları Açısından Şehir ve Osmanlı Şehri’’, *İstanbul Üniversitesi, Edebiyat Fakültesi Coğrafya Bölümü ,Coğrafya Dergisi*,İstanbul*,* 13:1

Cerasi M., M. (1999) ‘‘OsmanlıKenti, Osmanlı İmparatorluğunda 18. ve 19. Yüzyıllarda Kent UygarlığI ve Mimarisi’’, Ataöv. A., Yapı Kredi Kültür ve Sanat Yayıncılık, Istanbul, 70-159

ER, Mehmet Çelebi (1995), et al. *Ayaş'ın Görsel Tarihi*, Ayaş Belediyesi Yayınları, Ankara

FAROQHI, Suraiya (1981), *"Ankara ve Çevresindeki Arazi Mülkiyetinin ya da İnsan-Toprak İlişkilerinin Değişimi", Tarih İçinde Ankara,* pp. 61-88, ODTÜ Mimarlık Fakültesi Yayınları, Ankara

FAROQHI, Suraiya (1984), *Towns and Townsmen of Ottoman Anatolia*, Cambridge UniversityPress

Gülsoy, Mediha (1995), *"Geleneksel Ayaş Evleri",Ayaş ve Çevresi Kültür-Sanat Araştırmaları Sempozyumu Bildirileri*, pp. 159-172, Ayaş Belediyesi Yayınları, Ankara

Gültekin, N.T., (2010). "19. Yüzyılda Anadolu Kentive Konut Dokusu Ayaş ve Beypazarı", Nobel Yayın Dağıtım, Ankara, 50-68, 68-84

Karaman, A., F., 2006, XIX. Yüzyil Ortalarinda Ankara Vilayeti'ne Bağli Ayaş Kazasi'nin Sosyal Ve İktisadi Durumu, Unpublished Master Thesis in Gazi UniversityFaculty of History, Ankara

Karamağaralı, Beyhan (1993), *"Ayaş Ulu Cami", Ayaş ve Bünyamin Ayaşi (Tarihten Günümüze Ayaş ve Bünyamin Ayaşi Sempozyumu, Bildiriler,* pp. 53-60, Ayaş Belediyesi Yayınları, Ankara

Ünal, Mediha (1992), *Geleneksel Ayaş Evleri*, Unpublished Master Thesis in Gazi Üniversitesi, Fen Bilimleri Enstitüsü, Ankara

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Multiple Configurations of a Kinetic Shading System to Test Daylight Illuminance and Uniformity

Aslıhan Çevik[1*], Tuğçe Kazanasmaz[2]

[1]*Department of Architecture, Izmır Institute of Technology, Izmir, Turkey, aslihancevik@iyte.edu.tr*
[2]*Department of Architecture, Izmır Institute of Technology, Izmir, Turkey, tugcekazanasmaz@iyte.edu.tr*

Abstract: This study aims to evaluate daylight performance of a kinetic shading system by retrofitting a room to sustain visual comfort throughout a day. Dynamic conditions of daylighting indoors can be balanced by utilizing kinetic movement of façade elements. Unbalanced reduction of daylight when we use fixed shading systems can be controlled, so visual comfort can be improved with simple kinetic mechanisms. A classroom facing south is selected in Izmir, Turkey to test daylight performance of a proposed kinetic shading through simulations in Relux Desktop software. Both physical measurements and simulation results showed the comparisons of existing and proposed illuminance values of the workplane along. Three times of a day are selected to configure the rotation of the shading plates. Results display the improved efficiency of kinetic shading applications and also the understanding about the effect of rotation patterns.

Keywords: visual comfort; classrooms; kinetic shading; simulation; daylight

Introduction

Daylight is the preferred light source in workspaces such as classrooms and offices (Al-Khatatbeh & Ma'bdeh, 2017). Since school hours and daylight hours mostly match up in mid-latitudes, designers overlook both positive and negative effects of daylight in visual comfort and assume that access to daylight is sufficient enough. This results in insufficiently distributed daylight with unpleasant illuminance values. Satisfying visual comfort can improve academic performance and is essential to sustain a healthy environment (Wu & Ng, 2003). According to EN 12464-1, ideal illuminance and unified glare rating UGR values on task area in classrooms are 300 lux and 19 respectively while uniformity should be more than 0.5 (European Committee for Standardization, 2002). It's hard to maintain ideal daylight values especially in clear sky conditions without passive solar control features in design.

External shading devices are one of the best alternatives to control daylight in workspaces, especially in retrofitting. Fixed shading systems are generally optimized to perform best for the dominant condition for most of the time (Grobman, Capeluto & Austern, 2017). Because physical conditions in outdoor environment and requirements in indoor environment are not static but trackable, shading systems can be arranged regarding these patterns by kinetic movement. Static shadings can regulate the amount of unwanted solar

radiation or glare for a certain time, though they may not provide desired illuminance values throughout the day. Also, benefit of reducing solar heat gain causes destruction of adequate daylight performance. Kinetic movement allows shading devices to balance all environmental and lighting variables into an optimal condition throughout the day.

Although applicability of kinetic shadings is a debatable issue, simulations are needed to determine the efficiency of each design. Current simulation tools and strategies aren't complex enough to model kinetic movement and its effect on building performance. With the conduction of COST Action TU1403, a study reviewed current and future methodologies of simulating kinetic facades such as splitting each condition into a model (Loonen, Favoino, Hensen & Overend, 2017). Kensek and Hansanuwat simulated a kinetic system by splitting it into four angular settings (2011). This paper aims to evaluate the efficiency of kinetic shading by proposing a model to an existing classroom using the same methodology.

Methods

A classroom is selected in the campus of Izmir Institute of Technology (38.3° N/ 27.1° E). Its visual comfort conditions are poor because of the direct sunlight coming from three windows facing south while curtains are used to maintain class activities. Firstly, information about material and geometry of the classroom are gathered. The classroom's geometry is rectangular. The dimensions are 9.00 x 6.50 m with a 4m ceiling height. Their height from the floor is 1 meter. Surface reflectance values are determined as 60% for white granite floors, 90% for white plaster walls and ceiling. Transmittance value of windows (2.00 x 2.00 m) is determined as 80%.

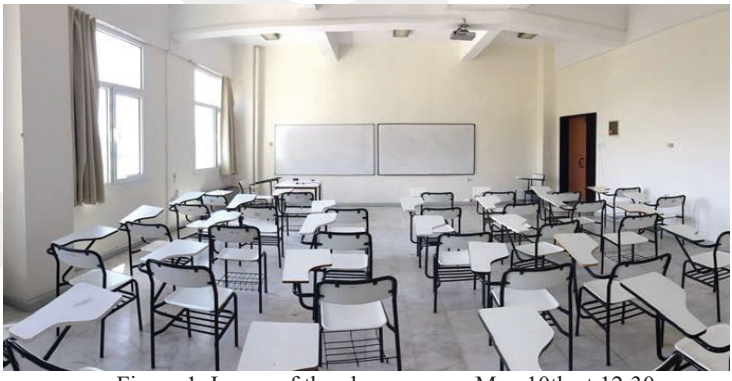


Figure 1. Image of the classroom on May 10th at 12:30

The room is modelled with ReluxDesktop software. Daylight calculations are run using Raytracing method under CIE clear sky conditions. ReluxDesktop is a free software for both artificial and daylighting simulations. It is validated in a study conducted by IEA SHC and CIE Technical committee. The software showed good performance in various scenarios (Maamari, Fontoynont & Adra, 2006). Here, simulation and physical measurement values are compared to ensure the quality of the software and the accuracy of the simulation process.

Measurements are taken with illuminance meter on 21th November 2017 at 14:30. Reference plane is determined at a 0.7 m height from the floor while the spacing of measurement points is set as 0.6 m in both x and y direction to generate 144 measurement points.

The kinetic shading system is composed of 18 horizontal aluminum plates which are installed in each window. Two separately movable plates form one horizontal slat which is incrementally lined up to face direct sunlight (Figure 2). Each plate which is 20 cm in width moves independently and can be operated automatically.

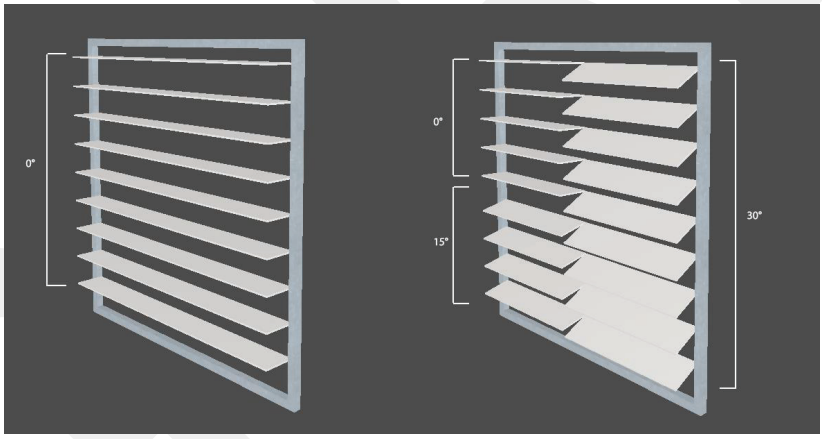


Figure 2. The structure of the system (left) and a possible configuration of the plates (right).

After inserting the shadings into the base model, multiple simulations are run at three times of the day, 9:30, 12:30 and 15:30 by rotating plates separately in angles (upwards is shown negative) -15°, 0°, 30°, 60°, 90° regarding excessive illuminance values in each run. By this way, a pattern of best performed shading configuration is constructed (Figure 3). The aim is to satisfy the required daylight illuminance and uniformity values and to improve spatial daylight autonomy (sDA) and annual sunlight exposure (ASE) values (Table 1). Additionally, configurations of the kinetic shading system are proposed for 21 March, 21 June and 21 September at 12:30 to test its efficiency throughout the year (Table 2).

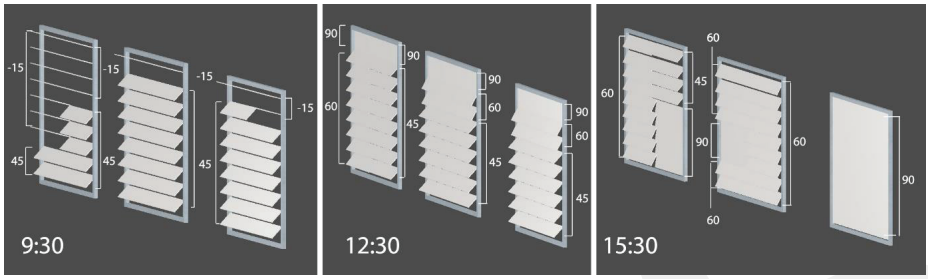


Figure 3. Configurations for three hours on 21 December.

Findings and Discussion

Results are compared visually and statistically. Since the classroom have a poor illuminance condition, target range of illuminance is set between 250 and 2300 lx.

The most improved hour performance is 12:30 with the 86.5% increase in the illuminance values within target range because the Sun angle parallels with the orientation of the classroom. For hours 9:30 and 12:30, illuminance values within the range increased 13.6% and 43% respectively. All configurations showed improvement in avoiding direct sunlight which causes glare with the increase of uniformity values 8%, 45% and 23% respectively.

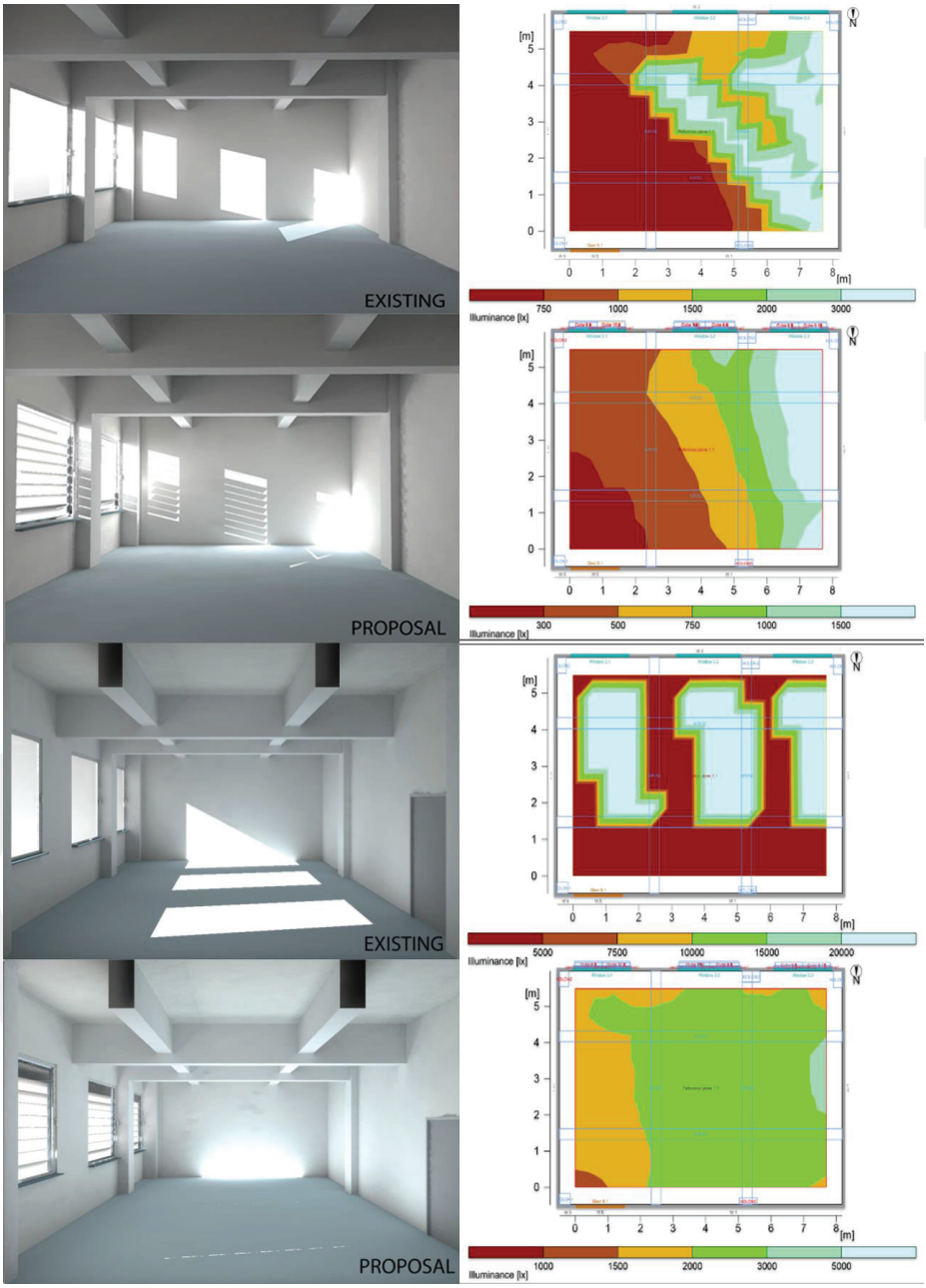
Table 1. Before and after comparisons on 21 December.

Variables	9:30 *(1)	9:30 *(2)	12:30 (1)	12:30 (2)	15:30 (1)	15:30 (2)
Eav	1489	822	10190	2039	6813	1791
Emin	259	192	1576	1228	911	640
Emax	6550	4091	26111	4097	24073	9026
Emin./Eav	0.17	0.23	0.15	0.60	0.13	0.36
Emin./Emax	0.04	0.05	0.06	0.30	0.04	0.07
sDA	98	70.8	100	100	100	100
ASE	39	22.2	100	100	98.6	79.9
Within Target Range (%)	73.6	87.2	7.1	93.6	42	85

Table 2. Shading configuration performance on different days at 12:30.

Variables	21 March	21 June	21 Sep.(2)
Eav	1563	1171	1590
Emin	574	536	625
Emax	3251	3394	2706
Emin./Eav	0.37	0.46	0.39
Emin./Emax	0.18	0.16	0.23
sDA	100	100	100
ASE	81.2	57.6	85.4
Within Target Range (%)	95.8	94.4	96.5

Notes. Eav = Average illuminance (lx). Emin = Minimum illuminance (lx). Emax = Maximum illuminance (lx). Emin/Eav= Uniformity. Emin/Emax = Diversity. *(1) = without shading application. * (2) = With shading application. *(1)*



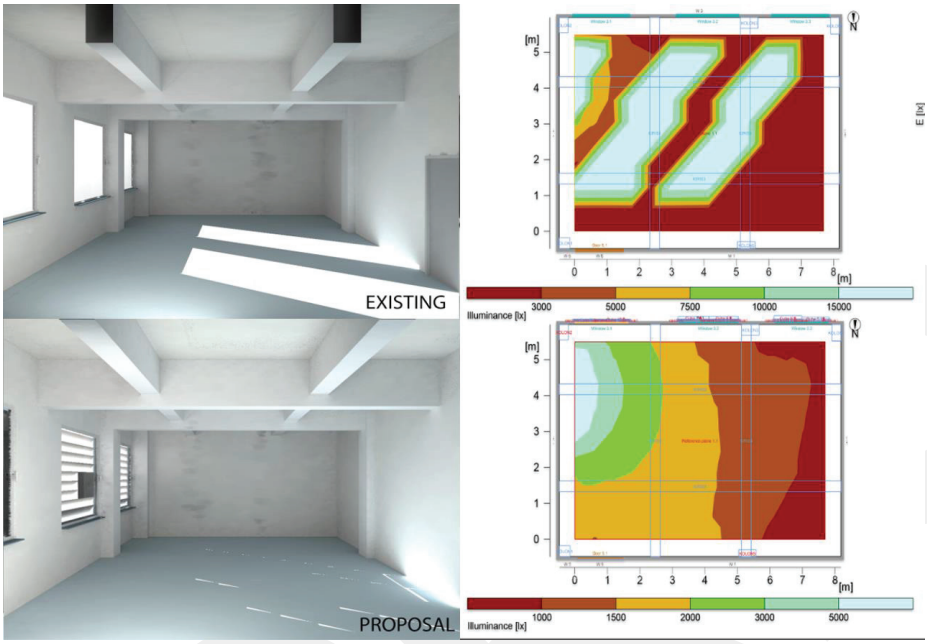


Figure 4. Rendered images and pseudo colour plans with (bottom) without shading (top) at 9:30, 12:30, and 15:30 respectively.

This system's control is determined as automated regarding its complex configurations. The manual control will be ineffective considering user's time, desire and knowledge to operate it though results can be used as a guideline to control manual shading systems in similar conditions.

Conclusion

This study proposes kinetic shading configurations using simple simulation methodology to improve the visual comfort in an existing classroom. Three pairs of models are compared to understand and improve the contribution of kinetic shading on visual comfort. All three proposed configurations showed improvement in visual comfort although the configuration for the hour 12:30 showed a dramatic improvement since the vertical movement of the horizontal shading plates works better when there are no horizontal angles of daylight. Regardless of applicability, multi-axis movement of shading plates can be tested in further studies to control the amount of sunlight in the hours 9:30 and 15:30.

References

Al-Khatatbeh, B. J., & Ma'bdeh, S. N. (2017). Improving visual comfort and energy efficiency in existing classrooms using passive daylighting techniques. Energy Procedia, 136, 102-108. doi:https://doi.org/10.1016/j.egypro.2017.10.294

European Committee for Standardization. (2002). Light and lighting - lighting of work places - part 1: indoor work places. CEN, Brussels.

Grobman, Y. J., Capeluto, I. G., & Austern, G. (2017). External shading in buildings: comparative analysis of daylighting performance in static and kinetic operation scenarios. Architectural Science Review, 60(2), 126-136. doi:10.1080/00038628.2016.1266991

Kensek, K., & Hansanuwat, R. (2011). Environment Control Systems for Sustainable Design: A Methodology for Testing, Simulating and Comparing Kinetic Facade Systems. Journal of Creative Sustainable Architecture & Built Environment, 1.

Loonen, R. C. G. M., Favoino, F., Hensen, J. L. M., & Overend, M. (2017). Review of current status, requirements and opportunities for building performance simulation of adaptive facades. Journal of Building Performance Simulation, 10(2), 205-223. doi:10.1080/19401493.2016.1152303

Maamari, F., Fontoynont, M., & Adra, N. (2006). Application of the CIE test cases to assess the accuracy of lighting computer programs. Energy and Buildings, 38(7), 869-877. doi:https://doi.org/10.1016/j.enbuild.2006.03.016

Wei, W., & Edward, N. (2003). A review of the development of daylighting in schools. Lighting Research & Technology, 35(2), 111-124. doi:10.1191/1477153503li072oa

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Evaluating the Adaptation of Historic Buildings to New Functions in Terms of Sustainability: Afyonkarahisar Mihrioğlu Mansion

Gamze Çoban [1*], Pınar Dinç Kalaycı[2]

[1]*Department of Interior Architecture and Environmental Design, Afyon Kocatepe University, Afyon, Turkey, a.gamzecoban@gmail.com*

[2]*Department of Architecture, Gazi University, Ankara, Turkey, pinarpinardinc@gmail.com*

Abstract: The most concrete means that helps societies transfer their cultures to the next generations is the immovable cultural properties. Bearing the traces of the period when they were built, immovable cultural properties fail over time to meet the expectations, and then are abandoned. Conserving a building by assigning new functions instead of passive protection sustains the building ecologically, economically and socially. Success of a re-functioning project is associated with the adaptation of the new function to the spatial organization of the building, and its ability to satisfy the users' needs. In the study, province of Afyonkarahisar is selected as the field of study, of which the historic city center has many examples of civil architecture with the potential of reuse, out of which Mihrioğlu Mansion is discussed which has been transformed into a restaurant. Success of the adaptation of the building to the new function is determined by the spatial organizations and the user satisfaction. The level of adaptation of the spatial qualities to the requirements of the newly assigned function is demonstrated by the surveys applied to the building's users. Advantages and disadvantages of the new function is determined, and the factors are revealed affecting the sustainability of the building.

Key Words: Reuse in architecture, adaptation to reuse, sustainability.

Introduction

Being the documents that best reflect the characteristics of their period, the immovable cultural properties need continuous maintenance and restoration in spite of the fact that they are long-lasting. The buildings are abandoned since, for instance, their function is no longer needed and has gone out of date due to the changes in conditions and value judgements (Douglas, 2002). There are two options for the abandoned buildings: demolishment for constructing a new one or bringing into use with new functions (Langston, 2002). Today many buildings that have become unable to meet their users' needs over time continue to be used after being re-functioned.

The increase in the population and thus in the consumption following the Industrial Revolution has caused the energy resources to diminish and the damage to the environment to deteriorate, of which recognition has led to the concept of sustainability. Within the scope of the concept of sustainability, which is based on minimizing the damage to the environment and on effective use of resources, utilizing the buildings available instead of constructing new ones has an advantage in terms of use of the energy and natural resources necessary for demolishment and construction, and contributes to the environmental sustainability (Yaldız, 2010). In addition, being a bridge between the past and the future, the immovable cultural properties also

contribute to socio-cultural sustainability in that they reflect the social, cultural and economic structure, and life style of the past periods (Madran and Özgönül, 2005).

Success of a re-functioned building depends on the continuity of its function, and functional sustainability is ensured when the building perfectly adapts to the new function (Aydın and Yaldız, 2010). Analysis of functional sustainability requires a number of research studies, and the physical (spatial composition, dimensions, functional relationships system and location of the building) (Altınoluk, 1998) and technical characteristics (lighting, heating, etc.) of the buildings, and the satisfaction of the users from the new function become important (Beyhan, 2004; Tunçer, 2000). All of those analyses are conducted through the approach of evaluation during use. Trying to reveal whether the spaces in the current building meet the requirements of the new function and whether the users are provided with quality spaces, the Post Occupancy Evaluation (POE) studies focus on making livability sustainable (Aydın and Yaldız, 2010).

Research Area and Method

Within the scope of the study, the province Afyon is examined, which is located next to the capital city of Turkey. Afyon is unique place due to its cultural, architectural and historic values. One of them is Mihrioğlu Mansion which is located in the Urban Protected Area of the province of Afyon and has started to be used as a restaurant by being re-functioned after use as a residence. Construction of the building started in 1896, and it was used as a residence until 1993 when it was registered as a “Registered Cultural Property in Need of Protection” by the decision of the High Council of Immovable Ancient Arts and Monuments.

Figure 1.Mihrioğlu Mansion (Çoban, 2016)

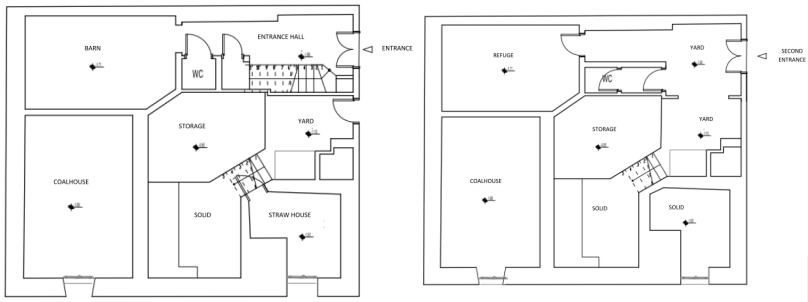


Figure 2.Mihrioğlu Mansion basement floor plan before and after the transformation (Afyon Municipality)

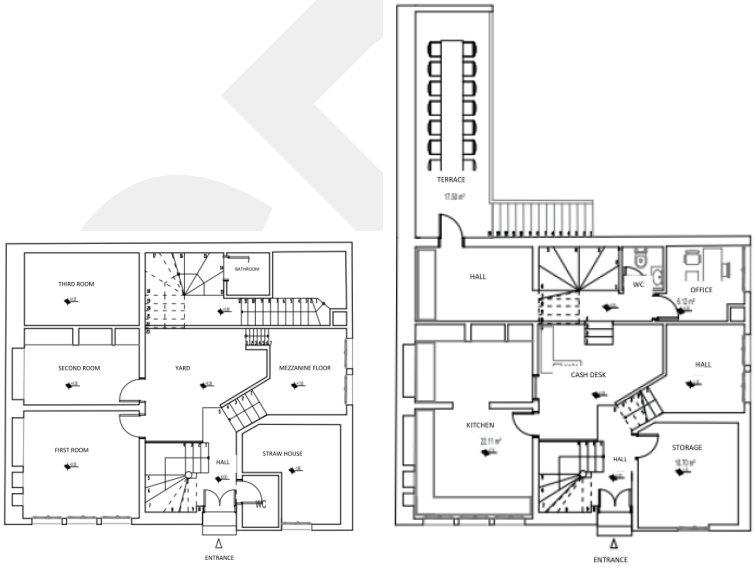


Figure 3.Mihrioğlu Mansion ground floor plan before and after the transformation (Afyon Municipality)

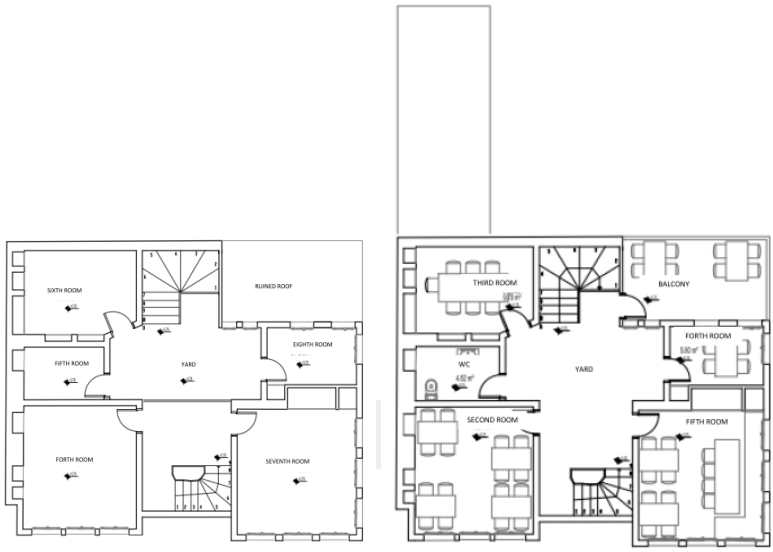


Figure 4.Mihrioğlu Mansion first floor plan before and after the transformation (Afyon Municipality)

Figure 5. Figure 6. Figure 7. Figure 8.Mihrioğlu Mansion interior images (Çoban, 2016)

Success of adaptation in reuse can be ensured by overlapping of the features of the present one with the requirements of the function. In the inquiry carried out accordingly, satisfaction of new users and what the performance of the spaces used as an indicator of this satisfaction is become important (Aydın and Yaldız, 2010). Components of performance are identified as technical (fire, building, ventilation, heating, acoustic, lighting), functional (human factors, circulation, zoning, communication, workflow, flexibility and variation, usage and specialization) and behavioral (proximities and areas of domination, privacy and interaction, use of building, image, meaning and environmental perception, environmental cognition and orientation) (Preiser at all., 1988). Optimum harmony between a space and its function ensures user's satisfaction, and becomes important to continuity of the building.

In this study, evaluation of the spaces for the predetermined purpose will ensure obtaining of the data, and the data obtained will contribute to increasing of the quality in the spaces by feedback and –forward.

Method of the research is formed in the following two stages:

(1) Preparation of the spatial program of the new function, determination of the new function's requirements for each spatial level, physical analyses of spaces (qualitative evaluation) for an understanding of adequacy of the spatial dimensions and

(2) A survey (quantitative evaluation) applied to the users for determination of the performance scores (technical, functional, behavioral and sustainability) of the spaces.

The result obtained through the evaluation will be a determination of the success of the adaptation to reuse. Continuity of the function and whether the building will continue its life with the new proposed function will be determined by evaluating the re-functioned buildings according to their new users. The findings obtained will indicate what actions to take to maintain the function, and provide data for suggestion of an alternative usage for buildings with similar features.

Evaluating the New Function during its Use

Qualitative Evaluations

According to the evaluation of the spatial program regarding the new function, it is seen that the ground floor of Mihrioğlu Mansion, which is used as a restaurant, has a kitchen, an administrative office, a reception, a cash point and a store, but lacks a dining area for the users. Considering the disabled and the old, it is concluded that there should be a dining hall on the ground floor, and lack of that area on the ground floor is seen as a weak point of the new function. Locating the kitchen on the ground floor has been a right decision in terms of

receiving products, and it can be said that the new function's positive aspect is that the cash point and the reception are located in the center of the building to face the entry, and that the administrative office sees that area. The original state and the current state of the building are compared within the scope of the consideration that, during the re-functioning activities, the original state of the building must be protected and the operations must be kept to a minimum, and it is seen as a result of that comparison that the wall in the kitchen area and the staircase in the basement have been removed, which is observed to be contrary to the protective approach, but for the spaces' requirements. The spatial and mass integrity of the building is not impaired, and the linking system between the spaces is not impaired despite the removal of one staircase.

Quantitative Evaluations

As a result of questioning the users regarding the building's technical performance, including the heating, lighting, ventilation and acoustic performance of the dining halls, which are the most frequently used units, the only low score is of the Dining Hall 2 according to the criterion of lighting. Based on the results of the survey, it is seen that the new function reflects the local cultural characteristics, and the materials used in the building fit each other. On the other hand, the notices for guiding the users in case of fire in the building are found to be inappropriate.

In the evaluation of the behavioral performance, accessibility, suitability for public transport and access on foot, access of the disabled users, and adequacy of the parking area are asked about, and it is stated that the building has no problem regarding accessibility. The only low score regarding the building's behavioral performance is of the parking area, which is an inadequate one.

In the questioning regarding the functional performance, the spaces' shape, height, size, interrelationships, equipment appropriateness, and suitability for the disabled users of the building are evaluated. Under that title of performance, size and suitability for the disabled of the dining halls are assessed to be negative.

In the questioning regarding sustainability, it is concluded that the building is visually in harmony with the neighboring buildings, reflects the local cultural characteristics, contributes to the promotion of the city, creates an ecological perception and maintains its original elements. It is assessed to be negative that the building has inadequate green space arrangements and no road around it for access by bicycle. The spatial analyses and the performance analyses regarding the new function are provided in Table 1.

Table 1.Mihrioğlu Mansion spatial analyses and performance analyses.

Performance Criteria	Criterion		Spatial Analysis		Performance Evaluation	
			Positive	Negative	Positive	Negative
Technical Performance Criteria	Technical requirements such as heating, cooling, and ventilation	Dining Hall 1	X		X	
		Dining Hall 2	X			X
		Dining Hall 3	X		X	
	Harmony of the new building materials with the original building		X		X	
	Protection of the building's original elements		X		X	
	Fire notices			X		X
	Harmony of the materials with the local culture		X		X	
Behavioral Performance Criteria	Accessibility		X		X	
	Access by public transport		X		X	
	Access on foot		X		X	
	Access of the disabled			X		X
	Parking area		X			X
Functional Performance Criteria	Formal appropriateness		X			
	Height		X			
	Size	Kitchen		X		X
		Wc	X			
		Office		X		
		Dining Hall 1		X		
		Dining Hall 2	X			
		Dining Hall 3	X			
		Dining Hall 4		X		
	Spatial relationships		X		X	
	Equipment appropriateness		X		X	
	Availability of necessary spaces		X		X	
	State of the disabled users within the building			X		X
Sustainability Criteria	Visual harmony with the neighboring buildings		X		X	
	Being a description point/benchmark		X		X	
	Reflecting the local culture		X		X	
	Green space arrangements			X		X
	Protection of the elements in the previous function		X		X	
	Perception of an ecological building		X		X	
	Contribution to the promotion of the city		X		X	
	Supporting access by bicycle			X		X

Conclusion

Success in adaptation of the existing building to its new function is important to the continuity and sustainability of the cultural property. The study conducted within that scope points out that a questioning regarding the adaptation of a re-functioned cultural property to its new function can be performed by focusing on the spatial performance with the approach of evaluation during use. The level of adaptation of the spatial characteristics of the cultural property to the requirements of the assigned function is revealed through the survey applied to

the building's users and the spatial analyses. Mihrioğlu Mansion is evaluated and the following results are obtained within the scope of the study.

Advantages;

- Reuse of the building greatly contributes to the city and the urban identity in the spatial context. Opening the building to the city-dwellers for use as a restaurant after use as a residence by a single family has transformed it into a social and cultural space that can bring the city-dwellers together.
- It is seen that the original function of the re-functioned building has failed to be protected, but the building's original elements and materials have been protected.
- It is seen that the building has become accessible through the surrounding arrangements, it has become a means of description, and it is known by the city-dwellers.
- The users think that the building contributes to the promotion of the city, and it is a building that they want to show their guests coming to the city.

Disadvantages;

- Arranging a function like a restaurant requiring large spaces for its layout in spaces like a residence with fewer users causes inadequacies in terms of the size and the interrelationships of the spaces.
- It is seen that the arrangements around the building ensures accessibility of the building, but the parking area and the green spaces fail to satisfy the users' expectations.

Consequently, the function to be selected should be examined in re-functioning historic buildings. Existence of the building with the assigned function is associated with the user satisfaction and the spatial performance score in terms of the improvement of the spatial quality in adaptation to the new function. Evaluation of the building's spatial performance is found to be important to making the assigned function sustainable, and the components requiring to be analyzed in the process of adaptation are determined as accessibility, characteristics and organization of the existing spaces, spatial requirements of the assigned function, and adaptation of the new function to the present building.

References

Altınoluk, Ü. (1998). Binaların Yeniden Kullanımı.Yapı Endüstri Merkezi Yayınları. İstanbul.

Aydın, D., Yaldız E. (2010). *Yeniden Kullanıma Adaptasyonda Bina Performansının Kullanıcılar Üzerinden Değerlendirilmesi*. METU JFA 27:1,1-22.

Beyhan, S. G. (2004). *Kültürel Süreklilik ve Çagdas Gereksinmeler Baglamında Sürdürülebilir Turizm ve Kimlik Kavramsal Modeli: Pamukkale Modeli*. Doktora Tezi. İstanbul Teknik Üniversitesi Fen Bilimleri Enstitüsü. İstanbul; 35-72.

Douglas, J. (2002). *Building Adaptation* (ISBN 0-7506-5085-0). Oxford, İngiltere:Butterworth Heineman.

Langston, C., Lauge-Kristensen, R. (2002). *Strategic Management of Built Facilities.* Butterworth-Heinemann.

Madran E., Özgönül N. (2005). *Kültürel ve Doğal Değerlerin Korunması.* TMMOB Mimarlar Odası. Ankara.

Neufert, E. (2008). *Yapı Tasarımı*. 35. Baskı, Ed: Çağla Özaslan. İstanbul.

Preiser, W.F.E., Rabinowitz, H.Z. and White, E.T. (Ed.) (1988). Post Occupancy Evaluation. New York: Van Nostrand Reinhold.

Tunçer, M.(2000). *Gelecek Yüzyılda Biyolojik Yasam Odaklı (Bio-centric) Kültür Nasıl Olusturulabilir? Kent Planlamasının Önemi*. Dünya Sehircilik Günü 24. Kollokyumu (8 Kasım 2000) Dokuz Eylül Üniversitesi Mimarlık Fakültesi Şehir ve Bölge Planlama Bölümü ve İzmir İleri Teknoloji Enstitüsü. İzmir; 12-8.

Yaldız, E. (2010). *Reuse of Monumental Buildings as a Sustainability Components*. CESB10 Prague .

GCIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainability and Built Heritage Conservation in today's Italy: an appraisal between theory, method and practice

Marina D'Aprile[1*]

[1]*Department of Architecture and Industrial Design, Università della Campania "Luigi Vanvitelli", Aversa, Italy, marina.daprile@unicampania.it*

Abstract: Although the first statements about heritage intrinsic ecology date back to the Seventies – as Roberto Pane displayed (Aveta, Di Stefano 2013) – it is since about the last decade that in Italy a new systematic approach has been increasingly involved to compatibly coordinating the so-called "quadruple pillar" (society, environment, economics, culture) of sustainability with historic architecture conservation requirements. Dealing with Italian contemporary topics as well as codes and protocols along with major implementations and case-studies, the study aims at a comprehensive comparative appraisal in the field, underlining its theory, methods and practices (best and bad ones), above all from the methodological perspective. Highlighting fundamentals and shared criteria of the "sustainable restoration", along with benefits and limits of its protocols and operational techniques, especially when suggested by law, not forgetting the role of multidisciplinary and multiscale dimension of restoration projects, it intends to contribute to the international trans-disciplinary investigation into the sustainability issue.

Keywords: environmental, social-cultural, economic sustainability; energy-behaviour improvement; Life Cycle Assessment (LCA); Green Building Council (GBC) Italian Historic Building rating system.

Introduction

Architectural preservation has a great deal in common with sustainability. In the broader ecological sense they share the same generative basis. The complex heritage-conservation issue has often impeded sustainable applications, although it should represent the best potentiality to sustainable development especially in Italy. The widespread land-consumption there occurred since the mid-1900s has directed major works to existing building-stock, including heritage. In today's Italy restoration and refurbishment works are worth more than 50% and they are constantly increasing. Contemporaneously, such an increasingly need to sustainability is investing heritage, even when code-graded, thus compelling theoretical and practical investigation into it, along with relevant codes and evaluating systems. Reviewing, primarily as literature, what it has been produced in the field so far, a comprehensive systematic appraisal has been set up, underlining its benchmarks, shared criteria, topical sectors, open issues and possible development paths. Due to the internationally-known Italian restoration research, the findings should be then differently interesting, first and foremost, methodologically.

The quadruple pillar of sustainability

As at the starting point of the sustainability, even in restoration it has been considered according to its "triple pillar" (economics, environment, society). At this regard an interesting document was promoted in 2014 (Workshop 2014). By listing the major key words in the field, a sort of sustainable restoration lexicon was thus developed. Culture has been then added, so shaping the forth component of the "pillar", as directly linked to the Faro's Convention statements (2005). Rather than being freestanding, culture has impacts onto sustainability, shaping and influencing it.

Heritage conservation implies a broader social participation. Since the links between heritage and communities are to be strengthened, even its usage, fruition, experiencing, sharing and displyaing must be broaden. This should happen not as marketing of a commercial good, so much used today, as the so-called "heritage branding" and its *edutainment* (education + entertainment) prove. We like practiced should choose coherently keys of interpretation to telling stories it contains, thus making communities feel involved in its protection.

The social sustainability stands for shared improvements of safety, equity, well-being, dwelling and knowledge. In this perspective diverse applications and case-studies have recently involved Italian sites and places, from single buildings up to towns and *Historic Urban Landscapes*. Economically speaking sustainable restorations are not to be considered as mere cost-benefit evaluating of works. Rather, it would be a thorough multifaceted appraisal of all their implications, direct and indirect, social and cultural, present and future, environmental and economic, even comparing alternative solutions. Therefore, it implies multicriteria evaluation tools (Fusco Girard 2013), according to the multidisciplinary and multiscale size of restoration itself. Operationally speaking, sustainable conservation primarily succeeds as *planned conservation*, or better as *preventive* one (Della Torre 2014; Franco, Musso 2014). Combining building every-day cures with maintaining works it diminishes material loss, delaying restoration works. *Planned conservation* then represents the shift from restoration as *act* to conservation as *process*, the best cutting-edge topic in the field.

Environmental sustainability

Even in architectural restoration, first and foremost, sustainability implies an exhaustive comparative understanding of heritage tangible and intangible features. Historic

architecture has been generally erected for tasks and with means that we can now consider as sustainable. They are continuously varied over times, making then heritage a complex palimpsest, where the past links among microclimatic performances and environmental features with indoor comfort and life-styles have been often altered. In-depth understanding of it thus represents a primary source of knowledge, directly connected to the sustainability issue, especially as energy-consumption. Multidisciplinary and transdisciplinary approaches are then necessary. A good example at this regard is the Historic Indoor Microclimate method (HIM), which studies how building indoor microclimate has changed over time and why (Fig. 1). Using building monitoring and digital modelling, its outputs reveal how we can help materials pass the test of time, so "protecting buildings before damage happens, even without actually having touched them" (Fabbri, Pretelli 2014).

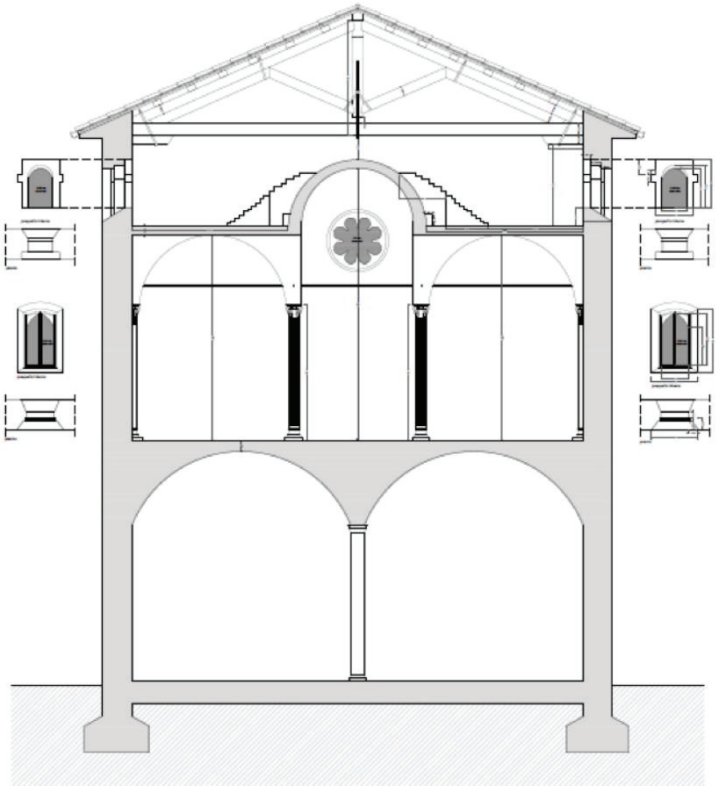


Fig. 1. Malatestiana Library (Cesena, Italy).

The edifice *ab origin* designed as library does not present any heating and humidity control plants. Nevertheless it still has good microclimatic and environmental performances, as even its HIM modelling and monitoring prove. (Fabbri, Petrelli, 2014).

Heritage environmental sustainability has been the best and the first investigated in this field, even if primarily considered as energy consumption. Up to about ten years ago, it has been faced as energy auditing only, even considered as into new buildings and faced using the same retrofitting techniques. Restoration design is, by definition, "anti-protocol". Its complexities cannot be faced with homologated practices. Rather, as sustainable practice the starting point should be detecting, understanding and assessing traditional building materials and techniques, that are as such sustainable. Intrinsic roles and potentialities of building materials, techniques and systems must be then investigated into all their aspects, tangible and intangible (DE VITA 2011), first interpreting and measuring the building passive behaviour (Fig. 2) (i.e. the extent up to which it is in balance with its environment).

Fig. 2. The building passive behaviour. The traditional dwelling (*trullo*) thermal performance on day (left) and night (right). (Dipartimento Ingegneria Civile e dell'Architettura, 2009).

According to this perspective, for graded architectures the energy-consumption *improvement* (MiBACT 2015) has substituted energy-performance adaptation to the new constructions standards. As defined by codes (2015), this improvement comes from what already applied into Italian graded buildings to augmenting their accessibility and usability (Picone 2004; MiBAC 2008a), as well as their anti-seismic behaviour (MiBAC 2008b).

Although Italian codes on heritage energy efficiency are still based on the single building scale, the core is rather to develop broad, flexible and diverse intervening strategies on different scales. This calls for integrated actions affecting city and territory. Community involvement and communication play here a central role, since systemic approaches are required. Several recent pilot-cases, even integrating personal and public investments, already have proven some best practices.

To auditing and monitoring restoration works in terms of sustainability, cataloguing them complying with specific standards, they must be cited the protocols of Life Cycle Assessment (LCA), relative to new added materials - evaluated through socioeconomic and environmental 'cost-benefit" appraisal according to their durability - and Green Building Council (GBC) Italy Historic Buildings rating system, which rates the environmental, economic and energetical sustainability of the project along with building cultural values, combining LEED rating system with the cultural values (GBC 2016).

Conclusion

Sustainable restoration is to be considered as articulated and punctual response to today's economic, environmental, social and cultural needs. Culture, ethics, responsibility and a broader social participation are then the key-factors to any possible sustainable development.

References

Aveta, A. Di Stefano, M. (2013). A. Aveta, M. Di Stefano (eds.). *Roberto Di Stefano. Filosofia della conservazione e prassi del restauro*. Napoli, IT: Arte Tipografica.

Della Torre, S. (2014). Oltre il restauro, oltre la manutenzione. In S. Della Torre (ed.). *La strategia della Conservazione programmata*, Firenze, IT: Nardini, 1-10.

De Vita, M. (2011). M. De Vita (ed). *Città storica e sostenibilità*. Firenze, Italy: Edizioni Regione Toscana.

Dipartimento Ingegneria Civile e dell'Architettura (2009). *Recupero delle acque piovane per uso domestico nell'area mediterranea*. Bari, IT: Politecnico.

Fabbri, K., Pretelli, M. (2014). Heritage buildings and historic microclimate without HVAC technology: Malatestiana Library in Cesena, Italy, UNESCO. *Memory of the World. Energy and Buildings*. 76, 15–31.

Franco, G. Musso, S.F. (2014). A "Comprehensive Sustainability". New design paradigms and methods for maintaining, conserving and managing monuments and traditional architecture. In Scienza e Beni Culturali. (2014), cit., 53-64.

Fusco Girard, L. (2013). La conservazione integrata del patrimonio culturale nella promozione della sostenibilità del sistema città/territorio. In A. Aveta, M. Di Stefano (eds.), cit., 63-71.

Green Building Council (GBC) Italy Historic Building (2016, reviewed april 2017). Retrieved from http://gbcitalia.org/gbc-historic-building-documenti (06/02/2018)

Lucchi, E. Pracchi, V. (2013). eds. *Efficienza energetica e patrimonio costruito. La sfida del miglioramento delle prestazioni nell'edilizia storica*. Santarcangelo di Romagna, IT: Maggioli Edizioni.

Ministero dei Beni e delle Attività Culturali (MiBAC). (2008a). *Linee guida per il superamento delle barriere architettoniche nei luoghi di interesse culturale*

MiBAC. (2008b). *Linee guida per .. il miglioramento sismico…*

Ministero dei Beni e delle Attività Culturali e del Turismo (MiBACT). (2015). *Linee di Indirizzo per il miglioramento dell'efficienza energetica nel Patrimonio Culturale. Architettura, centri e nuclei storici ed urbani*

Picone, R. (2004), *Conservazione e accessibilità. Il superamento delle barriere architettoniche negli edifici e nei siti storici*. Napoli, IT: Arte Tipografica.

Scienza e Beni Culturali. (2014). G. Biscontin, G. Driussi (eds.). *Quale sostenibilità per il restauro?* Venezia (IT): Arcadia Ricerche Editore.

Workshop (2014). *Quale sostenibilità per il restauro?* Retrieved from http://www.scienzaebeniculturali.it/download/doc_brixen_14.pdf) (2018/05/05).

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The challenge of preserving heritage: A Neighbourhood case in Ardabil, Iran

Yousef Daneshvar Rouyandozagh[1*], Ece Kumkale Acikgoz[2]

[1*] *Department of Architecture, Atilim, Ankara, Turkey, yusufdaneshvar1986@gmail.com*
[2] *Department of Architecture,Baskent, Ankara, Turkey, ecekumkaleacikgoz@gmail.com*

Abstract: The view that heritage is not merely a physical entity has raised the attention paid for its intangible part. The problem is the dilemma between the present priorities of a society and its contradictory preservation practices. The dilemma is felt stronger in societies with experienced radical transformations throughout their history. The historic residential neighborhoods of Ardabil City are examples of this dilemma with a unique social and cultural history and its intangible heritage shaped on that base, which is visible today in the dissolutions in their physical heritage. This study presents the outcomes of the in-situ research in the historic Uch Dukkan Neighborhood in Ardabil City with its spatial configurations, historic functions and current conditions. It is discussed that, due to the controversies between differing political and economic priorities of different eras, the intention to preserve the historicity of the neighborhood remains challenging in terms of adapting the intangible content of the heritage and the contradicting premises of the current local life to each other. This study intends to demonstrate how blurred the boundary between preservation and conservatism can be.

Keywords: intangible heritage; historic residential neighborhoods; adaptive reuse; conservative preservation

Introduction

Internationally, it is accepted and clear that urban area heritage has been affected by changing political views and priorities of different social and economic eras. Urban heritage represents a complete historic sum of the values of the past and present generations of its community. Heritage connects the past with the future; hence, its preservation is of primary concern that needs to be assumed by each generation.

The historical neighborhoods are characterized with their specific cultural, historic and aesthetic values, which include assets for the present and future societies. Nevertheless, many of today's historic neighborhoods are under the threat of decay in terms of preservation and management of their historic inventory. According to Lichfield (1997), historic neighborhoods have been abandoned because of competing demands for land use, changes in the nature of local economies, disagreement among shareholders, complexities of legal preservation procedures, high costs of restoration, and other factors. In another study by Watson and Webster (2002), discrimination among heritage content or dismissal of heritage that represent an outdated value of the past are argued to be the basic causes of the loss of the urban heritage in historic neighborhoods.

According to UNESCO Convention on the Safeguarding of the Intangible Cultural Heritage (ICHC) in 2003, intangible heritage includes social practices, oral traditions, expressions, rituals and festive events. In a study by Nurse (2006), social values and norms, being the subjects of intangible heritage, affect the social sustainability of urban landscapes.

Adaptive reuse of historical heritage has a main role in the sustainable development of communities. In historical neighborhoods, adaptive reuse can restore and maintain the tangible and intangible values of physical heritage and help to ensure its survival. When it cannot be used with its original function, proposing a new function for the heritage buildings is unavoidable (Mısırlısoy and Günçe, 2016). According to Bullen (2007), the most successful heritage adaptive reuse projects built are those that best respect and retain the building's heritage significance in the neighborhoods.

Following an introduction on the main elements of the Uch Dukkan neighborhood located in Ardabil City in Azerbaijani region of Iran, which is a historical zone and neighborhood, this study explores the changes and transformations in different periods, the view on the conservation between different periods and their impacts on the quality of the environment, as well as social sustainability.

Methods

The research of this paper is carried out by literature review and field study methods. The literature has been researched for the urban features of the Ardabil City and Historic Neighbourhood of Uch Dukkan. The field study was carried out by observation and visual documentation methods. The content reflecting the transformative consequences of the past and present values of the Uch Dukkan Neighbourhood has been photographed to reveal the preservation problem.

The aim of the research was to carry out a preliminary investigation on the Uch Dukkan neighbourhood's historical heritages and its main elements in terms of adaptive reuse and intangible heritage for improving the social and environmental sustainability of existing architectural elements.

Findings and Discussion

The literature research reveals that the historical neighbourhoods of Azerbaijan region of Iran have an organic structure (Sharifi and Murayama, 2013). The Uch Dukkan neighborhood can be classified as private, semi-public and public spaces from the social point

of view.

The Uch Dukkan Neighborhood is located in a historical district. It is the closest neighborhood to Ardabil's historical bazaar and exists on the historical axis of Sheikh Safi complex and Friday mosque.

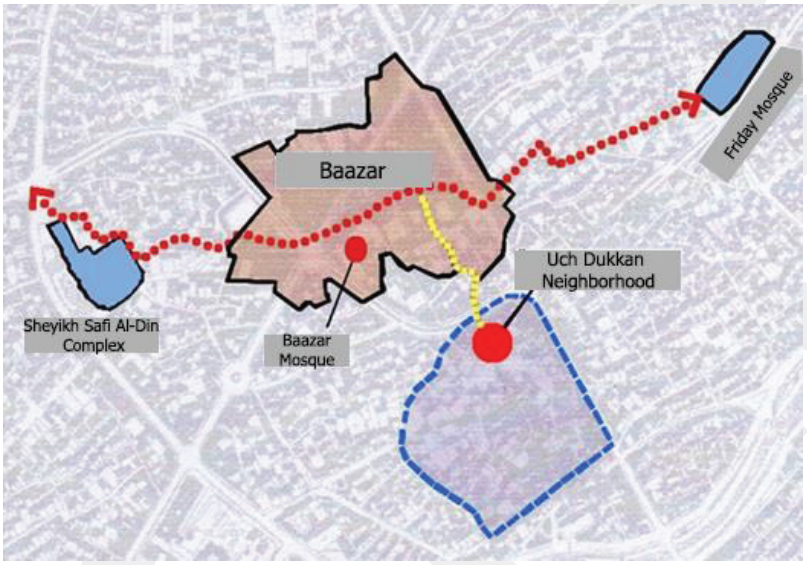


Figure 1. Location of Uch Dukkan Neighborhood

The Uch Dukkan neighborhood's physical components reflect the social pattern of the past, which are the rituals, oral traditions and daily interaction.

The Uch Dukkan neighborhood can be classified in three social frames; public, semi public and private areas. Similar classification can be applied in the units, such as mosques, squares, alleys and etc. The following table shows the units, as well as the physical and social responses of the Uch Dukkan neighborhood's components.

Table 1. The components, social characteristics and physical form classification of the Uch Dukkan neighbourhood

URBAN AREA		COMPONENTS	SOCIAL CHARACTER	PHYSICAL FORM
UCH DUKKAN NEIGHBOURHOOD	UNITS	HOUSES	PRIVATE AREA	Organic
	CENTER	1. Mosque 2. Square 3. Bazaar 4. Hammam(Bath)	PUBLIC AREA	Organic
	CONNECTION	1. Alley 2. Blind Alley	SEMI PUBLIC AREA	Organic and Linear

Despite all the interventions on the physical structure of the neighbourhood, the remains are evidences of the historic social hierarchy in it. The mosque, square, hammam and historical houses as well as alleys are the physical structure of the neighbourhood. These elements imply a specific social function taking part in the entire social life. The intangible value of the neighbourhood has faced an interruptive effect by the interventions on the components of this integrity (Kumkale Acıkgoz and Daneshvar Rouyandozagh, 2016).

The first intervention on the neighbourhood dates back to1950. It constructed the carriage drive on centre of Ardabil city and caused the separation of the organic line of historical neighbourhoods and the grand bazaar. After the increase of motor vehicles in Ardabil city, the second and third carriage drives (street) have been built. Therefore, the organic structure of the historical region of the city was decayed. The mentioned intervention caused the separation of a part of the historical bazaar from the main section.

It was observed that the Uch Dukkan Neighbourhood, after the construction and opening of Arta Hospital in 1992, was affected in terms of the historical identity. The hospital has not only affected the physical form of the neighbourhood but also affected the social feature. The Uch Dukkan square was first built as the gathering area and children's play area but after

mentioned interventions, the square is used as a parking lot. The narrow alleys of the neighbourhood, that have had a historical feature, were either destroyed or expanded. The interventions that have been seen in this example are not successful heritage adaptive reuse projects.

Figure 1. Arta Hospital

Figure 2. Uch Dukkan neighbourhood's square

Conclusion

The Ardabil case shows that there is a significant difference between the past and current social values. The surrounding area of the world heritage monuments is preserved by force, as if the time has been suspended, which requires the sustainability, integrity, quality and safety to achieve the compelling measure. These results are easily observed in the Uch Dukkan neighbourhood. It may be argued that some of the preservation projects in the Uch Dukkan neighbourhood respect neither the tangible nor the intangible characteristics. It can be added that preservation of the world heritage monuments by force and building a hospital in the surrounding area create a conflict between the past social values and current day values. According to the results of the Uch Dukkan neighbourhood research, the intangible values of the neighbourhood and the social sustainability could be lost.

References

Açıkgöz, E. K., & Rouyandozagh, Y. D. (2016). Hatıraların Seçici Yeniden Yaratımı: Erdebil, İran'da Şeyh Safi Al-Din Hangah ve Türbe Yapı Grubu Örneği. İDEALKENT, 7(19), 402-426.

Bullen, P. A. (2007). Adaptive reuse and sustainability of commercial buildings. Facilities, 25(1/2), 20-31.

Lichfield, N. (1997). Achieving the benefits of conservation. *Built Environment (1978-)*, 103-110.

Mısırlısoy, D., & Günçe, K. (2016). Adaptive reuse strategies for heritage buildings: A holistic approach. Sustainable Cities and Society, 26, 91-98.

Nurse, K. (2006). Culture as the fourth pillar of sustainable development. Small states: economic review and basic statistics, 11, 28-40.

Sharifi, A., & Murayama, A. (2013). Changes in the traditional urban form and the social sustainability of contemporary cities: A case study of Iranian cities. Habitat International, 38, 126-134.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. MIS quarterly, xiii-xxiii.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Urban Sustainable Innovative Actions: The I.Re.Ne. Project

Claudia De Biase[1], Michela Monaco[1], Maria Antonietta Sbordone[1*]

[1]*Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy,*
{claudia.debiase, mariantonietta.sbordone, michela.monaco}@unicampania.it

Abstract: Challenges for transformations are the first step for a new governance of territories, especially in degraded areas in which the urban tissue is the mirror image of the social one. This paper presents the main aspects of the European project I.Re.Ne, developed in the framework of the UIA third call. The project aims to the regeneration of three housing districts and their connections in three municipalities of the Caserta province.Attention to urban, socio-economic and environmental aspects, by means of a sustainable urban renewal are the key aspects. The project includes the design of a green infrastructure and actions directed to sustainable land use, energy efficiency of the buildings, green-blue urban landscape system design, urban agriculture by means of cannabis sativa plantations in the neighborhoods and along the connection roads.

Keywords: bridge management system, assessment, monitoring, rehabilitation.

Introduction

Urban Innovative Actions (UIA) is an initiative of the European Union that provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges. An interdisciplinary research group at the Department of Architecture and Industrial Design of Vanvitelli University has developed the innovative project I.Re.Ne. (*In*novative *Re*generation *Ne*twork), in the framework of UIA third call, to enhance the physical and socio-economic conditions of three districts and their networking through building and urban renewal, together with job innovation. The districts are part of three distinct municipalities in the Caserta province, part of a densely populated and built area in the north of Campania Region, perhaps one of the most depressed areas of Southern Italy (de Biase, 2015; de Biase and Losco, 2017). The three neighborhoods, although localized in different Municipalities with different context conditions, present a lot of common aspects: compact building settlement, great residential density, low-rise buildings, limited or insufficient infrastructure services, low-quality of the outdoors, high energy consumption, limited attention to vulnerable populations, modest presence of green areas, absent public transportations, high level of unemployed people. The planned change starts from the building regeneration: the low energy consumption and environmentally friendly materials are the

topics (Gesualdo and Monaco, 2010). In the meantime a more rational use of natural resource (water and land) is planned with the reintroduction of cannabis farming. The operating approach is an innovative aspect, with its particular attention to the environmental and socio-economical issues (de Biase et al., 2016). The project will in fact involve actions directed to sustainable land use, energy efficiency of the buildings, green- blue urban landscape system design, urban agriculture by means of cannabis sativa plantations in the neighborhoods and along the connection roads . The farming will be extended to land confiscated to mafia being part of the Municipalities assets. A consequent reduction of carbon dioxide and facilitation of land decontamination is expected as a result. The socio-economical innovation concerns the identification and enhancement of local capabilities to increase both a form of economy based on giving and small networks of production and commercialization of local products to revitalize the assets confiscated from the Mafia with ancient local cultivations. The project is strongly addressed to citizens' needs, so the involvement of the inhabitants in the project is a necessary component (Sbordone, 2016; 2017). The project has been selected and is actually under evaluation for eligibility: the contributions of several different Associations and Social partners, together with the determinant commitment of the Municipalities Network and the research group at the University of Campania is the key of this first success.

The I.Re.Ne. project: an interdisciplinary approach

The I.Re.Ne. project is the result of the application of methodologies and competencies from all the different stakeholders involved (de Biase and Matricano, 2018).

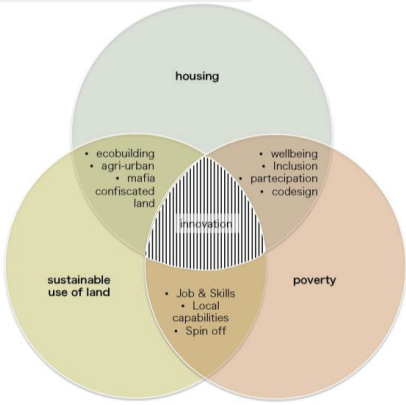


Figure 1. Venn diagram of the I.Re.Ne. project logical relations.

The innovation, central theme of the project, has been examined by an interdisciplinary point of view, as shown in the Venn diagram of Figure 1.

The three main issues to be addressed, poverty, sustainability and housing, have been connected by the different actions planned in the project (Morelli and Sbordone, 2016). The project development steps include:

1. The creation of a Network of Municipalities (Main urban authorities): one network as a syntesis of three Municipalities, to interact with the European Community.
2. Structuring of a network of Delivery partners directly involved in the project:
    - University of Campania "Luigi Vanvitelli" – Department of Architecture and Industrial Design.
    - Chamber of Commerce and all its branches.
    - ANCE (Italian National Association of Building Contractors).
    - CNR (National Research Council).
    - IACP (Italian Authonomous Institute for Council Houses).
    - Coldiretti (National Confederation of Farmers).
3. The determination of coplanning and codesign activities aimed to environmental, economical and social housing enhancement, due to the similar characteristics of the three neighborhoods. Building renovation, the creation of green infrastructures thanks to the cannabis sativa farming and implementation actions aimed at enhancing the local capabilities are the issues. In this phase all the competences of the delivery partner have been involved.
4. The creation of appropriate budget for financial resources and timetable for implementation.

The set of actions and their relations are reported in the influence diagram of Figure 2.

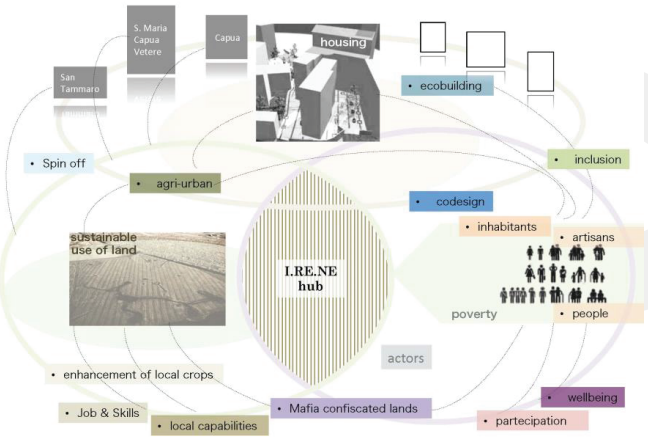


Figure 2. I.Re.Ne. networking: influence diagram for the actions involved

The expected results include the revitalization of the building heritage with recovery and reuse of empty dwellings and urban gaps aimed at sustainable use of derelict lands, framed in green and blue infrastructures, together with the social innovation due to the planning of sustainable urban agriculture and green jobs, to forming and giving evidence to local capabilities. The use of lands confiscated to the Mafia for innovative and sustainable agriculture contribute to the positive message contained in the planned interventions .

Conclusions

This paper has presented the key issues of the European project I.Re.Ne, developed in the framework of the UIA third call. Particulat attention has been devoted to the synergy of the different skills involved, made available by the different delivery partners, and in particular the interaction in the scientific research group that has developed the kernel of the project.

Acknowledgments: The contribute of University of Campania “Luigi Vanvitelli” is gratefully aknowledged.

References

de Biase, C., (2015). Turismo e resilienza: gli strumenti della programmazione turistica nella Conurbazione Casertana, *Urbanistica Informazioni*, 263 s.i., 19-23 (in Italian).

de Biase, C., Frettoloso, C., Perrone, V., (2016). Social Housing e riqualificazione degli spazi aperti. Il caso studio di Scampia (NA), *Housing Policies and Urban Economics*, 3(2), 109-122 (in Italian).

de Biase, C., Losco, S., (2017). The last fifty years: tourism policies and territorial planning in Caserta Province, *Abitare la Terra*, 42-43, 90-93.

de Biase, C., Matricano, D., (2018). L'influenza delle relazioni territoriali sulla creazione di spin off da ricerca, *Sviluppo & Organizzazione*, 282, 56-65 (in Italian).

Gesualdo, A., Monaco, M. (2010). *Seismic vulnerability reduction of existing masonry buildings. Modelling of retrofitting tecniques*. In: Urban Habitat Construction Under Catastrophic Events. vol. 1, p. 853-858, London, New York: CRC Press, Taylor & Francis Group, ISBN: 9780415606851

Morelli, N., Sbordone, M.A., (2016) .Service Design as the ground for alternative social and economic scenarios. *The Design Journal*, 20, sup. 1, S614-S621..

Sbordone, M.A. (2017). Design Networking. Local systems of collaborative economies. PAD Pages on Art and Design, 13, Letteraventidue Edizioni, 51-70 (in Italian).

Sbordone M.A., (2016). Local Design Network. Rete di Economia Sociale nelle Terre di Don Peppe Diana, Listlab, Rovereto, 7-157 (in Italian).

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The ecological and social role of open spaces in urban regeneration processes

Raffaela De Martino[1*], Barbara di Vico[2]

[1*] *Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli, Aversa, Italy, raffadema@libero.it*
[2] *Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli, Aversa, Italy, barbara.divico@libero.it*

Abstract: The uncontrolled growth of cities, with consequent settlement, infrastructural and productive phenomena, have led to profound changes in the urban ecological structure transforming the natural spaces in isolated fragments depleted of their environmental peculiarity. The redevelopment and connection of these spaces are the prerequisites for the formation of a network capable of contributing not only to improving the overall environmental quality of the city, but also to its social and economic development, thus playing a key role in the processes of urban regeneration. It is indeed a true statement that well placed green elements in an anthropized context improve citizens' health and wellbeing, contributes to uplift the economic value and cohesion of communities.

Keywords: urban ecological network; urban regeneration; sociality.

Introduction

In anthropised landscapes, the urbanization and infrastructuring of the territory has determined, together with the activities of agricultural mechanization and control of flowing waters, a tendency towards the simplification and homologation of the landscape (Paolinelli, 2003). The phenomena of settlements, infrastructures and manufacturing, have therefore produced profound alterations to the ecological structure of the territory causing fragmentation of natural and/or semi-natural areas, which have lost with the passage of time the elements of contiguity and have been depleted of their environmental features. The phenomenon of fragmentation causes, from an ecosystemic point of view, a compromise of the “structure” and “function” of the elements of the anthropised landscape. Fragmentation is a strong threat to biodiversity: man-made areas and artificial linear structures (roads, highways, railways, power lines) in fact, represent low permeability barriers to the movement of many species that may be extinct either due to the reduction of the surface of the remaining habitats available, or because the increase of their isolation. The urban landscape is the place where this process has occurred more prominently.

The city, from an ecological point of view, can be considered a complex artificial ecosystem that like any other ecosystem consists of habitats with different degrees of naturalness: artificial habitats (buildings, industries, infrastructures), semi-artificial habitats

(gardens, trees, urban allotments), semi-natural habitats (urban forests, parks) (Mininni, 2000). Semi-artificial and semi-natural biotopes, in particular, can play a crucial role within the city in terms not only of usability and comfort, but also, from an ecological point of view.
Green areas are, in fact, important habitats and valuable ecological niches for the protection of biodiversity in the city (Chiusura, 2010).

In recent years, the concept of ecological network, as a system of interconnected habitats, which protect the biodiversity, although usually applied to vast territorial areas, has been proposed for the reorganization of open spaces in urban areas.

The aim of this paper is to analyse and discuss how the creation of an ecological urban network, through a green implementation and the connection of naturalness areas in the city, could concur not only to the improvement of the environmental quality but also as for the social value of interested areas with benefits related to citizens' general wellbeing.

Methods

The construction of an urban ecological network is based on two fundamental assumptions: first, that the spaces are characterized by an adequate environmental quality, the other is that they are connected to each other. It is possible to carry out an ecosystemic analysis of the city, in order to verify the presence of the two conditions (De Martino, 2014).

From a methodological point of view, then the construction of the ecological network starts from an ecological-environmental analysis, identifies the elements that constitute it, and finally assesses the level of overall quality in order to define the possible strategic actions necessary for its implementation. The ecosystemic-ecological analysis is based on ecological indicators and analytical-descriptive methods (Fabbri, 2007), already present in the literature, capable of detecting the level of territorial fragmentation and defining the initial ecological structure.

The construction of the ecological network was made possible through the application of landscape-structural and biological-functional criteria. The first approach involves the identification of an environmental reality that, due to its structural and spatial conformation, could belong to a potential ecological network. On the other hand, the biological-functional approach takes into consideration the behavioural differences of several priority species (focal species) present in the territory, so as to focus any form of action on the elements under greatest risk as well as optimize the use of resources available (Fiduccia, Fonti, Funaro, Gregori, Rapicetta, Reniero, 2004).

The adjective “potential” highlights how the efficiency of the network is subject to an acceptable level of the ecological-environmental quality of the structural elements that

constitute it. If this condition was not always satisfied, it is necessary to identify for some elements, more appropriate environmental rehabilitation interventions so as to improve the overall level of ecosystemic-ecological quality (Malcevschi, Bisogni, Gariboldi, 1996).

Findings and Discussion

The contribution that an ecological network can bring is fundamental to provide an ecological and environmental presence and to create positive repercussions from a physical and psychological point of view on the inhabitants. In fact, the presence of a green network strengthens the general environmental quality, thus creating a better living context making areas more desirable and leading to an economic uplift.

Sustainable actions should be based on a multi-dimensional structure that considers also a long-term economic and social feasibility, taking into account the costs of these natural infrastructures together with their maintenance thinking about the social benefits that such an investment could bring into the communities.

In fact, green spaces often have a positive social impact on people's health and wellbeing, on helping people feel safer by reducing the possibility of anti-social behaviour episodes, offering for example community activities that bring people together (The Land Trust, 2016).

The regeneration of urban voids into green spaces provides environmental benefits and it should be based and aim to a trend reversal on those activities that residents carry on within the city, providing them spaces for physical activity and social interaction, and allowing psychological restoration to take place.

For these benefits to accrue, first there is a real need to understand which mechanisms have brought to an insufficient level of livability. Urban planning interventions can play a critical role to address health benefits that a green urban space can bring to the community well-being (Chee Keng Lee, Jordan, Horsley, 2015).

No project should not take into account the social context where to operate a social analysis carry out through surveys; understanding the economic and employment situation; considering age groups and every other characteristic that can lead to a better functional intervention.

The presence of green spaces, even if it has been put in a systemic context, isn't enough to be considered fully useful if it is not took into considerations how each social group can see and use green spaces in different ways.

As a matter of fact, how and where these natural areas are located is important to have actual consequences from a social point of view. While large open spaces can certainly bring positive effects on the environment, smaller green areas surrounded by housing are more likely to generate a community feeling.

This proximity can be perceived as a continuation of the home environment as an open-air living room (Cabe Space, 2004). If shared by residents it can shape the cultural identity of an area with the chance of being a place to hold diversified activities to promote social interaction.

The design itself of green open spaces can promote a safer place to live in decreasing, for example, the tendency of going from one closed environment (your own house) to another one (pubs, restaurants, disco) when going out, leaving out the possibility to make the city streets and open areas equally lively.

Conclusion

A real ecological network cannot be created in any urban environment, but it requires the presence of green spaces with certain characteristics. However, we can align its concept to the fact that the city is a set of various spaces including large and small parks, equipped green areas, or simple open spaces such as squares and pedestrian areas.

All these types of urban areas can be put in a larger system and be the focal point of a series of interventions where a new subject in the decision-making process should be able to coordinate on one side local administrations and on the other side citizens. In fact, every type of action must be done with a real contribution from people and this happens only when there is mutual trust between the local power and local people.

Note: The paragraphs “Introduction" and “Methods" are edited by Raffaela De Martino. The paragraphs “Finding and discussion" and “Conclusion" are edited by Barbara di Vico.

References

The Land Trust. (2016, January). *The Value of our green space*. Retrieved from The Land Trust website https://thelandtrust.org.uk

Chee Keng Lee, A., Jordan, H. C., Horsley, J. (2015). Value of urban green spaces in promoting healthy living and wellbeing: prospects for planning. *Risk Management and Healthcare Policy* (8), 131-137.

De Martino, R. (2014). *La rete ecologica per la riqualificazione di ambienti fluviali.* Monfalcone (Gorizia): EdicomEdizioni.

Chiusura, A. (2010). *Verso una gestione eco sistemica delle aree verdi urbane e peri-urbane. Analisi e proposte* (Rapporti 118/2010). Roma: ISPRA Settore Editoria.

Fabbri, P. (2007). *Principi ecologici per la progettazione del paesaggio.* Milano: FrancoAngeli.

Paolinelli, G. (2003). *La frammentazione del paesaggio periurbano*. Firenze: Firenze University Press.

CABE Space Design Council. (2004, March). *The Value of Public Space*: *How high quality parks and public spaces create economic, social and environmental value*. Retrieved from The Cabe Space Design Council website https://www.designcouncil.org.uk/

Mininni, M. (2000). Ecologia urbana. In: AA.VV., *Costruire sostenibile*. Firenze: Alinea Editrice.

Fiduccia, A., Fonti, L., Funaro, M., Gregori, L., Rapicetta, S., Reniero, S. (2004). Strutture di informazione geospaziale e processi di conoscenza per l'identificazione della connettività ecosistemica potenziale. In: Sitzia, T., Reniero, S. (a cura di), *Reti ecologiche: una chiave per la conservazione e la gestione dei paesaggi frammentati*.

Malcevschi, S., Bisogni, L., Gariboldi, A. (1996). *Reti ecologiche ed interventi di miglioramento ambientale*. Milano: Il Verde Editoriale.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Conservation state and structural deficiencies of typical Italian bridges

Gianfranco De Matteis[1*], Mattia Zizi[2], Antonino Del Prete[3*]

*[*1]Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, gianfranco.dematteis@unicampania.it*
[2]Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, mattia.zizi@unicampania.it
*[*3]Province of Caserta, Settore Viabilità, settoreviabilita@provincia.caserta.it*

Abstract: the preservation of strategic infrastructures, like bridges, is a public domain interest to avoid both losses of human life and connection problems in case of collapse. Most of the Italian bridges have been built before 1990, so actually they may present structural deficiencies due to bad state of conservation as well as outdating of adopted design criteria. On the basis of a collaboration between the Province of Caserta and the Department of Architecture and Industrial Design of the University of Campania "L. Vanvitelli", four reinforced concrete bridges built in 1950s and located in the Caserta district have been examined. The aim of this study is to provide a general information on the state of conservation and structural suitability in relation to current code provisions. The results of this investigation reveals the existence of significant deterioration phenomena due to degrade and the presence of some structural deficiencies for the examined bridges.

Keywords: existing bridges; infrastructures; seismic risk; structural degrade.

Introduction

The study focuses on the state of conservation and structural suitability of four road bridges built in the 1950s and located in the area of Caserta district. The examined bridges are:

- New Bridge across Volturno River in Capua (see Figure 1a);
- Bridge across Volturno River in Castel Morrone (see Figure 1b);
- Margherita Bridge in Dragoni (see Figure 1c);
- Bridge across Volturno River in Aliano (see Figure 1d).

The analysed infrastructures present different conditions. In fact, while the Capua bridge is located in the centre of the city on an urban road, the other bridges are subjected to a suburban traffic type and allow the connection of Matese zone to the south area of Caserta Province. However, the inoperativeness of these structures would cause severe diseases to the civil population. In some cases, due to structural checks that evidenced the presence of structural problems, the local authorities decided to limit the transit to vehicles with a total weight less than 3.5 ton. Nevertheless, such bridges will be subjected to structural interventions with the aim to re-establish the transit of any type of vehicle (1st class bridge).

The aim of this study is to analyse the structural deficiencies of these strategically important infrastructures in order to define the main common problems affecting these constructions as well as the measures to be applied for possible structural rehabilitation.

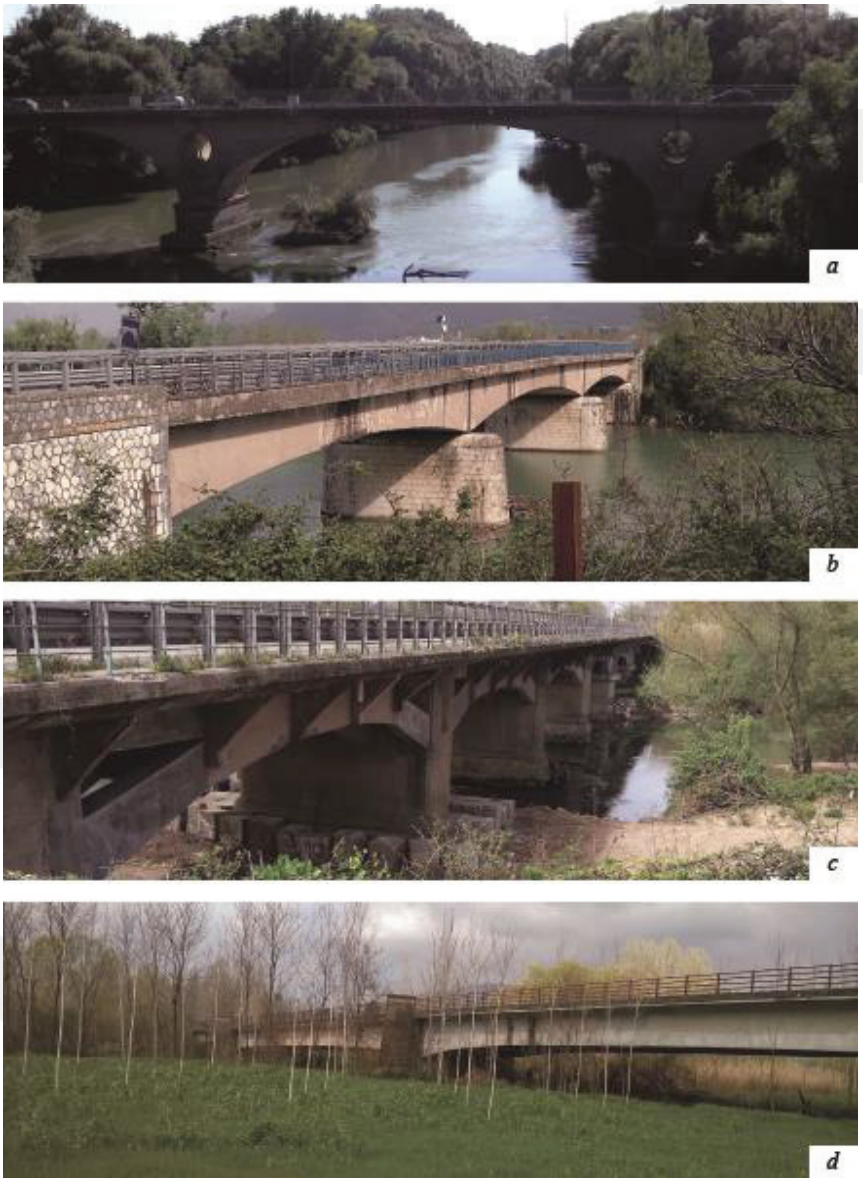


Figure 1. New Bridge across Volturno in Capua (a), Bridge across Volturno in Castel Morrone (b), Margherita Bridge in Dragoni (c) and Bridge across Volturno in Aliano (d).

Methods

All investigated bridges are characterized by a reinforced concrete deck with masonry or concrete piers and abutments. General characteristics about geometry and materials of each structure are summarized in Table 1.

Table 1. General characteristics of investigated bridges.

Bridge	*Year of construction*	*Total Length [m]*	*Number of spans*	*Static scheme*	*Piers material*	*Abutments material*	*Type of foundation*
Capua	1950	115	3	Arch bridge	Concrete	Concrete	Shallow
Castel Morrone	1948-1953	94	3	Gerber's beam	Masonry	Masonry	Shallow and deep
Dragoni	1953	140	6	Supported beam	Concrete	Concrete	Shallow
Aliano	1956-1958	150	3	Gerber's beam	R. C.	R. C.	Deep

Due to the conditions of environmental exposure and absence of adequate maintenance, such constructions present important deterioration of concrete cortical layer, with strong oxidation and diffuse damage of steel bars. In Figure 2, some significant pictures representing the present conditions of examined bridges are provided.

Figure 2. Deck degradation state: New Bridge in Capua (a), Bridge in Castel Morrone (b), Margherita Bridge in Dragoni (c) and Bridge in Aliano (d).

Moreover, the structural capacity of these structures appear to be inadequate respect to both vertical traffic loads and seismic actions presently provided by Italian structural codes; in particular, the piers and the abutments suffer in case of horizontal actions, while the decks are not adequate for sustaining maximum vertical loads**.**

All bridges have been investigated and analysed following a "performance approach", as defined by European and Italian codes (British Standards Institution, 2005), (Ministero delle Infrastrutture e dei Trasporti, 2008 and 2009). To this scope, a preliminary level of knowledge (LC) of the structures, acquired from original design documents, in-situ and laboratory tests and from visual inspection, has been defined. On the basis of such inspections, a "Confidence Factor" (FC) has been established, in order to assume a conservative value for the design strength of adopted constructional materials. It is important to note that in case of bridge structures, the Italian code recommends to achieve the highest level of knowledge (LC3), to which corresponds FC=1.

Then, with the aim to conduct structural checks, vulnerability and structural safety analyses have been carried out, by means of either simplified or complex methods based on the adoption of FEM models (Reluis, 2009).

Findings and discussion

Even though with the presence of substantial differences among the four analysed structures, all bridges exhibit the same critical issues. Principally, considering vertical loads effect, it has been observed that all deck structures resulted not adequate with regard to shear and/or bending internal forces produced by traffic load typical of 1st class bridge. In particular, bridges having a Gerber static scheme showed significant deficiency against shear internal forces according to capacity formulations provided by the Italian and European structural codes. However, it is important to note that the structural model adopted to evaluate shear capacity does not take into account the beneficial effects due to presence of longitudinal steel bars located throughout the depth of the cross section (side reinforcement). Shear capacity of bridge beams, as noted in "Test of RC Deck Girders with 1950s Vintage Details" (Higgins *et al*, 2007), resulted underestimated. In fact, according to the classical design approach, the contributes of concrete (*compression strut*) and stirrups and/or inclined shear reinforcements (*tensile tie*) are considered separately, without taking account of the real tangential stress distribution in the beam.

In additions, it was noticed that in many cases, the in situ concrete appeared to be qualitatively poor. Special attention should be paid to the case of Margherita Bridge in Dragoni; in fact, based on destructive tests on concrete samples collected from two of six spans of the deck beam, a compressive strength unacceptably low (minor than 2 MPa) has been detected.

Also, in all cases, unsatisfied bending and shear checks of the deck beams have been determined due to traffic loads imposed by codes, which appear to be excessively restrictive for existing structures in relation to the real traffic conditions. However, the evaluated inefficiency should not compromise entirely the static of the structures, it being sufficient to operate a declassification of the infrastructure, limiting the type of allowed traffic loads.

Furthermore, the advanced state of degrade and material quality could affect the structural efficiency. In fact, all studied bridges present, in critical zones of the corresponding decks, significant spalling of concrete with exposure of iron bars, which appear corroded and in some case with presence of evident discontinuities. These important structural aspects are well referred in Yoon *et al* (2000); they may influence significantly the real strength of the structures, requiring opportune improvement interventions to be undertaken.

As far as seismic loads are concerned, a significant deficiency limited to piers and foundation systems, due to shear and/or combined compressive and bending stresses, has been detected. It is worth noting that only in the case of Capua bridge, considering the arch structure, the deck also suffers lateral loads.

Conclusion

Safety of strategical infrastructures like bridges is of paramount importance, considering the possible diseases due to structural collapses. On the basis of available data, four bridges located in the area of Caserta district and built in 1950s have been investigated. The study revealed the presence of a significant degrade as well as structural deficiencies for all investigated structures. It is evident that the problem of structural rehabilitation of existing bridges should be faced at territorial scale, implementing appropriate maintenance and intervention strategies, which must be economically compatible with available resources but also structurally effective.

References

British Standards Institution (2008). Eurocode 2: design of concrete structures: British standard. London: BSi

Higgins, C., Potisuk, T., Farrow III, W. C., Robelo, M., McAuliffe, T. K., Nicholas, B. S. (2007, September/October). *Journal of Bridge Engineering, 12*(5), 621-631.

Ministero delle Infrastrutture e dei Trasporti (2008, Jenuary 14). Nuove norme tecniche per le costruzioni, Rome.

Ministero delle Infrastrutture e dei Trasporti (2009, February 2). Circolare 2 febbraio 2009, n.617- Istruzioni per l'applicazione delle "Nuove norme tecniche per le costruzioni" di cui al decreto ministeriale 14 gennaio 2008, Rome.

Reluis (2009, March). Linee guida e manuale applicativo per la valutazione della sicurezza sismica e il consolidamento dei ponti esistenti in c.a.. Rome.

Yoon, S., Wang, K., Weiss, W. J., Shah, S. P. (2000, November 1). Interaction between Loading, Corrosion, and Serviceability of Reinforced Concrete. *Materials Journal, 97*(6), 637-644.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Influence of structural typologies on architectural style of high-rise steel buildings

Gianfranco De Matteis[1*], Valentina Corlito[2], Graziella Soleti[3]

[1*] *Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, gianfranco.dematteis@unicampania.it*
[2] *Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, valentina.corlito@unicampania.it*
[3] *Architect, freelance, graziella.soleti@alice.it*

Abstract:
High-rise buildings made their appearance in America and in Europe in the 19th century thanks to the progress of steelworkers and structural engineers. This type of constructions transformed over time, developing both by structural and stylistic point of view. In the following paper, the main structural systems of high-rise steel buildings are identified. Fifty Asiatic skyscrapers are considered with the aim to identify structural and architectural evolution of each type. Based on this analysis, an attempt for a new structural classification for high-rise steel buildings is made, trying to link this evolution to the main architectural advances occurred over time.

Keywords: high-rise steel buildings; structural systems; architectural style

Introduction

High-rise buildings (or *skyscrapers*) represent the iconic element of the modern urban skylines. These structures have had a strong impact on the society since their appearance, bringing to the development of both engineering and architectural studies and promoting the match between these two different disciplines (Armstrong, 1995).
The development of this structural type resulted in the definition of a new concept of city (*vertical city*), stressing the importance of a sustainable urbanistic development. According to the supporters of the vertical model, the main benefits of high-rise buildings are:

- lower land use;
- development and preservation of green areas;
- traffic avoidance in urban areas.

The first skyscrapers (representative of the *American Building Type*) made their first appearance in the USA (in Chicago) and, in a second time, in Europe at the end of the 19th century, thanks to the economic and technological benefits promoted by the Industrial Revolution. In Asia, this structural type developed only in the last decades, experiencing a rapid boom in a very limited time. At present, East Asia entertains almost the 50% of the tallest buildings of the world (Binder, 2001).

In the following, the main structural types of high-rise tall buildings are identified. To assess how these typologies developed overtime from engineering and architectural point of view, fifty Asiatic skyscrapers have been considered. Based on the obtained results, a new classification for high-rise steel buildings is then proposed.

Methods

In the study of high-rise steel buildings, different structural systems can be distinguished considering the criteria used to contrast horizontal loads. All these systems present a limit height over which they become ineffective or not economically convenient. In the 1970s Fazlur Khan gave a first classification of high-rise buildings with steel or concrete structures, considering the adopted structural system and the maximum height reached by each type (Ali and Moon, 2007).

In this paper, the considered classification is integrated with some additional structural types, considering the progressive evolution in steel technologies and structural engineering and the connection with the evolution of Modern architecture (CTBUH, 1995; Lepik, 2004; Wells, 2005; Bungale, 2012; Boake, 2012; Moon, 2012).

All the considered structural types can be distinguished in two main groups based on the system used to absorb horizontal forces:

- internal structures (in which the resistant system is in the inner part of the building);
- external structures (in which the resistant system is located on the perimeter).

The main types of internal structures are:

- Moment Resisting Frame (MRF): is composed by a rectangular grid with beams and columns connected through rigid or semi-rigid joints; the whole frame is designed to bear both vertical and horizontal loads.
- Braced Frame (Concentric Braced Frame -CBF- and Eccentric Braced Frame -EBF-): presents hinged framed structure designed to bear vertical loads only; then, diagonal elements (Shear Truss) are introduced to withstand horizontal loads.
- Shear Walls or Concrete Core structures: shear walls are adopted to withstand horizontal loads through their bending stiffness; in a possible layout, the shear walls can be arranged to create a rigid core inside the structure (Concrete Core).

- Outriggers Structure: the excessive slenderness of the inner core is contrasted through the insertion of rigid horizontal elements that connect the internal core to the external columns, increasing the bending stiffness of the buildings.

The main types of external structures are:

- Tubular Structures (Framed Tubes, Braced Tubes, Tube- in- Tube Systems and Bundled Tubes): the resistant system is located on the external perimeters to increase the inertia and the bending stiffness of the buildings.
- Diagrid Structures: the traditional framed structure is replaced by a "mesh" of triangular elements arranged to generate a rigid tube. This solution allows to redistribute all horizontal loads in form of axial stresses.

To assess how the listed structural typologies are applied and how they can be combined to get more efficient systems, fifty Asiatic high-rise steel buildings have been analysed. The group of buildings has been sorted according to the above identified structural typologies and in chronological order, with the aim to interconnect architectural evolution and structural development.

Findings and Discussion

Based on the analysis carried out on the considered group of Asiatic high-rise buildings, some general consideration can be made:

- few cases of Framed or Braced Structures have been identified;
- the low presence of Moment Resisting Frame can be probably related to the low performance of this structural typology and to the difficulties linked to the realization of rigid joints;
- few cases of Framed Tubes have been identified;
- Space Truss Frames, Super-Frames and Bundled Tube systems have been detected in very few cases.

A comparison between the different structures can be made considering the following geometric factors:

- the maximum height of the building (H);
- the maximum span of the beams (s);

- the slenderness (*H/D*), defined by the ratio between the maximum height of the building (*H*) and the diagonal measurement of the base (*D*).

In particular, the *H/D* ratio allows to get a synthetic parameter assessing the structural performance of a high-rise building: the increase of slenderness clearly identifies a performance improvement due to the adopted structural typology.

A trend of the *H/D* ratio has been defined for every structural typology (see Figure 1), allowing also to predict possible further developments. A clear evolution in slenderness can be observed from 1st Generation systems (Moment Resisting Frame or Braced Frame) to Tubes and Mega-Structures (2nd and 3rd Generation systems). The obtained values of *H/D* ratio for each structural type are given in Table 1.

In Figure 2, a new classification for high-rise steel buildings is then proposed, considering the results obtained for each structural type.

Table 1. Values of the *H/D* ratio for each structural type.

	STRUCTURAL TYPE	*H/D*
1st Generation	Moment Resisting Frame	1.5
	Moment Resisting Frame + Concrete Core	3.8
	Braced Frame	4.0
	Braced Frame + Concrete Core	5.0
2nd Generation	Framed Tube	5.6
	Braced Tube	6.5
3rd Generation	Mega-Structures	8.5
	Diagrid Structures	9.0
	Outrigger Structures	9.0

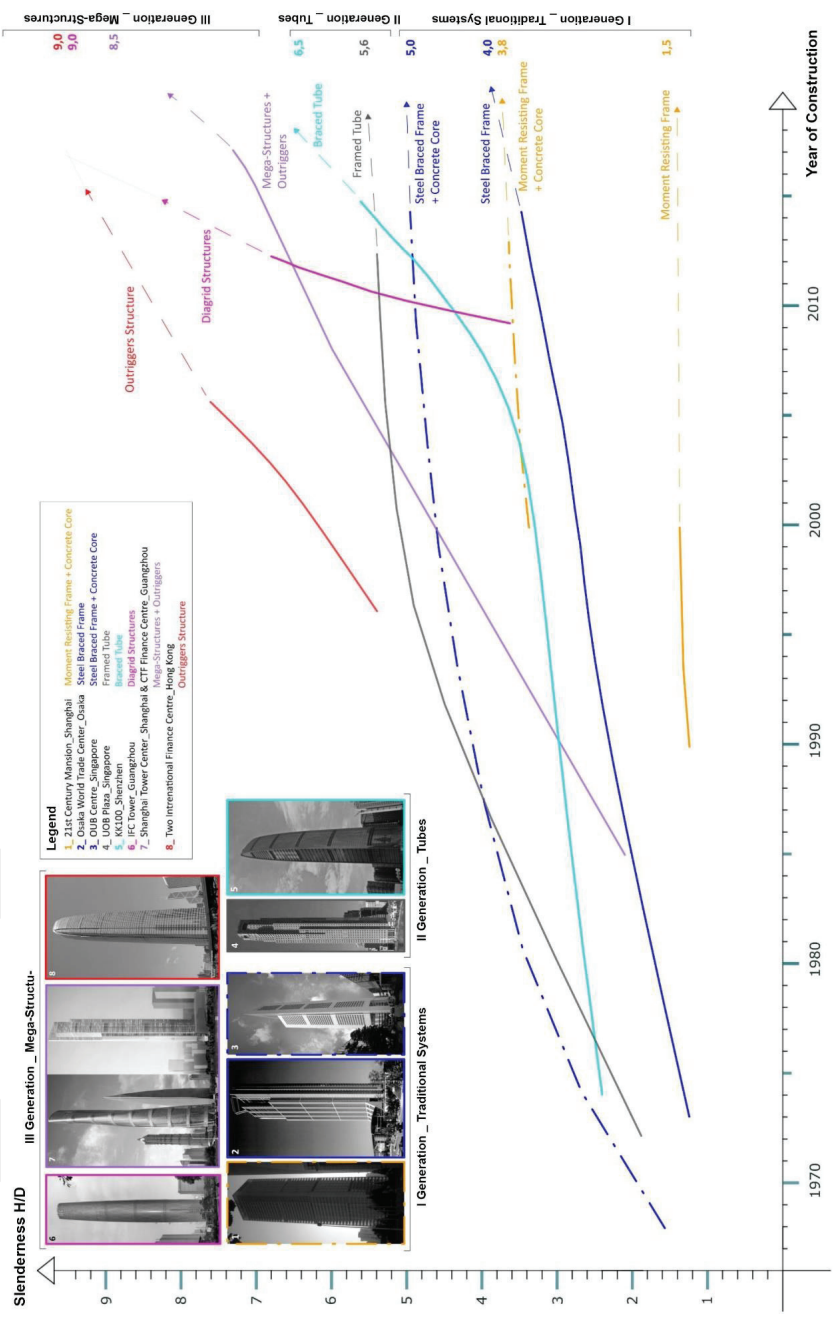


Figure 1. Trends in evolution of the *H/D* ratio for the structural types.

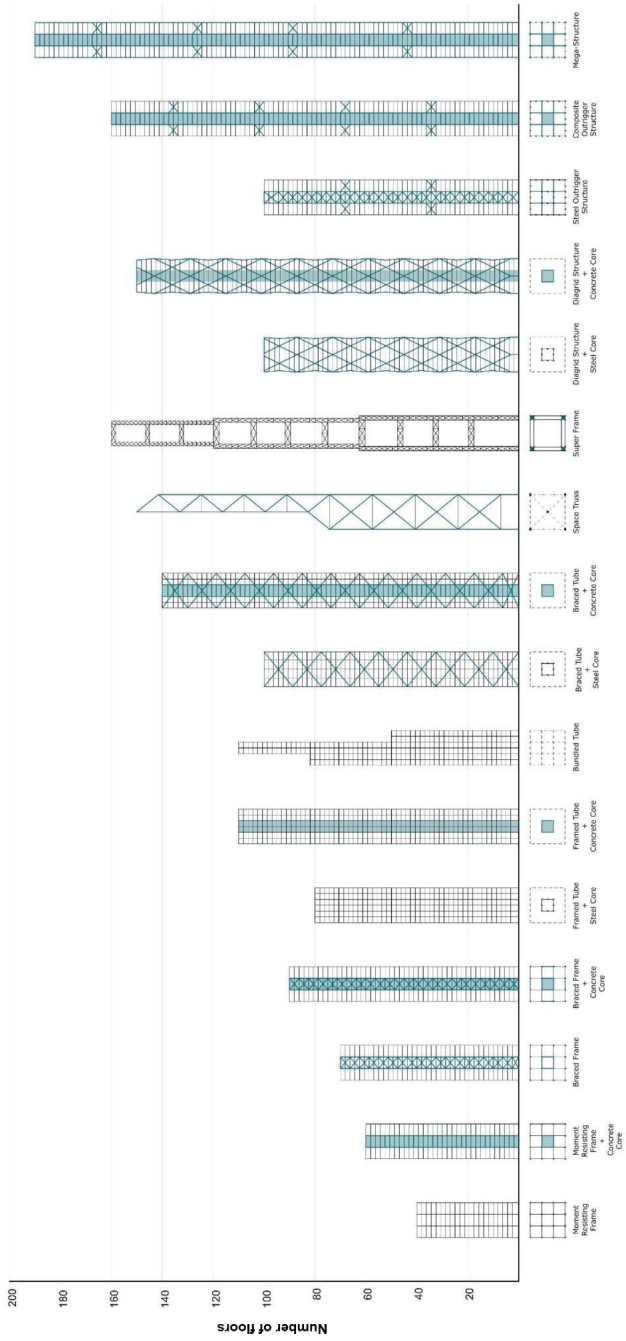


Figure 2. New classification system for structural types.

Conclusion

In this paper, the main structural types of high-rise steel buildings have been identified with reference to fifty skyscrapers. Based on the obtained results, it is apparent that the design of a skyscraper is a process that merges engineering and architectural needs: in fact, only the advances in structural engineering allowed the development of more daring solutions and, vice versa, the architectural needs clearly influence the development of more efficient structural solutions.

The main outcomes of the paper are listed in the following:

- a trend of the slenderness ratio *H/D* for each structural type can be identified;
- the 1st Generation systems, made of traditional Moment Resisting Frames and Braced Frames + Concrete Core, clearly evidences an asymptotic trend of *H/D* ratio up to 5, which identifies the structural limit for such a typology;
- in II Generation systems, made of Framed Tubes and Braced Tubes structures, evidences *H/D* ratio up to 6.5, with a clear gradient in the trend which provides possibility for Braced Tubes to develop more efficient solutions;
- the trend obtained for the 3rd Generation systems, made of Mega-structures, Diagrids and Outrigger structures, shows a clear improvement of the structural performance with *H/D* ratio up to 9.5, which could even increase in the future.

References

Ali, M. M. & Moon, K. (2007), Structural Developments in Tall Buildings: Current Trends and Future Prospects, *Architectural Science Rewiew*, *50.3*, 205-223. doi:10.3763/asre.2007.5027.

Armstrong, P. (1995). *Architecture of Tall Buildings*, McGraw-Hill, New York (USA)

Binder, G. (2001), *Tall Buildings of Asia & Australia*, Images Publishing Group pty Ltd., Malgrave, VIC, Australia (AU).

Boake, T. M. (2012), *Understanding Steel Design: an Architectural Design Manual*, by Birkhäuser, Basel (CH).

Bungale, S. T. (2012), *Structural Analysis and Design of Tall Buildings: Steel and Composite Construction*, by CRC Press (Taylor & Francis Group, LLC), Boca Raton (USA), 1-104.

CTBUH (1995), *Structural Systems for Tall Buildings*, by McGraw-Hill, New York (USA).

Lepik, A. (2004), *Skyscrapers*, by Prestel Publishing.

Moon, K. (2012), Optimal Configuration of Structural Systems for Tall Buildings, *20th Analysis and Computation Specialty Conference*, 300-309.

Weels, M. (2005), *Skyscrapers: Structure and Design*, by Laurence King Publishing, Londra (UK).

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Beyond the limits of Building Performance Analysis

Pieter de Wilde[1*]

[1]*Chair of Building Performance Analysis, School of Art, Design and Architecture, University of Plymouth, Plymouth, United Kingdom, pieter.dewilde@plymouth.ac.uk*

Abstract: Across the world, the built environment is facing serious challenges: it needs to provide for growing populations while resources are limited, in terms of finance, materials, energy, water, land, time, and workforce. At the same time there is concern for the environment, the impact of long-term climate change, and resilience towards extreme events that may have a natural, technical or human causes. This situation creates a strong emphasis on the need for building performance analysis and quantification. While the Architecture, Engineering and Construction industry is making progress, deficiencies remain. This presentation reviews the state of the art in this field, pointing out some of the gaps in our knowledge base that need urgent attention.

Keywords: building performance; analysis; ICT support; process management; knowledge gaps

Introduction

There is a wide literature that spells out the many challenges faced by buildings, and, in a wider sense, the built environment. This includes the need to provide healthy and comfortable accomodation for various key uses such as living, working, production, recreation, healthcare provision and others. The resources available to provide such accomodation are limited: there only is a finite amount of land available for construction, while the same goes for time, finance, material, and energy resources to built and operate facilities. There is significant concern for environmental degradation, due to habitat destruction, salination, and global warming. At the same time, buildings need to cope with increasingly harsh conditions, such as extreme weather events caused by climate change, serious technical breakdowns like breakdowns of the utility grid, and even intentional malevolent human actions.

Designing, constructing and operating buildings that can cope with these challenges is a non-trivial task. Buildings are complex 'systems of systems'. They are mostly highly bespoke one-off projects, designed by architects and engineers in response to the specific needs of individual clients. Even in housing, where there is the highest level of communality, production series are small. At the same time, due to the fact that buildings are omnipresent and due to the size of the overall building stock, the built environment has a large scaling factor. This means that problems in single buildings, such as energy use, costs, or health implications for occupants, become significant challenges when viewed at a national level. The large size of the existing stock means that change comes slowly; the number of newly constructed buildings is

low in comparison to buildings already in use, and renovation and refurbishment are key priorities in preparing the built environment for the future.

The complexity and uniqueness of buildings, combined with the scaling factor, means that many R&D efforts focuses on single building performance aspects, such as for instance energy efficiency, greenhouse gas emissions, or indoor air quality. While such efforts are worthwhile and the limitation to single aspects is essential to make progress, it also risks to lead to some degree of 'tunnel vision'. By way of example, efforts to make buildings more energy efficient are now found to lead to unintended consequences for occupant health, or, as evidenced by the Grenfell Tower disaster in the UK, fire risk.

In order to design, create and manage buildings that meet thise these challenges, the Architecture, Engineering and Construction industy needs to be able to quantify how well buildings perform for each performance aspect. While there is a significant body of knowledge on the subject, as evidenced by a large body of literature and a wealth of guidelines and digital tools, there also are areas that need improvement. This presentation reviews the state of the art in building performance analysis, pointing out some of the gaps in the knowledge base that need urgent attention.

Background

This discussion is grounded in n extensive review of literature on building performance analysis that has been conducted in the context of writing a book on the subject of Building Performance Analysis (de Wilde, 2018a). The book gives a deep review on the concept of building performance itself; a spin-off paper presented some key findings at the IBPSA Building Simulation conference (de Wilde, 2017). Recent work has extrapolated some of the issues into the domain of computing (de Wilde, 2018b).

Deficiencies and knowledge gaps

On a high level, there are a number of challenges that need addressing if the world is to move towards buildings that perform well:

(1) There is an issue with building performance terminology. In generally, concepts are not well defined; many authors confuse static building attributes with performance attributes. Tunnel visions persist, with most focussed being placed on energy efficiency, with limited attention for thermal comfort, daylighting and indoor air quality.

(2) Tensions exists between the more creative and analytic actors in the industry. There is an emerging body of literature on "performative architecture" (see for instance Kolarevic and Malkawi (2005) or Hensel (2013) yet this seems disconnected from the many technical contributions in academic journals such as *Automation in Construction, Advanced Engineering Informatics*, *Energy and Buildings* and the *Journal of Building Performance Simulation*.

(3) The parellel evolution and interaction between building design briefs (statements of requirements), building designs (technical solution) and predicted building performance (quantified behaviour under well-defined testing conditions) is not well-understood (Augenbroe, 2011).

(4) Methods for performance quantification are not properly aligned. A key example of this is the 'energy performance gap' between predicted and measured energy efficiency. However, similar gaps exist across a much wider range of performance aspects, and between many other points in the building life cycle.

(5) Automation is often seen as a solution to complex problems. The same goes for the AEC industry, where Building Information Modelling (BIM) is seen by some as the key enabler for building performance. Yet it must be noted that automation only works well where processes are repeatable, and driven by clear process logic. So far identification of recurrent design steps in creating well-performing buildings still need significant work. And while BIM is showing excellent prospects for the management of geometry and static building attributes, the capture and storage of longitudinal dynamic behaviour still faces significant barriers.

This presentation will review these issues, thus pointing out how the AEC sector can move beyond current limits and restrictions.

References

Augenbroe, G., 2011. The role of simulation in performance based building. *In*: Hensen, J. and R. Lamberts, eds. *Building performance simulation for design and operation.* Abingdon: Spon Press

de Wilde, P. (2018a). *Building Performance Analysis*. Hoboken: Wiley Blackwell

de Wilde, P. (2018b). Intelligent computing for building performance analysis. *In:* I. Smith and B. Domer (eds), *Lecture Notes in Computer Science: Advanced Computing Strategies for Engineering*. Cham: Springer, 457- 471

de Wilde, P. (2017). The concept of building performance in building performance simulation – a critical review. *In*: Barnaby and Wetter, eds. *Building Simulation '17, 15th International IBPSA Conference*, San Francisco, USA, August 7-9 2017

Hensel, M., 2013. *Performance-oriented architecture: rethinking architectural design and the built environment.* Chichester: Wiley

Kolarevic, B. and A. Malkawi, eds. 2005. *Performative architecture: beyond instrumentality.* New York: Spon Press

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Wind energy: differentiating perspectives

Başak Demir[1*]

[1]*RUZGEM Center for Wind Energy, Middle East Technical University, Ankara, Turkey, zekabasak@gmail.com*

Abstract: This paper focuses on the relationship between the wind energy production processes and the social dimensions in terms of differentiating perspectives of the involving actors during wind energy transition. Paper will present the findings in the Turkish context, in a case study area İzmir, Turkey that is one of the geographies in which most wind farms are in operation together with high public opposition.

Keywords: wind energy; social dimensions of wind energy; wind energy actors

Introduction

Stock and Campbell (1996) with a biological perspective, consider human society and its creations as a global 'superorganism': "Metaman". The energy consumption issue is one of the critical aspects for the operation of this Metaman, since its activities are gradually growing, and more energy is needed. Therefore, long-term solutions to human energy problems require renewable energy transition.

Renewable energy development is beneficial, inevitable and contributing to sustainable living. However, existing renewable energy development practices lead to public opposition and understanding different perspectives within such practices can diminish this opposition.

This paper focuses on the relationship between the wind energy production processes and the social dimensions in terms of differentiating perspectives of the involving actors during wind energy transition. Paper will present the findings in the Turkish context, in a case study area İzmir, Turkey that is one of the geographies in which most wind farms are in operation together with high public opposition.

Turkey's current energy profile heavily relies on unsustainable foreign resources (fossil fuels) (TEİAŞ, 2013). This points out the potentiality and the necessity of effective and efficient use of local wind energy resources. In this respect, government has set critical goals about obtaining energy from renewable energy sources (Ministry of Development, 2013). This accordingly requires the development of wind energy technologies and practices compatible within varying geographic, social, economic and ecological context because when it is not planned with the community, it becomes a social issue. Whilst there is an established international body of literature on social dimensions of renewable energy developments, there is a lack of studies relating to the Turkish context. Existing international literature places increasing emphasis on the importance and value of public participation in planning processes

and reflects the challenging nature of public relationships with renewable energy projects – particularly onshore wind farms. Localised public opposition to onshore wind farms has frequently been pointed to as an obstacle – or at least a challenge – for the realisation of renewable energy deployment targets (Aitken, 2010; Bell et al, 2005). A number of studies have sought to identify the reasons for this opposition which include (perceived or actual) visual impact (Wolsink, 2007), (perceived or actual) noise impact (Haggett, 2012), place attachment (Devine-Wright, 2010), impact on birds and local wildlife (Aitken et al, 2008), perceived injustice in planning and development processes (Aitken et al, 2016) and inequitable distribution of benefits (Gross, 2007).

Whilst there is an established international body of literature relating to social dimensions of renewable energy developments, studies in Turkish context are inadequate. Given the Turkish Government's commitments to increasing deployment of wind energy combined with increasing localised public opposition to proposed developments, there is a pressing need for social science research to examine and address social dimensions of renewable energy development in the Turkish context and to build on and contribute to the established international literature.

Within this framework the study focuses on the crises occurring at the two different levels: "macro and micro level" regarding macro level as the top-down wind energy development decisions and their consequences as the micro level. By focusing on this relationship study will present the 'wind energy development' within the planning process in the Turkish context and analyze the differentiating perspectives in this process.

Methods

The research methodology conducted in this study includes a combination of research strategies such as explanatory research approach, mixed methodology and case study. The research is designed with an exploratory approach, since little is known about the social aspects of wind energy developments in Turkey. Mixed-methodology will be used including quantitative and qualitative data gathering and analysis methods and techniques. Study is conducted in a case study area: İzmir, Turkey. which is located in the western region of Turkey. With its highest wind energy potential, Izmir houses 20% of the operating and 23% of the under construction wind farms in Turkey.

In order to find out the position of wind energy development within the planning process in-depth face-to-face and telephone interviews are conducted with national and local decision-makers, investors, consultancy firms, NGOs, local civil initiatives.

Table 1. List of actors to be interviewed

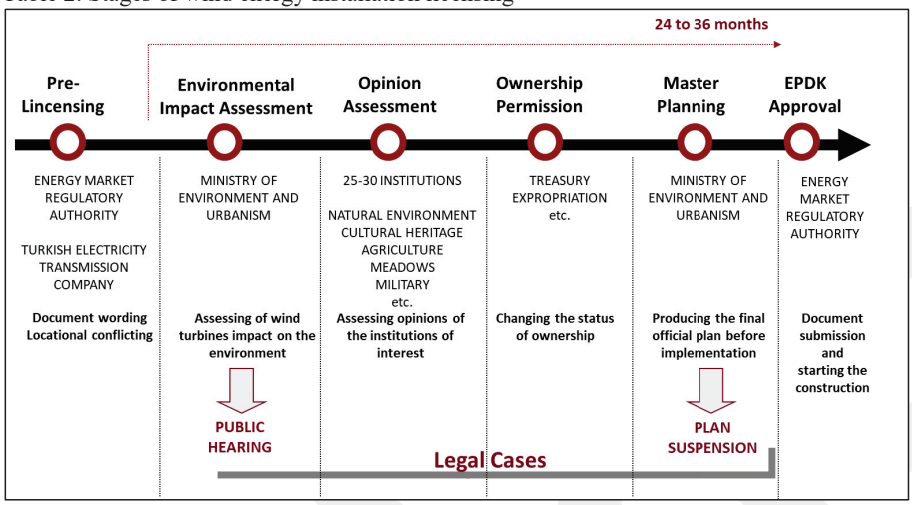
National decision-makers	Local decision-makers	Private sector	NGOs
Ministry of Environment and Urbanism • Doğa Koruma ve Milli Parklar Genel Müdürlüğü • Bölge İmar Müdürlükleri	İzmir Metropolitan Municipality • Sağlıklı Kentler ve Temiz Enerji Şube Müdürlüğü • İmar Planlama Daire Başkanlığı	Investor firms • Borusan ENBW • EnerjiSA	National level • TÜREB (Turkish Wind Energy Association)
		Consultancy firms • Reconsult	Local level • Gönüllü Çevre Avukatları • Rüzgar Yaşamdan Yana Essin Platformu

Research Findings and preliminary results

The study revealed results about the wind energy installations' licensing process including stages of the wind energy development in the planning process, related actors and their positions, public participation and objection/opposition opportunities as well as differentiating perspectives of the involving actors.

Research findings illustrates that wind energy installation licensing is a very complex, bureaucratic, multi-actor process that lasts from 24 to 36 months and is a stressful process, especially for the private sector and local people. This process is composed of 6 main stages: 1) Pre-Licensing; 2) Environmental Impact Assessment; 3) Institutional Opinion Assessment; 4) Ownership Permission; 5) Master Planning; 6) Energy Market Regulatory Authority Approval (Table 2).

Table 2. Stages of wind energy installation licensing



Along with the analysis of wind energy development in the planning process study identified 4 key actor groups having major roles in managing the social sensitivities about wind energy development. These are Energy Market Regulatory Authority (EPDK), Ministry of Environment and Urbanism, Investors and Civil Initiatives. The study reveals that the perception and claims of these different actor groups play an important role in managing the social sensitivity about wind energy development.

In this respect, while EPDK has an economic-oriented approach and takes a position where social sensitivity related reactions are left to be solved by the investors, Ministry of Environment and Urbanism claims that the ministry is following the legal rules and yet, on one hand they are open to social sensitivity reactions, however on the other hand they are in a position that they cannot do anything more because their mission is to implement the rules. Parallel to this, wind farm investors claim that they are putting emphasis on not having an impact on society; but in practice, while sometimes they are having a harmonious and sensitive approach, some other times their financial interests come forward. On the contrary, civil initiatives claim that their lives are under threat and posit themselves against the wind energy development. Besides, there are also civil initiatives and volunteers who want to produce constructive and common mind.

The social sensitivity perception and evaluation of the fifth actor group: local people within the context of İzmir and Turkey will be investigated in another study.

Conclusion

Study identified that the wind energy transition is a long and complex as well as a political process including serious economic dimensions with conflicting interests. The fact that actors with differentiating perspectives are trying to execute processes independently of each other in this complex and long process prevents the production of context specific decisions and strategies; instead the process is shaped by the actions of certain actors groups that are politically and economically powerful. In addition to this, lacking in public participation opportunities during the wind energy transition planning process calls for legal arrangements that take local context into consideration.

Acknowledgments: This work is supported by the RUZGEM Middle East Technical University Center for Wind Energy.

References

Aitken M., Haggett, C., Rudolf, D., (2016), Practices and rationales of community engagement with wind farms: awareness raising, consultation, empowerment, *Planning Theory & Practice*, 17(4), 557-576.

Aitken, M. (2010). Why we still don't understand the social aspects of wind power: A critique of key assumptions within the literature *Energy Policy*, 38(4): 1834-1841

Aitken, M., McDonald, S., Strachan, P. (2008). Locating power in wind power planning controversies: The (not so) influential role of local objectors. *Journal of Environmental Planning and Management*, 51(6): 777–799.

Bell D., Gray, T., Haggett, C. (2005). The 'Social Gap' in Wind Farm Siting Decisions: Explanations and Policy Responses. *Environmental Politics*, 14(4), 460-477 (2005).

Devine-Wright, P., Howes,Y.(2010). Disruption to place attachment and the protection of restorative environments: a wind energy case study. *Journal of Environmental Psychology on Place, Identity and Environmental Behaviour*. 30 (3):271–280.

Gross, C.(2007). Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance. *Energy policy*, 35(5): 2727-2736.

Haggett, C. (2012). The Social Experience of Noise from Wind Farms,in *Learning from wind power*, Joseph Szarka, Richard Cowell, Geraint Ellis, Peter A. Strachan, Charles Warren (eds), Palgrave Macmillan, London.

Ministry of Development, (2013).*10th Development Plan 2014-2018*. Ankara.

Stock G. B., Campbell J.H., (1996). Human society as an emerging global superorganism: A biological perspective in *Evolution, order and complexity*. Ellias L. Khalil and Kenneth E. Boulding (eds.). Routledge, London and NewYork.

TEİAŞ. (2013). Turkish Electricity Transmission Corporation (TEİAŞ), *Annual Report 2013*.

Wolsink, M.(2007). Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation. *Energy policy*, 35(5): 2692-2704.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Adaptive Re-Use, Sustainability and the Modern Movement

Huriye Armağan Doğan [1]

[1] *Institute of Architecture and Construction, Kaunas University of Technology, Kaunas, Lithuania, huriye.dogan@ktu.lt*

Abstract: The Modern Movement and its heritage are a moot case in the architectural sphere by its peculiarity of appraisal as cultural heritage. While the Modern Movement artefacts are evaluated as cultural heritage by the experts, the perception of non-experts differs. Therefore, its architectural merit is not appreciated by the society in a way it deserves. However, the Modern Movement heritage has the potential which can be beneficial for the adaptive re-use by its flexibility in its plans and the materials it uses, and furthermore for the sustainable development in the cities which contain this style. Furthermore, it can be instructive for understanding the perception of people while they are evaluating cultural heritage. Therefore, this paper attempts to establish a different approach for the adaptive re-use of the cultural heritage by analysing the social aspect of the process through the Modern Movement.

Keywords: adaptive re-use; sustainability; the Modern Movement

Introduction

The original function of a building can become obsolete because of various reasons, such as: changes in economic and industrial practices, demographic shifts (the original users might leave the premises for different reasons), increases in maintenance costs, moreover, because it is no longer suited for the original function, and a new use has not been identified. When this situation occurs, the building might need to re-functioned – the adaptive re-use. According to the paper of Yongtanit Pimonsathean which has been presented at Commemoration of the 5th Old Phuket Town Festival, adaptive re-use helps to extend the life of a historical building by adapting their functions in response to contemporary needs (2002). Hence, if the original function of the building is not convenient anymore, it is inevitable to provide a new function to the existing building, therefore, it can continue its life. However, as Rodrigo Perez de Arce (2015) states, the interventions towards buildings and changing their functions is not a new phenomenon, although, previously it was done more pragmatically in many cases without heritage preservation as an intention (p. 238). Therefore, the reason for the adoption of adaptive re-use in earlier periods was more about giving a new function to an existing building and considering the economic benefit of it. However, in contemporary perspective, adaptive re-use is an important strategy which is applied to the well-being of the cultural heritage and also the sustainability of the environment.

When the Modern Movement evolved to a greater extent of the continuum of the architecture and the environment in the 20th century, the impact of the buildings on the

environment and the genius loci ceased. Depreciation which is arising from the obsolescence of the materials and functions of these buildings blended with the lack of appreciation on the appraisal of them as cultural heritage by the society. One of the principles associated with the 20th century's architecture is the primary statement of Louis Sullivan (1896) "*form follows function*". In this statement, Sullivan emphasised that the shape of a building or an object should be the result of its intended function or purpose (p.408). According to his statement, when a building loses its function, it should not be possible for the form of the building to keep its meaning. However, one of the essential indicators which keep the meaning of a building for society is people's perception.

In order to understand the problems and establish a different approach for the adaptive re-use of the cultural heritage, this research attempts to develop a conceptual framework for adaptive re-use strategies by analysing the aspect of invisible social context which is the perception of people.

Methods

A selected review of the literature was conducted to study the contributions of other researchers from different disciplines for preceding information. Afterwards, the infrastructure of this research is established in three steps.

(1) The first step is the analysis, which is performed on the language of the Modern Movement to identify the problems in the perception of cultural heritage.

(2) The second step is the survey which is implemented on participants about their perception of the immovable cultural heritage of the Modern Movement for determining the indicators which have an impact on their appraisal.

(3) The third step is the establishment of an approach which is adopting the perception of the society towards cultural heritage for implementing on the strategies of adaptive re-use.

Findings and Discussion

As Kevin Lynch (1960) states, "*Every citizen has had long associations with some part of his city, and his image is soaked in memories and meanings*." (p.1) Therefore, people need to attach memories and meaning for perceiving the city. This also holds for the perception of cultural heritage, since it is not conceivable to isolate a building from the environment and its

surroundings, and furthermore from the image which has been established by the memories of the society, which has an impact on sustainability.

However, the most problematic component of the adaptive re-use of the Modern Movement buildings is the fact that they lack the perceived inherent value and memory value for the society and furthermore, conventionally recognised adaptive re-use strategies might not always work in the Modern Movement buildings. Therefore, adaptive re-use of the structures from this era is confusing for the academics and practicians. As a result, researching or applying strategies to these artefacts need new tools and methods, and furthermore, different identification and selection criteria. In that regard, identifying the invisible social context and measuring it gets essential. Therefore, the perception of people in regard to the appraisal of cultural heritage should be measured by analysing the indicators which have an impact on their decisions.

The potential indicators which have been adopted in this research were decided by the questionnaire which has been implemented to a total of 70 participants who took part in the survey through one to one interview either by interactive online communication tools or face to face by former research. (Doğan, 2018). According to the defined indicators, different buildings have been analysed to detect and test the impact of these indicators on the appraisal of cultural heritage by running the second survey.

Conclusion

Adaptive re-use is an essential strategy for the sustainability of cultural heritage, and furthermore for preserving the image of the city. However, it can become a problematic issue when there is a paucity of the participation and the appreciation of the society. In that regard, the Modern Movement is an intriguing case in the architectural sphere, because while it has been evaluated as cultural heritage by the experts, the perception of non-experts differs. Hereof, examining it can shed light on understanding how people are evaluating cultural heritage, and furthermore, determine the indicators which are perceived to influence the appraisal of cultural heritage can be adopted in adaptive re-use strategies. When people perceive the building as worth-preserving, it is more likely that they would be involved in the process, and furthermore, the buildings would attract people, and that would provide status, sustainability, and the image for the city. Therefore, while making the decisions in the process of adaptive re-use, it is important not to disregard the requirements of the society.

References

Doğan, H. A. (2018). Impact of memento Value on The Perception of Cultural Heritage: Case Study of The Modern Movement and Dialect of Kaunas, *Science-Future of Lithuania*, 10, Lithuania, doi: 10.3846/mla.2018.1064

Lynch, K. (1960). Image of the city, Massachusetts: the MIT Press

Pérez de Arce, R. (1978). Urban Transformations & The Architecture of Additions, *Journal of Architectural Design,* 4, 237-266

Pimonsathean, Y. (2002). Current Issues Concerning Adaptive Re-use in the Conservation of Urban Cultural Heritage, Old Phuket: Our Heritage, The Development & Conservation of Old Commercial Quarter in Phuket Town, *Paper presented at Commemoration of the 5th Old Phuket Town Festival*, Phuket, Thailand.

Sullivan,L. (1896). The Tall Office Building Artistically Considered, Lippincott's Magazine, 403-409

GCRIS

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Authenticity and Sustainability

Rui Duarte[1]

[1]*CIAUD, Lisbon School of Architecture, Lisbon, Portugal, rbdapp@gmail.com*

Abstract: Equate the authenticity, the cultural identity and social economic and environmental sustainability is to reflect on the values and actions that must be developed to strengthen the identity of the regions. They are inseparable components with an impact on the organization of the territory and architecture that affect everyday life and the means and modes of production. To avoid the destruction of secular structures of territorial organization, it is necessary to have a critical awareness of the heritage, to question the cultural values and the symbolic contents that define the ways of being of the populations. Action strategies have been creating tourism networks, rebuilding constructions. We only see effects of a formal contaminated recovery process. Intervention methodologies have to create dynamics that make regions attractive to live, providing quality of life and meaning to the collective future. As case study on vernacular architecture we present *Outeiro da Vinha*, Portugal.

Keywords: authenticity; heritage; vernacular architecture; architectural rehabilitation; sustainability

Introduction

The organization of the territory corresponds to traditional structures that are manifested in the change of the soil sedimented over time. However, the profound changes introduced in the economic system require adequate policies and action, a structure of regional polarities and the dynamization of kernel to attract new inhabitants. The creation of infrastructures (road network, water, sewage, electricity) and effective security systems, especially related to the forest, articulate the traditional occupation and the current affectation of the soil. In emergency cases, systems of access to water must be guaranteed with effectiveness and quantity. The use of cisterns and wells, water towels, dams, rivers and streams are complementary factors to be included in a territorial matrix.

The fires are the great spectrum that hangs in the air as a deterrent factor to inhabit, with no alternatives available. Although the great civilizations of antiquity have already taken care of the basic needs of the population, of the organization of the territory, the effectiveness of the solutions created still works today. The approximately 40,000 Qanat in Iran, - underground tunnels to irrigate desertified areas - were considered, in 2017, World Heritage Site by UNESCO.

However, in Portugal there is still a lack of solutions and the casuistry manages the process that involves the use of airplanes and helicopters to combat flames, complementing the actions of firefighters, although there are organizational structures in network that allow access to all kinds of information. Economic development funds have action programs, create

incentives that must respond to cultural values and make regions attractive to work at. They should not only focus on tourism, in the epidermal sense of the question.

Quality of life and safetiness, the access to goods and services, to health and education, the possibility of working and inhabit, are determinants that have to be guaranteed as they reflect an option for where to live, encourage or nullify the creation of social life. There is still a lot of work to be done, there is a lack of basic safety points, of mapping, of knowledge regarding the property structure and affectation of the soil. The territory organization requires data that can be worked with, to cross information on the evolution of soil affectation over time to identify protected areas, forests (what type of forest), agricultural areas, non-aedificandi zones, urban and intended industry areas. This aspect crosses both the inefficacy of response actions to the fires with the regions' decharacterization and the abandonment of places due to lack of incentives.

Methods

In modern societies, employability constitutes a dependency system of the worker that today suffers the contingencies vicissitudes of the economical crises with frequent bankruptcies and consequent unemployment. As a counterpoint, the constitution of small production cells can create economic sustainability for families or for small communities. They combine rural practice with a performance of sophisticated types of specialized work for which it is difficult to find new skills, types of remote work made possible by the internet, the computer, e-learning and teleconferences.

The existing deterritorialization in this domain can take advantage of time zones and create global connections. Thus, continuous training actions continue to be one of the power factors nowadays, along with the credit card and the TV, according to Deleuze. There are two structures: one creates responsibility and training commitment; the other offers only subsidized facilitation.

Continuing training in terms of regional employability, meets the needs of the qualification and diffusion of regional products. There are niche markets in the global structure that value the quality of what is different. This is what differentiates agricultural products from regional production, which are a counterpoint to massification as it is the wines' case. However, the cultural question that arises is the mediatization of life, by the effects of the easiness considered as a value that offers itself as an illusion.

Findings and Discussion

There are several types of dynamics that have been sedimentary over time, such as schist villages. They correspond to an action program in network that sets up a homogeneous region with 27 villages distributed in 16 municipalities in central Portugal. All of them have constructive features that involve schist. Mostly ruins, they are nowadays award-winning tourist destinations. The European application actions were a way to raise development funds that allowed the recovery of homes that are generally intended for rural tourism.

Despite their landscape qualities, various kinds of events, organization of group visits and cultural dynamics of rural culture are not enough to create a social dynamic that encourages the permanent habitability of these areas. Schist, rivers, reservoirs, streams, cliffs and valleys, constitute diverse and harmonious sets that allow walking, cycling or swimming. However, they are seasonal actions that do not have as counterpoint an attractive social aspect that fixes people. In addition, they are included in production systems linked directly or indirectly to tourism.

Although it is a level of intervention that takes advantage of the exceptional landscape features that provide identity to the region, the organization of the territory must take into account the broad set of environmental, social and economic characteristics.

Housing is a determinant when talking of people's attachment to a place. When it corresponds to a symbolic value of tradition, it activates memories that are even stronger when they root cultural values with customs and beliefs, with the secular imaginary that is transversal to time and helps to build the place.

In the book "Inquiry to the Vernacular Architecture in Portugal" started in 1955, despite being a reference of vernacular architecture, it was detected a reductive presentation that omits the schist architecture in the center zone, except for two photographs that focus on the space adjacent to the project place.

The house referenced as case study is located in Outeiro da Vinha, Serra da Estrela, Portugal a small housing nucleus that has been getting depopulated and deeply uncharacterized.

The expansion of a schist rural house that did not have the minimum conditions of habitability according to current standards, affirms the patrimonial value of the rural housing that was referenced as a sign of poverty. The owner of the house, who had already immigrated to Lisbon, requested the intervention of the architects Rui Barreiros Duarte and Ana Paula Pinheiro and distanced herself from the local mentality. She pretended to optimize the housing

program that had small areas that were very conditioned, intending to spend little money on the construction (Figure 1).

Figure 1. Outeiro da Vinha, Portugal. In colour: architectural intervention (Rui Barreiros Duarte, 2008).

Figure 2. Expansion of the house: local materials, local techniques and technological innovation (Rui Barreiros Duarte, 2008).

The use of cheaper local materials, allows the house of schist and wood to require practically no maintenance (Figure 2). It is a sign of recovery of cultural identity in an area where acculturation decontextualizes interventions with signs of equivocal status. The

intervention reacts against the adulterations that have been done and against a misleading opening of concepts on what is today the vernacular architecture.

In addition, actions of this kind for sustainability and authenticity add value. It is a matter of architecture to know how to take advantage of tradition, to update the constructive systems and to create solutions of balanced performance in face of the new challenges.

Conclusion

The territory intervention must equate the society change and create sustainable and attractive alternatives to dynamize and fix populations in the abandoned regions of the interior.

The cultural and economic matters, coupled with the expectations of quality of the current society, must create conditions so that there is no exclusion of opportunities by reversing the current desertification process of the interior.

The quality of the images must not be epidermal, but should correspond to a real fixation of the populations. This social aspect is articulated with the architectonic thought that specifies, recovers and enlarges the community network and architectural interventions that were omitted from the Inquiry, as opposition to the destruction of the regions' characteristics, the acculturation of personal taste and critical relativization.

It emphasizes the patrimonial place, the tectonics, the constructions' sustainability and quality, definitively distanced from the deficient conditions of livability that generated the symbolic repudiation by the past of poverty. It is necessary to reestablish the pride and values that people formerly had for their village, an identity that was ideologically deactivated. Today we find a revision of concepts, but there is a lack of theory essential to refound the cultural sense community and architecture in its time and place.

References

A.A.V.V (1980). *Arquitetura Popular em Portugal*, Edição da Associação dos Arquitectos Portugueses, Lisbon, 2nd Edition, p.236.

Duarte, R., Pinheiro, A.P. (2009). *The Power of Idea*, Insidecity, Lisbon, 1st edition, pp.100-109.

Teixeira, M. (2016). *Popular Architecture*, Archinews 06, Year X, Special Edition.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture,

Planning, and Design, 17-19 October 2018, Ankara, Turkey

An Ecotourism-oriented Proposal in the Context of Sustainability: The Case of Rize Küşüve Village

Derya Elmalı Şen[1*], Evşen Yetim[2], Elif Öztürk[3]

[1]Department of Architecture, Karadeniz Technical University, Trabzon, Turkey, d_elmali@ktu.edu.tr*
[2]Department of Architecture, Recep Tayyip Erdoğan University, Rize, Turkey, evsen_yetim101@hotmail.com
[3]Department of Architecture, Karadeniz Technical University, Trabzon, Turkey, elifozturk@ktu.edu.tr

Abstract: Protecting the ecosystem, biodiversity and natural habitat means reducing parameters that cause climate change. Human is the most effective factor in the protection and decay of nature. When human cares, protects, and respects nature, nature produces positive value to him. Ecotourism should be an attitude that protects the sustainability of the natural resources of the earth, supports the economic development of the local people and protects their social and cultural integrity. In this context, it is important to be able to respond correctly to the increasing tourism potential in the region and to make improvements to organic ecotourism in order to keep the settlement alive and raise awareness of the people of the region. The purpose of this study is to sustain the functions of Küşüve village in the context of ecotourism in short-term, and to prevent the destruction of nature and climate change in the long-term.

Keywords: sustainability; ecotourism; rural architecture; preserve the nature.

Introduction

In recent years, both in the world and in Turkey, tourism trends have shown that the expectations of the people who participate in the tourism movements are changing. The way of life brought by modernization and industrialization, cumulative environmental pollution, rapidly developing technology, loud and tired cities and unplanned urbanization bring people closer to nature by removing them from crowded and customized tourism centres. Thus, ecotourism, which is an alternative tourism type, attracts more and more attention. In addition, differences in consumers' demands for products and services; rise in the level of education and culture of individuals; and changes in social and demographic structure are influential in ecotourism, too. The development of ecotourism depends on the presence of people who understand the natural and cultural environment, protect the integrity of the ecosystem and contribute to the conservation of natural resources that are also beneficial to the local population. Moreover, ecotourism has created economic opportunities for local people and has led to the popularity of organic ecotourism, a part of meaningful travel to natural areas.

Ecotourism, unlike irreversible destructive mass tourism, is advancing in the direction of sustainable principles and its application areas in the world are expanding. All the beauties that nature offers to human beings provide a renewal and refreshment for him. Forest explorations, nature walks, places where nature and history together can experience the vivid examples of traditional life are therapeutic for people. Eastern Black Sea Region is one of the regions where the potential of nature tourism is the highest. This region draws attention with its ecological diversity, flora, climate and climate-friendly rural architecture. The province of Rize in the region is very rich in terms of natural assets. Villages with socio-cultural heritage characteristics are located in Çamlıhemşin and Hemşin regions. Fırtına Valley; Ortan, Küşüve (Yolkıyı), Çamlıtepe (Zuga) villages; Pokut, Elevit, Gito, Sal, Huser, Samistal plateaus are house of special examples with both natural and rural architecture.

The Aim and the Method

The aim of this study is to revive and reuse the Küşüve Village, which is used only during the summer months in Çamlıhemşin, with the idea of organic ecotourism. In this way, it is aimed to reveal a feasible and rational idea project that can be realized organic ecotourism activities in Küşüve village in particular and in the whole of Eastern Black Sea Region in general. In short, with the developed proposal, it is aimed to revive Küşüve Village with ecotourism activities, to bring local people in a sensitive and conscious tourism understanding and to protect the natural and traditional areas by this means. For these purposes, concepts of ecotourism and organic ecotourism are emphasized as an idea to protect the natural and cultural areas of rural and the applications of organic ecotourism are briefly mentioned. Subsequently, an idea project has been presented in the context of organic ecotourism by evaluating natural, cultural and structural resources with on-site observation and determination studies in Küşüve Village, which is selected as the study area.

Field of Study: Küşüve Village / Rize

Today, there are about 63 houses in the village of Küsüve. The village is divided into three neighborhoods: upper, middle and lower. The proposal developed within the scope of the study focuses the Upper Neighborhood, which has 19 places. The population of the Upper Neighborhood varies according to the seasons and the population can sometimes be 100, sometimes 20, sometimes even 3. The settlement in the Upper Neighborhood was built on a single main axis. The mansions are usually three floors.

Figure 1: Küşüve Village

Figure 2: Küşüve Village-Upper Neighbourhood

Figure 3: Küşüve Village – main road

A Proposal for Küşüve Village in the Context of Organic Ecotourism

The basic aims of the study are to sustain the natural and cultural assets in short term, and to overcome the climate changes in the long term. For this reason, it is important to evaluate the area with minimum intervention, to protect and transform existing structures. First, the possibilities of existing building facilities have been evaluated and then suitable functions have been proposed by considering the organic ecotourism activities that can be applied to the area. There are 19 buildings in the study area for the Upper Neighbourhood of the Küşüve Village. One of these buildings is used as a tea collection place and the other is out of use due to it is ruined. In the proposal, it was aimed to make all buildings healthy. Renovation of the buildings with maintenance and repair works in accordance with the proposed functions is important for the region to be a sample sustainable organic tourism village.

Within the natural and cultural possibilities of the study area, which activities can be carried out and the buildings can be equipped with which functions are proposed as followings (Table 1 and Figure 4).

Table 1. Activities that can be carried out in Küşüve village

dening ganic iculture Farming) rism	Gardening tourism is mostly done in tea gardens. It is a good activity for those who are interested in tea gardens, who want to experience picking up and to le how to steep and serve tea. In addition, organic farming and fruit production ta place among the essentials of farming and the village life. An important experie for the guests to collect these products by themselves that is to bring them fro the garden to the table. In addition, animal husbandry is very important along horticulture. Guests in these organic ecotourism farms may experience milk fro the cow's milk, eggs from the poultry. Horticulture and livestock are the forefro not only for adults but also for children to experience natural life.
al Dishes rism	Rize has an extensive menu in terms of local flavours. Traditional meals are se in all pansions, guesthouses, mini-hotels and restaurants in Ortan and Senyuv villages where the ecotourism becomes popular. Some of the local flavours are creamy potatoes, meat and rice wrapped in cabbage leaves, muhlama, hamsik hamsi çığırtası, korkota soup, çumur, pepeçura, pumkin rice pudding, kocakarı gerdanı, tomarı tavalısı, hoşmer, braised pickle, laz pastry, ekşaşi. These meals are made with ingredients such as cabbage, corn, isabel grape, winter squash, potatoe, forest weeds, which are grown in the organic gardens of the pansion owners. It is the place where the guests get a complete renewal and awareness witnessing the making of these dishes, and sometimes-collecting parsley in the garden for a salad. A fully organic breakfast, lunch or dinner offers a nice experience for guests.
ng and erfalls	Küsüve village situates at a point overlooking the landscape. There is a sloping land in front of the southern façades of the mansions. There are no roughness front of the mansions blinding their vistas due to they sit on a sloping ground. Therefore, the mansions are home to a wonderful view. The forest road in the village is parallel to the slope of the ground, so it is suitable for nature walk. O the forest road, there are surprise spots and ponds where the water from the mountains flows out as a waterfall.
s	On the forest road, the villagers to take advantage of the waterpower of the sn waterfalls on the rivers built mills. These mills are located in almost every villa because people used to grind corn through these mills to obtain flour. Therefor is among the activities that ecotourists want to experience to see the mills still preserved today, adapted to current life and revived. The mills play an educati role not only for adults but also for children. Mills; is an example of evaluating physical data of nature and bringing it together with the mechanism and transforming it into a useful field for human beings.
orical itage and al dicrafts rism	The historical texture of the village of Küsüve is the best example of traditional rural architecture. This village exhibits a historical period by the examples of w stone, niche-filling techniques and metalworks. Besides, local handicrafts and weaving attract the attention of every tourist.

The location plan in Figure 4 shows the current building density of the Küşüve village. Organic ecotourism activities are planned on this site plan of the village similar to the function scheme of an organic farmhouse.

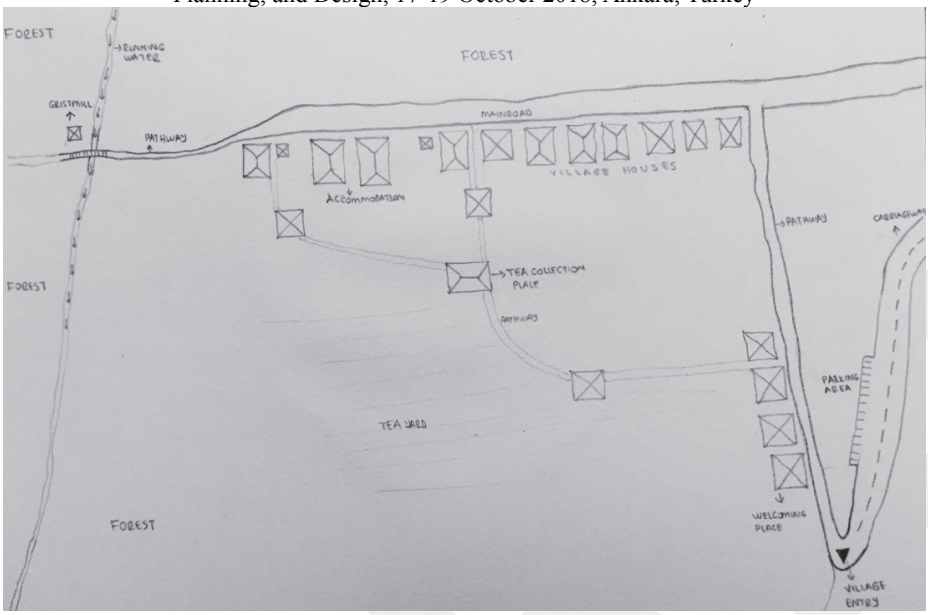


Figure 4: Küşüve Village Upper Neighborhood- Proposed Functions

The mansions, which are adapted to the current time with the preservation of historical texture, are equipped with organic ecotourism functions. These functions mean that each site is loaded with the suitable action. The conceptual proposal, designed as a role model, is planned as followings:

• In the planning of organic ecotourism, which is shaped around the concept of "collective work (imece)"; it is aimed that all the people of the village should be in unity and togetherness.
• A board or commission responsible for the conduct and supervision of the activities related to organic ecotourism in Küşüve Village should be established.
• This commission should be arranged in such a way that the distribution of incoming tourist masses to the mansions would not be unfair in the financial gain of the village people.
• Each mansion will be operated by its owner and the owners would continue to live in their own homes, just as other hostels in this area do. Thus, the guests will feel themselves in a warm family environment and will experience the traditional village house living.
• The gardens that the villagers will work with the help of "collective work" style would be common use.

• The tea collection area would continue to be used jointly, as it is today, and it would be easier for guests to experience all stages of tea.

• All of the mansions will be run as part of an operator with different functions. So the village; it will be protected by all and individual interests will not be considered.

• Four mansions at the entrance of the village; will provide pre-reception, eating and drinking and recreation areas that will enable tourists to recognize the village and the region.

• Other accommodation located on a single axis will carry out housing and accommodation services.

• Traditional regional meals, Rize fabric, wool sock workshops, traditional accessory workshops, lecture benches, honey and tea tasting - sales offices will be found on these axles.

•

•

• (*All of the proposal is not given due to the limits of extended abstract*)

Conclusion

Organic ecotourism and reuse activities, which are wanted to be realized within Küşüve Village, are supported with strong parameters with these principles. These tourism activities clearly show that; the Küşüve Village and the Fırtına Valley have a high potential for revitalization of the village as well as ecotourism. Recalling the people of the village and presenting them with their own business opportunities means protecting both the historical heritage and the nature. In short, conservation of nature is one of the most important things that can be done to prevent climate change.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Effects of Architectural and Behavioural Factors on Indoor Air Quality in Residential Apartments

Ehab Ali Eshtiwi, Papatya Nur Dokmeci Yorukoglu[1*]

[1]*Department of Interior Architecture, Çankaya University, Ankara, Turkey, papatya@cankaya.edu.tr*

Abstract: This study aims to investigate the impact of interior design criteria and occupants' lifestyle on the indoor air quality, and the preference and satisfaction from IAQ, within residential units in Çankaya, Ankara, Turkey. Objective measurements (total VOC, CO and CO2) are recorded in the living room space through visits to the houses of 20 people using specialized measuring devices. In addition, cross-ventilation and finishing materials are also observed and noted for further discussion. Information of the user's lifestyle and daily activities (cooking, cleaning and smoking) are collected through questionnaires. The results show that cross-ventilation is correlated with less total VOC readings, as well as less sickness frequency and allergies within the members of the household. Moreover, using open windows as a ventilation method in the kitchen and using non-chemical cleaning agents are found to be correlated to less pollutants' concentration in the indoor environment.

Keywords: Indoor air quality (IAQ); occupant questionnaire; cross-ventilation; interior pollutants; household lifestyle

Introduction

As people spend most of their time inside their houses, the air quality in these environments play a major role in determining their short-term and long-term health and disease occurrence. Therefore, the indoor air quality (IAQ) is an important parameter to monitor in order to ensure a healthy indoor environment for the occupants of a residential environment (Pickett and Bell, 2011). Most of the pollutants in a house environment occur as a result of user's lifestyle and daily activities. For instance, using cleaning materials with high chemical concentration, heavy cooking, and smoking can change the daily concentrations of the pollutants in the air, especially if ventilation mechanisms are not installed within the concerned spaces (CDC, 2016). While the indoor air quality (IAQ) is always studied from the perspective of the design of the buildings, the occupants in the space has a contribution to the subject as well. In this study, the indoor air quality is investigated in houses located in Ankara, which is performed through studying the architectural plan layouts, finishing materials and ventilation mechanisms as well as, user's lifestyles and daily activities.

Methods

Gathering the data for this research is performed through field visits to 20 houses of the Arab residents living in Ankara. Firstly, cross ventilation, finishing materials in the house and approximate window to floor area ratio is noted. Secondly, VOC measurement (by RAE3775 device), CO and CO2 measurements (by ToxiRAE Pro PGM-1800 device) are done in the living rooms in each case space. Thirdly, one of the occupants has filled out the specifically designed survey in order to assess the household lifestyle and perceived indoor air quality. After gathering all the data, SPSS is used to perform the required analysis. Finally, based on the results of the survey, the correlations between the different factors are studied and the results are discussed by providing recommendations and conclusions.

Findings and Discussion

All the surveyed households have varied types of natural ventilation; however, only 35.0% have a proper cross-ventilation, while 45.0% and 20.0% have two-sided and one-sided ventilation, respectively. In regard to the finishing material used in the living room, all households' living rooms had wood laminates as finishing material, while all walls were painted. All households' ceiling finishes are also paint, except for one household which had a wooden ceiling panel. Furthermore, 75% of the window frames were aluminium, while the rest were wooden. On the contrary, 90% of the households' door frames were wooden, while the rest were aluminium. The mean area of the living rooms is 27.6 m2, with a minimum of 18.50 m2 and a maximum of 41.80 m2. The mean area of the windows is 1.64 m2, with a minimum of 0.68 m2 and a maximum of 2.84 m2.

In regard to the pollutant measurements in the case study households, 40% have shown no total VOC readings, while 70% have shown no CO readings. However, all households have shown different level of readings for CO2. The mean total VOC reading is 0.145 ppm, and 0.7 ppm and 965 ppm for CO and CO2, respectively. The houses that have high levels of total VOC and CO levels are noted to be performing cleaning activities including floor cleaning, and clothes' washing using a washing machine. The researcher observed that these activities have contributed into the readings, while further evidence is needed. The mean readings of the CO and CO2 are below the limits of 9 ppm and 970 ppm,

which are set by ASHRAE and NAAQS standards. The Total VOC mean of 0.145 ppm (145 ppb) is close to the maximum limit of 120 ppb, which indicate acceptable indoor air quality along with the results of CO and CO2 (Safetech, 2014).

Using Spearman's rho correlation, the analysis of the results shows a weak correlation between cross-ventilation and the objective pollutant measurements of the households. Results show that the higher the degree of cross ventilation adopted in the design of the house, the less total VOC within the indoor environment. However, positive correlations with the readings of the CO and CO2 with the increase of cross ventilation are mainly attributed to the impact of the road traffic emissions that enter the house more through the higher airflow from outside to inside of the house.

The finishing material used in the Arab residents in Ankara did not show apparent variances. Therefore, there were no correlations between the finishing material and the objective measurements of the pollutants. However, a moderate correlation of 0.353 ($p<0.05$) is found between performing maintenance activities within the past six months and the total VOC readings, which confirms the findings of Mantanis et al. (2007), which showed that recent maintenance and casework activities increase the total VOC level within the indoor environment. Futhermore, weak to moderate correlations were found between the effectiveness of cross-ventilation and the sickness frequency, chronic diseases and allegries in the household. High moderate correlations were found between cross-ventilation, and a better IAQ perception and high IAQ satisfaction.

Objective pollutants' measurements and the lifestyle habits of the occupants collected through the questionnaire answers are also analysed. Spearman rho relationship test was performed for four indicators; cooking and kitchen ventilation, cleaning frequency and cleaning material, and smoking in the indoor environment. For the cooking frequency, households who cook more often showed a moderate correlation with total VOC, CO and CO2 readings. The strongest correlation is found with the CO2 readings ($p<0.01$), which could be a result to inadequate ventilation methods in the kitchen, as recommended by WHO (2014). Moreover, the type of ventilation used in the kitchen has shown a weak to moderate correlation with the pollutants' measurements; however, the correlation factors show a positive factor indicating that open windows are more efficient in ventilation than cooker

hoods. This indicates that using the cooker hood is not necessarly the best method to ventilate the interior environment from the combustion gases including CO and CO2.

Furthermore, the cleaning habits, especially the materials used, have important effects in increasing the VOC content of the indoor environment. Therefore, spearman rho correlation test is conducted between the pollutant measurements and the cleaning habits' indicators included in the questionnaire. The cleaning frequency did not yield any significant correlations, while the type of material used for cleaning showed a weak correlation ($p<0.05$) with total VOC and CO2 readings. The positive correlation indicates that using chemical agents in cleaning increases the total VOC in the indoor environment, as reviewed before by Buekens and Schroyens (2003).

Conclusion

Sustaining a healthy indoor air quality is essential for users' comfort and safety. Several factors could affect the indoor air quality; however, pollutants such as fine particles, VOCs, CO and CO2, are considered within the most significant factors that lead to reducing it. In this research, the study aimed to analyse the relationship of certain habits of the occupants on the indoor air quality, along with architectural design factors, such as; cross-ventilation and finishing materials. The conclusions of this study includes;

- Cleaning activities including floor cleaning, and clothes' washing using a washing machine have led to high levels of total VOC and CO levels.
- Higher degree of cross ventilation in the house have led to less total VOC but more CO and CO2 due to road traffic emissions that enter the house.
- Performing maintenance activities within the past six months and the total VOC readings have shown positive correlations ($p<0.05$)
- Weak to moderate correlations were found between the effectiveness of cross-ventilation and the sickness frequency, chronic diseases and allergies in the household.
- High to moderate correlations were found between cross-ventilation, and better IAQ perception and high IAQ satisfaction.
- Open windows are more efficient in ventilating kitchen than cooker hoods for decreasing the levels of the combustion gases including CO and CO2.
- **C**hemical agents in cleaning increases the total VOC in the indoor environment.

Future research could support the findings of this study by including more case spaces and concentrating on other topics such as; indoor plantation, pets, city locations and closeness to industrial areas. Moreover, different pollutants can be studied, including other pollutants such as, sulphur and Particulate Matters (PMs), as these types of pollutants are found hazardous through the literature review and few studies have considered them in the residential environments.

References

Buekens A., Schroyens K. Indoor Air Quality Monitoring and Control. Pollution Control Technologies. (2003). EOLSS, 2:1-10.

CDC. Centers for Disease, Control and Prevention. [Online]. (2016). Available from: https://www.cdc.gov/niosh/pdfs/sec_2.pdf.

Mantanis G., Vouli E., Gonitsioti C., Ntalos G. Formaldehyde in indoor air of new apartments in Greece. (2007). COST Action E49 Conference Proceedings, Braunschweig: p. 1-7.

Pickett A. R., Bell M.L. Assessment of Indoor Air Pollution in Homes with Infants. (2011). *International Journal of Environmental Research and Public Health*, 8: 4502-4520.

Safetech. Indoor Air Quality Assessment. (2014). Ontario, Canada

WHO. WHO indoor air quality guidelines: household fuel combustion. (2014). Geneva.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Assessing the Sustainability of Historical Continuity in Multi-Layared Historic Towns: The Case of Amasya, Turkey*

Dr. Leyla Etyemez Çıplak[1*]

[1]*Architecture Department, Çankaya University, Ankara, Turkey, leylaec@cankaya.edu.tr*

Abstract: The major subject of this study is the sustainability of historical continuity in multi-layered historical towns which are the outcome of continuous inhabitation process that is reflected in current town by physical remains belonging to different periods. This study asserts that these remaining elements of past periods can be conserved, as long as they become an integral part of the current urban context. Thus, conserving the multi-layered character requires sustaining the historical continuity by integrating the remaining elements of the former periods with current context. According to this concern, for assessing the integration of historical stratification with the current town regarding the physical, visual, functional, social and managerial aspects, a method is developed. This method, applied on Amasya (Turkey), makes possible to expose the factors of disintegration which can provide a basis for searching the strategies and tools for their reintegration with the current urban context, consequently, for the sustainable conservation.

Keywords: multi-layered historic towns; sustainability of historical continuity; historical stratification; integration; Amasya

Introduction

Towns, due to the range of their development processes, can be considered as complex and heterogeneous organisms. Historic towns with continuous habitation are the locus of the collective memory that has been generated by formations, transformations and continuities in the urban form and the use of space through history (Rossi, 2006, p. 125). Continuous habitation creates a new urban structure for each period and culture by defining a new whole with the previous elements of the urban topography. Thus, the significant character of multi-layered historic towns[1] is reshaped by this new urban topography that is the product of a continual historical progress with the former and latter structure superimposed in time.

As it is affirmed by Feilden and Jokilehto (1998, p. 78), "historical stratigraphy is the evidence and marks brought by changes in use over time, as well as the connections and continuity that make an individual building part of the urban context." Accordingly, ascertaining this stratification is fundamental for sustainability of the historical continuity and the identity of multi-layered historical towns. Thus, the evidences of different periods together

* This study is generated from the author's own Unpublished Master's Thesis supervised by Assoc. Dr. Güliz Bilgin Altınöz in METU Architecture Department (Etyemez, 2011).

[1] "Multi-layered towns", as an urban archaeology term, is defined by Güliz Bilgin Altınöz as "towns which have been continuously inhabited since early ages onwards and where still inhabitation exists" (2002).

with the stratified urban structure should be systematically comprehended, fairly respected and meticulously integrated in the conservation and design strategies (Biddle, 1980, p. 9).

Admittedly, the integration within the current context cover wide range of aspects, however considering the aim of this study, it concentrates on the physical, visual, functional, social and managerial aspects of integration. Additionally, this is a critical and theoretical framework developed and applied in master's thesis of the author. Distinctively, the objective of this study is not to define the re-integration principles or strategies for sustainable conservation planning process but providing a preliminary discussion on disintegration problems and questions on re-integration possibilities for multi-layered historical towns with the current context.

In other words, the study aims at identifying these five aspects of integration of collective memory with the generations to understand obstacles behind re-constitution and re-integration of fragmented and lost elements of historical continuity in a sustainable way, so as to make them available to present and future populations[2]. Concentrating on this aim, the study is structured as definition of historical layers of the town for exposing the most stratified areas. Subsequently, it is continued by assessment of the integrations of historic edifices with surrounding current context, and followed by the discussion of various aspects of disintegration problems. Amasya, a multi-layered Anatolian town in Turkey with significant topography, history and continual inhabitation, is selected as the case concerning its urban character reflecting the values, potentials and problems of multi-layeredness entirely.

Methods

Consistent with the purpose, the study has two-folded process. Firstly, developing an assessment method for evaluating integration of historical stratification with current context by discussing the background information on the significance of "integration" in the field of conservation. Therefore, the concept of "integration" are discussed on the basis of Brandi, Philippot and Carbonara (Prince, 1996); Matero (2007); Jokilehto (2006); Feilden and Jokilehto (1998); Boyer (1994); Lynch (1981); Somella (1984); international documents[3] regarding the conservation of cultural heritage. Moreover, in the light of these discussions, the

[2] The objective is driven from main definition of the (APPEAR Project, 2005) (Accessibility Projects. Sustainable Preservation and Enhancement of Urban Subsoil Archaeological Remains).
[3] Council of Europe (1975) (1985) (1989) (1991) (ICOMOS, 2016)

five aspects of assessing the "integration" of former period edifices with the current town, are adapted to multi-layered historical towns. Afterwards, the subtitles of each five integration aspects are synthesized and graded for a general assessment (Figure 1). The gradation of each five-integration status is constituted by synthesizing subtitles separately due to their different significances for the integration of the edifices with the current context (Figure 2).

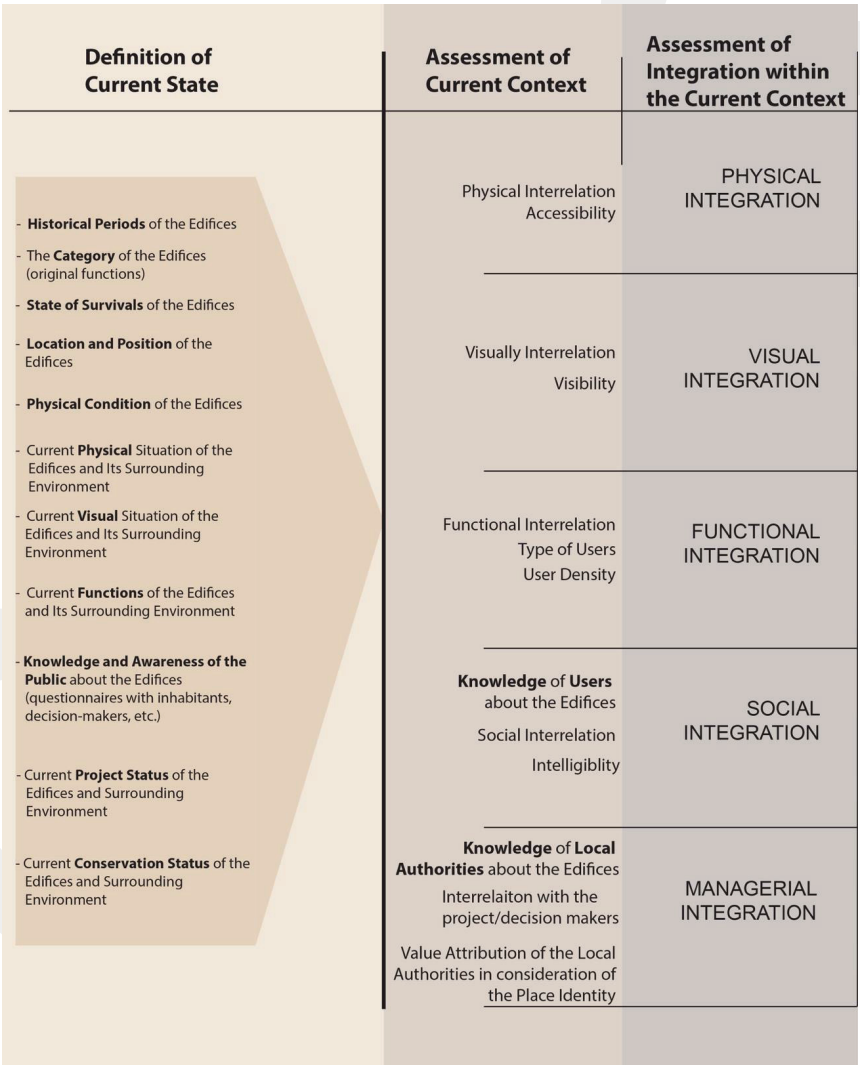


Figure 1: Information groups and subtitles regarding the integration aspects (Etyemez, 2011, p. 36).

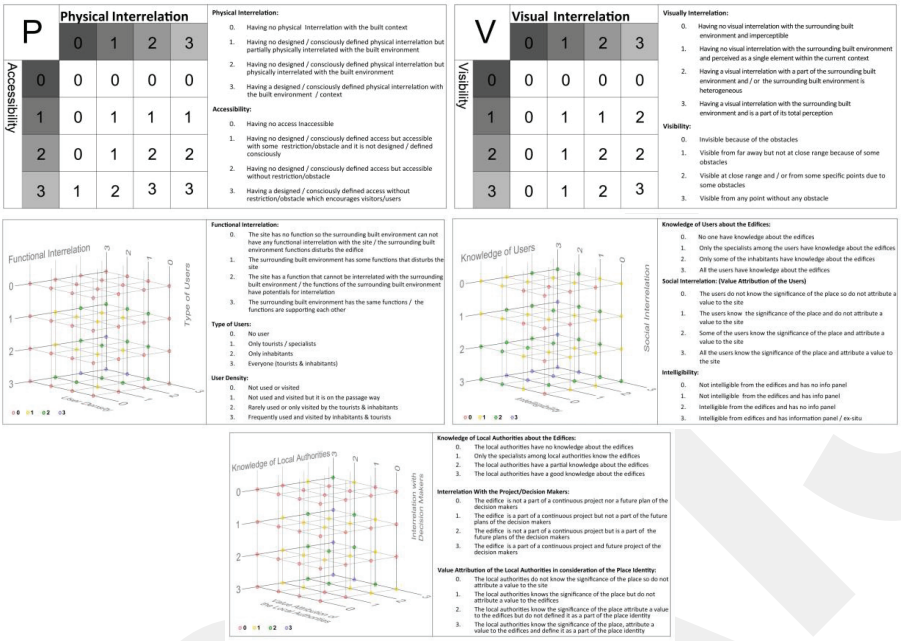


Figure 2: The gradation of Physical, Visual, Functional, Social and Managerial Integration Aspects (Etyemez, 2011, pp. 38-43)

Subsequently, in the second part, developed method for assessment is applied on the multi-layered identity areas determined according to the analysis and evaluation of historical stratification in Amasya. Since the main concern is to sustain the historical continuity of each stratum, a comprehensive knowledge on the integrity of each stratum constituting the stratified whole becomes crucial. Therefore, the historical stratification of Amasya is deduced with the method[4], based on each successive period's diachronic analysis of the general layout and structure of urban form, together with their relation with each other and with current town. The diachronic plans of each historical layer are superimposed for obtaining the plano-volumetric[5] view of the town, and finally, historical urban formations, continuities, transformations and interruptions are assessed within the town and the most stratified areas are selected for the case study as the identity areas of multi-layeredness (Figure 3,5). Accordingly, with a site survey the current situations of the selected multi-layered areas are analysed regarding the developed assessment method.

[4] The method was proposed and utilized by Bilgin Altınöz in her PhD Dissertation (2002)
[5] The terminology of plano-volumetric is used by P. Sommella. (Somella, 1984, p. 28)

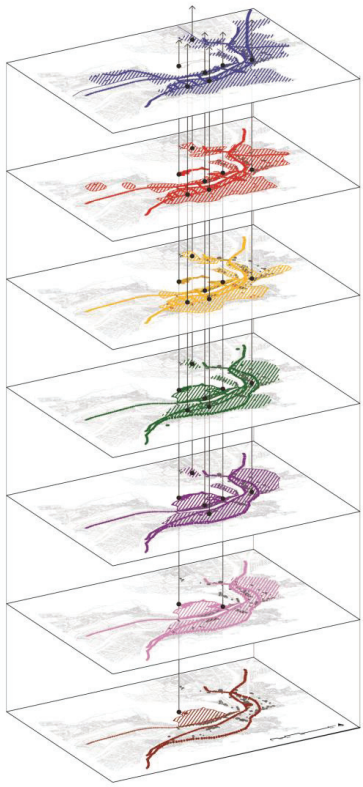


Figure 3: Plano-volumetric view of multi-layered town Amasya (Etyemez, 2011, p. 90)

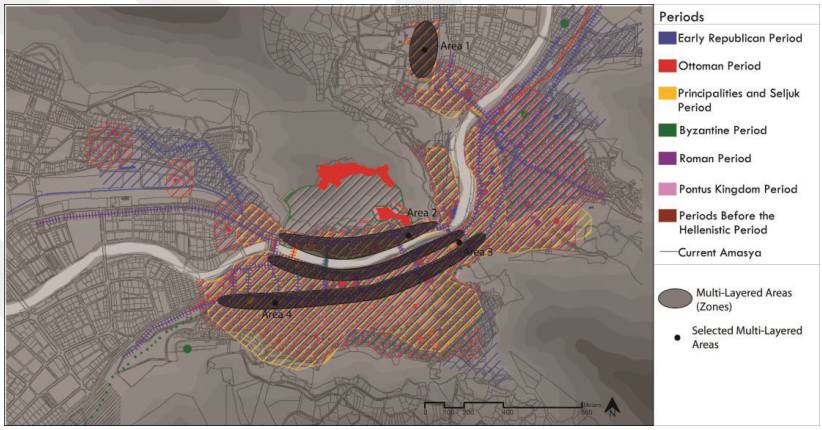
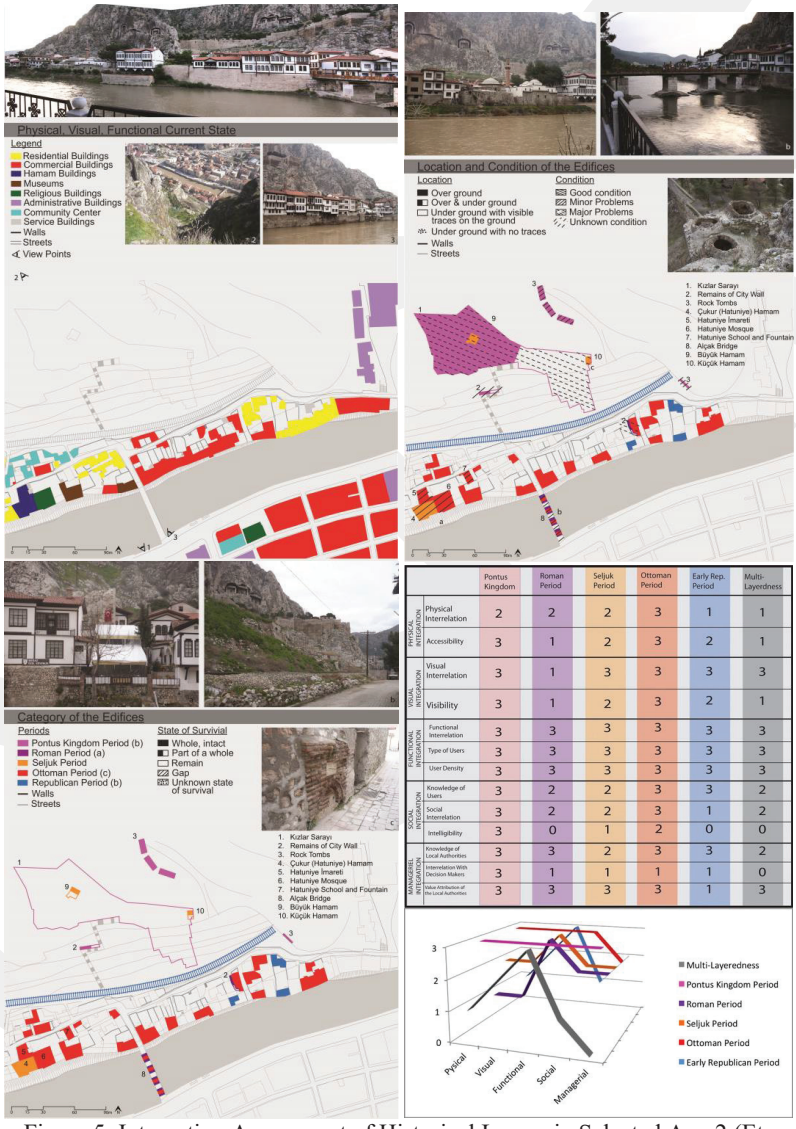


Figure 4: Selected Identity Areas of Multi-Layeredness (Etyemez, 2011, p. 97)

Findings and Discussion

In the light of the gathered data during the site survey, the integration status of the historical stratification with the current town is evaluated for the selected four identity areas of multi-layeredness, as an example can be seen in the Figure 5.



		Pontus Kingdom	Roman Period	Seljuk Period	Ottoman Period	Early Rep. Period	Multi-Layeredness
PHYSICAL INTEGRATION	Physical Interrelation	2	2	2	3	1	1
	Accessibility	3	1	2	3	2	1
VISUAL INTEGRATION	Visual Interrelation	3	1	3	3	3	3
	Visibility	3	1	2	3	2	1
FUNCTIONAL INTEGRATION	Functional Interrelation	3	3	3	3	3	3
	Type of Users	3	3	3	3	3	3
	User Density	3	3	3	3	3	3
SOCIAL INTEGRATION	Knowledge of Users	3	2	2	3	3	2
	Social Interrelation	3	2	2	3	1	2
	Intelligibility	3	0	1	2	0	0
MANAGERIAL INTEGRATION	Knowledge of Local Authorities	3	3	2	3	3	2
	Intervention With Decision Makers	3	1	1	1	1	0
	Value Attribution of the Local Authorities	3	3	3	3	1	3

Figure 5: Integration Assessment of Historical Layers in Selected Area2 (Etyemez, 2011, pp. 116-128)

In general, it is deduced that for integrating each stratum by respecting fairly, the selected multi-layered areas need to be re-thought together with their surrounding environment. The surrounding built environment necessitates reconsideration for coherent physical and visual interrelation with the edifices not disturbing the visibility and providing an inviting access to site. The function of edifices and the surrounding should support each other by raising utilization with adaptive and compatible functions. Furthermore, for social integration with the current life, public awareness ought to be promoted by using information media such as books, the press, television, radio, cinema, travelling exhibitions and information panels of historical heritage reflecting the cultural significance of the multi-layered areas. Additionally, the local authorities must be conscious about cultural significance of multi-layeredness and have a comprehensive knowledge about all edifices. For this purpose, they can be educated by means of educational documents, presentations, guides, travels and programs.

Conclusion

Cultural heritage in mutli-layered towns can be conserved and sustained for the future, so long as they are an integral part of the "new urban whole". The developed method for assessing the integration of the historical stratification with the current town in multi-layered towns contributed to reveal the weaknesses and problems about integration of each historic stratum with the current town. These inferences provide a preparatory work for future re-integration strategies and tools for each area. Although this study is just an introductory attempt to ascertaining a comprehensive methodology for the integration of historical stratification in multi-layered towns, it revealed various important outputs for the future studies on this issue as well as for the case of Amasya. Together with the further studies, it can turn out to be a more comprehensive research contributing to the conservation and sustainability of the multi-layered character of historic towns.

References

APPEAR Project. (2005). *Urban Pasts and Urban Futures: Bringing Urban Arhaeology to Life.* Brussel: European Union Committee of the Regions. Retrieved 07 09, 2018, from Enhancing the Values of Urban Arhaeological Sites Practical Guide: https://www.icomos.org/actes-symp-appear-en.pdf

Biddle, M. (1980). The Experinece of the Past: Arhaeology and History in Conservation and Development. In R. Holod (Ed.), *Conservation as Cultural Survival.* Philadelphia: The Aga Khan Award for Architecture.

Bilgin Altınöz, A. G. (2002). Assessment of Historical Stratification in Multilayered Towns as a Support for Conservation Decision-Making Process; A Geographic Information Systems (GIS) Based Approach Case Study: Bergama. (METU, Unpublished PhD Dissertation) Available from Yok Tez Merkezi database (119458).

Boyer, M. C. (1994). *The City of Collective Memory: Its Historical Imagery and Architectural Entertainments.* Cambridge Massachusetts: The MIT Press.

Council of Europe. (1975). *Resolution No R(76)28 the Adaptation of Laws and Regulations to the Requirements of Integrated Conservation of the Architectural Heritage*.

Council of Europe. (1985). *Resolution No 2 On the Promotion of the Architectural Heritage in Socio-Cultural Life and as Factor in Quality of Life*.

Council of Europe. (1989). Recommendation No R(89)5 Concerning the Protection and Enhancement of the Archaeological Heritage in the Context of Town and Country Planning Operations.

Council of Europe. (1991). Urban Archaeology in Today's Town. 1991.

Etyemez, L. (2011). Assessing the Integration of Historical Stratification with the Current Context in Multi-layered Towns. Case Study: Amasya. (METU, Unpublished Master's Thesis) Available from Yok Tez Merkezi database (339829).

ICOMOS. (2016). *Cultural Heritage, the UN Sustainable Development Goals, and the New Urban Agenda.* Retrieved 07 11, 2018, from http://www.usicomos.org/wp-content/uploads/2016/05/Final-Concept-Note.pdf

Jokilehto, J. (2006). *Considerations on Authenticity and Integrity in World Heritage Context.* Retrieved 07 10, 2018, from City & Time 2(1): http://www.ceci-br.org/novo/revista/docs2006/CT-2006-44.pdf

Jokilehto, J., & Fielden, B. M. (1998). *Management Guidelines for World Cultural Heritage Sites.* Rome: ICCROM.

Lynch, K. (1981). *A Theory of Good City Form.* Canbridge Massachusetts: The MIT Press.

Matero, F. (2007). *Loss, Compensation, and Authenticity: The Contribution of Cesare Brandi to Architectural Conservation in America.* Retrieved 07 10, 2018, from Departmental Papers (Historic Preservation): https://repository.upenn.edu/hp_papers/11/

Prince, N. S. (Ed.). (1996). *Historical and Philosophical Issues in the Conservation of Cultural Heritage.* USA: Science Press.

Rossi, A. (2006). *Şehrin Mimarisi.* İstanbul: Kanat Kitap.

Somella, P. (1984). Urban Archaeoloy. *Colloquy Organized Jointly by the Council of Europe and Region of Tuscany.* CE.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Room Impulse Response in Game Engines

Hasan Baran Fırat[1*], Massimiliano Masullo[2], Luigi Maffei[3]

[1]*Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, e-mail: hasanbaran.firat@unicampania.it*

Abstract: Auralization in virtual environment was taken in consideration in a wider research on multisensorial reconstruction to extend current approaches stucked in visuals. In this study after the previous ones on evaluation of sound propagation and reverberation in Unreal Engine 4 (UE4), a possibility to import Impulse Responses into UE4 through the Wwise was assessed. Comparisons between the static geometric room acoustics software (Odeon) and UE4 with Wwise middleware were presented. The study was based on measurements of objective acoustic parameters. While the main drawback is emerging in case of dynamic auralizations, results showed that Wwise is capable to convolute the sounds into UE4 for static positions and fixed receiver and sound source orientations. Nevertheless, it has to be enhanced for the sounds which are dense with regard to early reflections.

Keywords: ımpulse response, wwise, dynamic auralizations

Introduction

Qualitative functions such as reverberation or attenuation are applied in many Game Engines and VR software for the acoustic simulations of virtual environment. Although these functions, can be summarized as perceptual modelling (Lokki & Jarvelainen, 2001) and might correspond to the expectations of game design, they may result inappropriate in case of physically based scenarios (physical modelling). Because of that, lots of research groups are working on to increase the realism of perceived sound field. Current static geometric room acoustic software (e.g. Odeon, CATT, EASE) and dynamic real-time auralization software (e.g. RAVEN, Schröder & Vorländer, 2011; DIVA, Savioja et al., 2002; EVERTims, Noisternig et al., 2017) represent the benchmarks in acoustics nowadays.

On the other hand, even though lots of tools (e.g. Oculus Audio, Steam Audio, Audiokinetic's Wwise-WW) have been developed to improve the realism of sound in Game Engines and VR software, none of their outputs seem as comparable with the basic physical laws of the sound propagation.

Continuing the preliminary study on the sound attenuation (Masullo et al., 2018a) and on the reverb asset in Unreal Engine 4 (UE4) (Masullo et al., 2018b), this paper investigates the results of the procedure which was generated to simulate the virtual sound field (in UE4) by importing the Impulse Response (IR).

As a part of wider investigation on sound reproduction in game engines, Wwise Convolution Reverb was chosen firstly for the current evaluation and any other features for

spatialization were not included in reproduction of sound in UE4. A large box was modelled as a case study. Auralizations of Odeon and UE4 through the WW were compared with the help of some objective acoustic room acoustic parameters.

The study aims to investigate the possibilities to bridge over the gap between virtual reality design and room acoustics studies. In fact, while the expectations from future studies are to create a common platform for both visual rendering and dynamic auralizations, it could be really useful to generate an efficient process for using current audio design tools for UE4 and/or other room acoustic software.

Wwise Convolution Reverb Plug-in

Audiokinetic's Wwise (Wave Works Interactive Sound Engine) is a cross platform audio middleware. It allows an effective control of the audio design for virtual environment. While the WW is the one of audio tools which provides a really useful documentation of its features, because of the general tendencies of users which are mostly game designers it is hard to come across on experimental studies on the comparisons with equivalents or conventional room acoustic software.

It contains several plug-ins for individual purposes. The WW Convolution Reverb plug-in is one of them and it includes a collection of reverberation time of various acoustical spaces, which are ready-to-use. Besides it provides a route to import different impulse responses with various channel configurations (mono, stereo, ambisonics, etc.) and it is possible to convolute sound source with these IRs.

Methods

A large box (40m edge) was modelled to obtain relatively long decay in Odeon to see the differences of early and late reflections. It includes a sound source (S1) with a sound pressure level of 110 dB, positioned at the centre of the cube (at 1.5 m height) with three receivers (R1, R2 and R3). Although the measurements were planned at different sound absorption levels of room, in this study only an homogeneous sound absorption coefficient of 0.2 was selected and assigned to all surfaces of room. Then a map of the reverberation time (RT) (at 1.2 m height, listeners seated position) was calculated and used to obtain regions with significant differences of RT. Due to the symmetry of the box three main regions were recognized and the receivers R1, R2 and R3 were used as representative of these regions. The source-receiver distance for R1, R2 and R3 were 22.6m, 12,8m, and 4.45m respectively (see Figure 1), immediately lower (R3) and higher (R2 and R1) the critical distance (about 6,2m).

Afterwards two different impulse responses (IR) were calculated for each receiver. The first was the Binaural Room Impulse Response (BRIR) calculated with *Subject* Head Related Transfer Function (HRTF) (Subject_021Res10deg, The CIPIC HRTF Database) (Sub) and the second were the IRs calculated with the *Unity* HRTF option (Un) in Odeon. This option provides neutral impulse responses, which means without HRTF (Odeon User's Manual, 2016).

These IRs were imported into UE4 through the WW Convolution Reverb Plug-in to convolve an anechoic sound (white noise). At the same time, for comparison, the same anechoic sound was auralized in Odeon.

Finally, the outputs of both Odeon auralizations and UE4-WW convolutions were measured in lab with a Mk1 Cortex manikin and the two-channels sound card Symphonie. A framework of the study was showed in Figure 1.

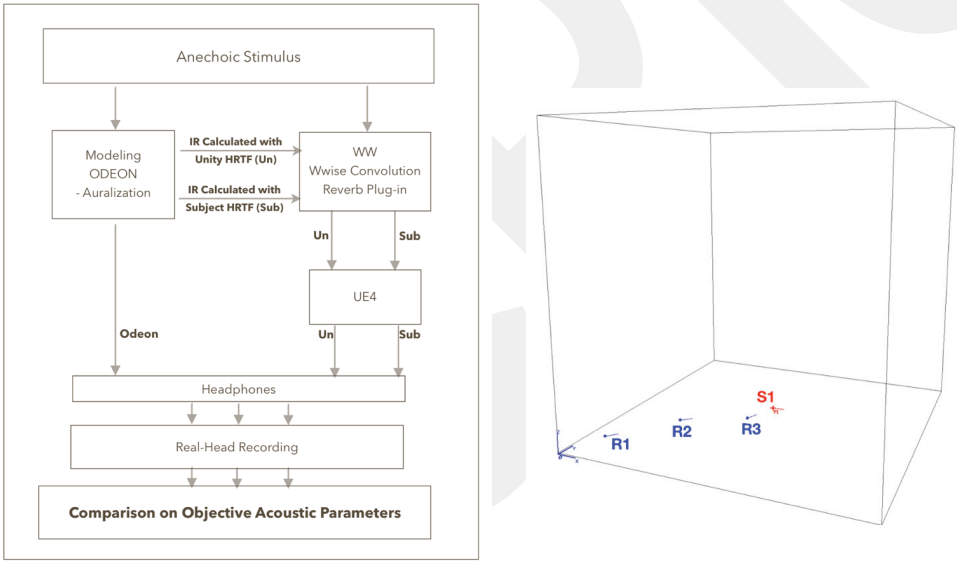


Figure 1. Framework of analysis and image of simple box modelled in Odeon

The measurements were analysed within each receiver point and the results for three objective room acoustic parameters: RT (Reverberation Time), C80 (Clarity), D50 (Definition) used for comparisons.

Results

Results which are given in Figure 2 showed that RT_{30} values are pretty close among the three methods for all the results, except the values for 125 Hz which are not reliable. The biggest differences between different methods for R1, R2 and R3 are 1.5s, 1.7s, and 1.6s respectively.

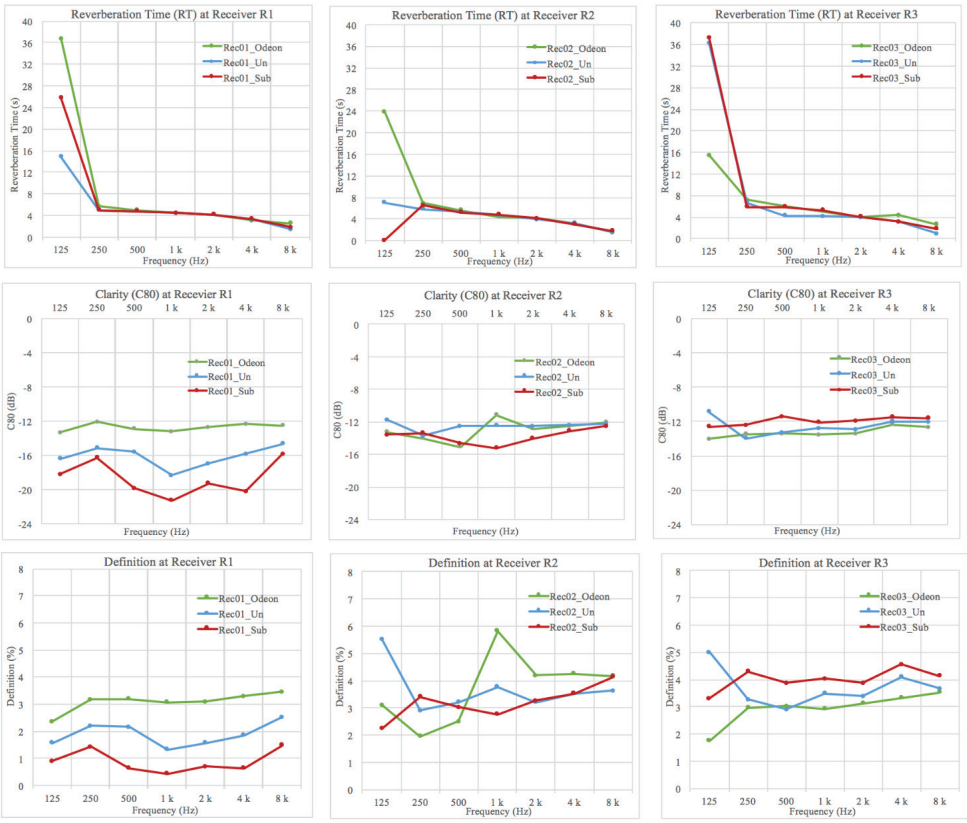


Figure 2. Reverberation Time, (RT_{30}), Clarity (C_{80}) and Definition (D_{50}) results

On the other hand, there are no big differences between the Clarity and Definition which show a similar behaviour for each receiver. This can be explained by simple shape of cube and its diffusivity. The biggest differences within each method, for R1, R2 and R3 are, respectively, 2.3 dB, 5.9 dB and 9.1 dB for Clarity and 2.9%, 4.0% and 3.9%, for Definition.

Except for the position R1, the differences of Clarity among the methods are lower than 4dB in R2 and lower than 3.2 dB in R3. In particular, at 1 kHz these differences are comparable with the just noticeable difference (JND) range of 1.6-4.0 dB founded by recent studies (Jasinski et al., 2011; Viegant & Celmer, 2010; Cox et al., 1993). In R1 the differences of the Sub and Un

methods respect to Odeon are 5dB and 8dB respectively. Hereby, as can be seen in Figure 1, R1 is farthest receiver from the centred sound source and closest to the edges, thus it is possible to say that when the early reflections are come to forefront, WW has some difficulties in reproducing the sound according to Odeon. When the receivers get close to sound source differences between the Sub and Un methods are starting to decrease.

Conclusions

Evaluation on measurements have showed that WW is reliable when the early reflections are not intense, in contrast it has difficulties to reproduce sounds when they are rich with regard to early reflections. Therefore, beside the WW Convolution Reverb Plug-in, WW Reflect plug-in which focuses on enhancing the early reflections with real-time calculations should be analysed both separately and together with WW Convolution Reverb. Further work will be conducted on these two plug-in and 3D spatialization for several different case studies.

References

Cox, T.J., Davies, W.J. and Lam, Y.W. (1993). The sensitivity of listeners to early sound field changes in auditoria. *Acustica, 79*, 27-41.

Jasinski, C.M., Ahearn, M.J., Giacomoni, C.B., Ormsbee, C.I., Schaeffler, M.J. and Wells, A.P. (2011). Investigations of the just-noticeable-difference of clarity index (C_{80}). *The Journal of the Acoustical Society of America, 130*, 2429. doi.org/10.1121/1.3654736

Lokki, T., Jarvelainen, H. (2001). Subjective evaluation of auralization of pyhsics-based room acoustics modeling. Proc. of the International Conference on Auditory Display, Espoo, Finland, 29 July-1 August.

Masullo, M., Fırat, H.B., Toma, R.A., Maffei, L. (2018a). Ricostruzione virtuale di eventi e rappresentazioni tramite game engine. Associazione Italiana di Acustica, 45° Convegno Nazionale, Aosta, Italy, 20-22 June.

Masullo, M., Fırat, H.B., Maffei, L. (2018b). Virtual acoustics with game engines. 25th International Congress on Sound and Vibration, Hiroshima, 8-12 July.

Noisternig, M., Katz, B.F.G., Siltanen, S. & Savioja, L. (2008). Framework for realt time auralization in architectural acoustics. Acta Acustica united with Acustica, 94 (6), 1000-1015. https://doi.org/10.3813/AAA.918116

Odeon. (2016). Odeon User's Manual.

Savioja, L., Lokki, T. & Huopaniemi, J. (2002). Auralization applying the parametric room acoustic modeling technique - the DIVA auralization system. Proceedings of the International Conference on Auditory Display, Kyoto, Japan, 2-5 July.

Schröder, D., & Vorländer, M. (2011). RAVEN: A Real-Time Framework for the Auralization of Interactive Virtual Environments. Forum Acusticum, 1541-1546.

Viegant, M.C., & Celmer, R.D. (2010). Effect of experimental design on the results of clarity-index just noticeable-difference listening tests. Proc. of 20th International Congress on Acoustics, Sydney, Australia, 23-27 August.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The influence of early Christian basilicas in the Byzantine East.

Raffaela Fiorillo[1]

[1]*Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy, raffaela.fiorillo88@gmail.com*

Abstract: Recent research have highlighted the presence of churches with a triconch termination dated between the fourth and sixth centuries in some areas of ancient Anatolia. The archaeological documentation and the recent progress of studies on Christian art have provided new interesting data on the spread of architectural models throughout in the Mediterranean area: from Algeria to Egypt, from the Balkan regions to Italy. The triconch churches present in Algeria, are (martyrium ruins of Aguemmoun Oubekkar in Kabylie and the Tebessa Khaila basilica I, both of the (IV-V century AD), in Tunisia (the triconch of El Faouar for IV-V century AD), in Egypt (the church of the White Convent or Deir el-Abyad, the church of the Red Convent or Deir el-Aḥmar, the church of Denderah and the monastery of Apa Bane or Dayr Abu Fanah for V century AD), exhibit obvious similarities with the Turkish examples.

Keywords: History of Architecture**;** trichonc plan; Mediterranean models.

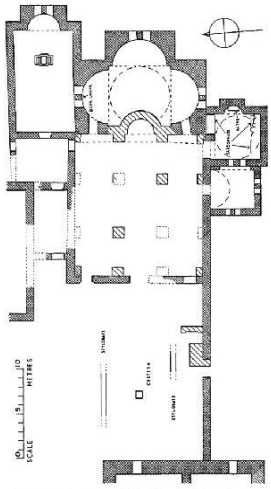
Introduction

Christian churches with Turkey's triconch plant had a significant influence in a broader context of early Christian architecture at the end of the 5th century. The existence of these cultural and religious boundaries probably explains the great diffusion of examples that are recorded. In late antiquity there is a significant shift of population and wealth from the coast, towards the hinterland and a similar movement run by the cities towards small outlying towns with a predominantly rural character. The Lycian coast has always played an important role in the history of Anatolia because its ports were important in the Mediterranean and on the main sea routes between the West, Syria and Egypt.

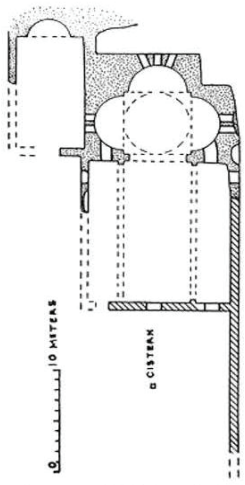
There are three triconch's churches very similar in the Turkish area, all of the IV-V century AD: one in Alacahisar, three kilometers south-west of Karabel, a second one in Dikmen, near Alakilise and a third in Devekuyusu, north of Muskar and east from Karabel towards Alakilise. On a hill 5 km. south-west of Karabel there is a large church known locally as Alacahisar. The church of Alacahisar is similar to that of Karabel: also this church has a triconch at the end of the central nave. A door in the northern apse leads into a large adjacent room, corresponding exactly to the baptistery of Karabel. The Devekuyusu site is an hour's walk east of Karabel. In the church the triconch is placed at the end of the nave.

The dimensions of the triconch sanctuary are roughly similar to those of Karabel. In Dikmen, southwest of Alakilise, there was a three-aisle church with a triconch whose side apse has a door leading to an adjoining chapel or probably to a sacristy that seems to have been added

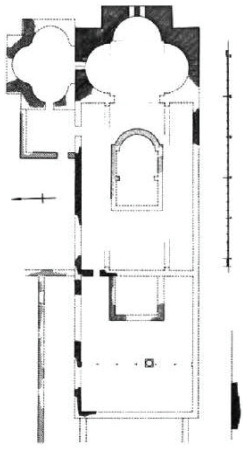
later. The three apses have a diameter of 4.5 meters and probably the outer walls were rectangular. Later, inside the original church, a second church was built, characterized by a narthex, a single nave and a single apse. It measures approximately 15 meters in length and 5.70 meters in width, and was built using materials from the previous church.



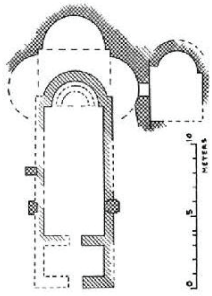
Sion monastery of Karabel - Asarcik.



Church of Alacahisar, Çam Dağı/Pine Hill.



Church of Devekuyusu.

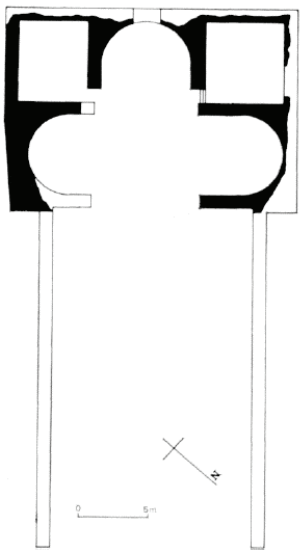


Church of Dikmen.

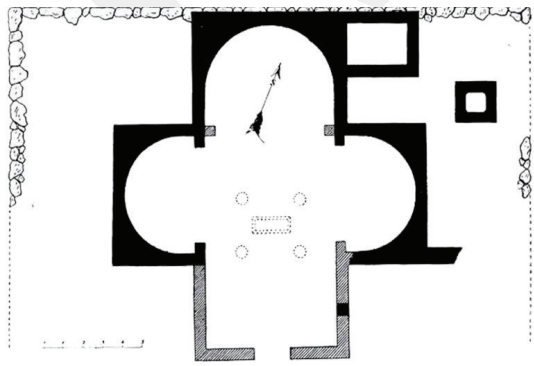
Basilica of Zindan Cave.

Figure 1. Churches with triconchs apses in Turkey.

After the excavation activities conducted on the hill in front of the cave of Zindan, a church was discovered. However, due to previous terracing work on the hill, the structure has been damaged. The walls are covered with mortar and the front surface is plastered with white lime mortar. These basilicas resume the Hellenistic style, a fairly common phenomenon in the Mediterranean region. On the hill in front of the Zindan cave, the church designed in the first phase had a three-lobed apse, generally made of reclaimed stone of about 3.50 m. The triconca cell was probably used as a *martyrium*, and a skull and a cross-shaped bronze pendant were found inside it. This scheme refers to the architectural models present in the Mediterranean area. In fact between the V and the beginning of the VI century, it was used in Algeria, Tunisia and Egypt. In Algeria, the Christian basilica is generally made up of a rectangular hall, twice the width wide, oriented to the east, with entrances on the western front. In Kabylie, a region north of Algeria, stood the Aguemmoun Oubekkar martyrium (IV-V century AD), which included a rectangular space of 6.50 m which was to be covered by a vault; three apses on the north, west and east side had an opening of 5.50 m and a depth of 4 m, while the south side was destroyed. In the center there were four columns arranged in a square, as supports of a ciborium. Of the basilica I of Tebessa Khaila (IV-V century AD), little remains.



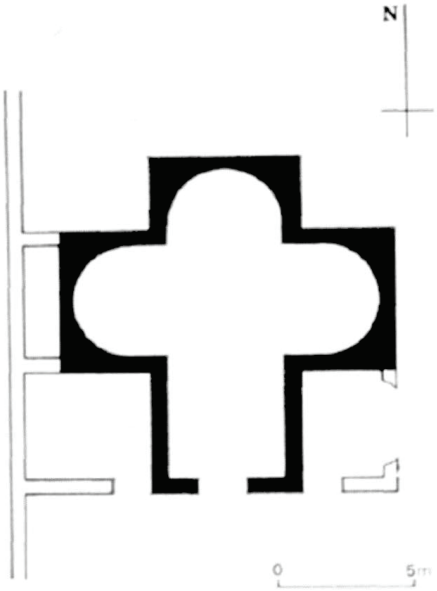
Basilica I of Tebessa Khaila.



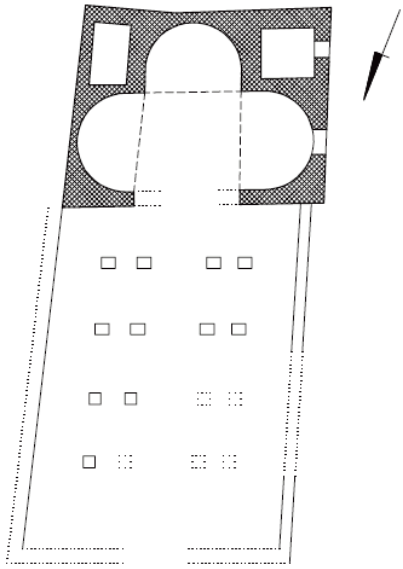
Martyrium of Aguemmoun Oubekkar.

Figure 2. Christian basilica in Algerie.

The triconch apse is located in the south-west part of the basilica and is almost the same size as the other two side apses, about 6 meters wide and 5 meters deep. On the sides there are two rectangular rooms (*prothesis and diaconicon*) in communication with the central nave through two small doors. Tunisia, the eastern region of the Maghreb Island, is the African country of Arab culture closer to Italy. The early Christian churches of the region have a basilica with three naves, sometimes five, exceptionally up to seven. The early Christian architecture of Africa is also characterized by some specific liturgical arrangements such as the position of the altar, well advanced in the central nave, the absence of the amphora, the frequent orientation of the apse to the west, especially in East Africa (as it happens in Italy).



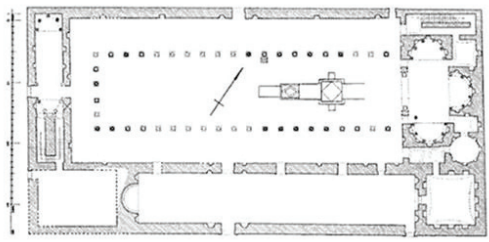
Triconch of Thibar.



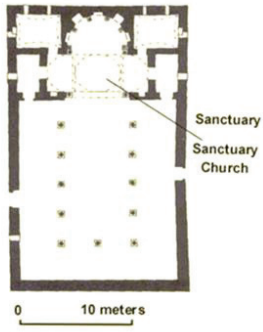
Triconch of El Faouar.

Figure 3. Christian churches in Tunisie.

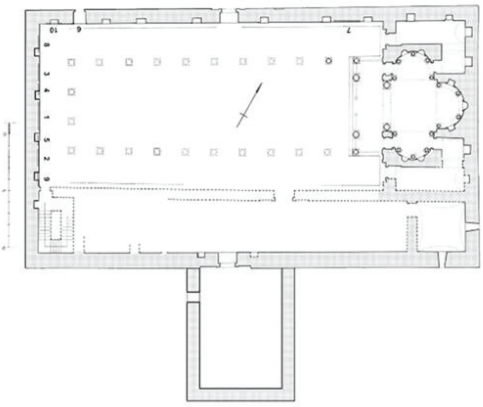
The cult of the martyrs developed a lot along the Tunisian coasts: many martyrs have centralized plants with four or three apses. These include the tricone of Thibar (IV-V century AD) and the triconch of El Faouar (IV-V century AD). Thibar's triconch is one of the smallest monuments in Tunisia. It was discovered in 1935 by the missionary archaeologist Father Lapeyre and was built on the site of a former rectangular building that had a small apse (probably not a Christian basilica). Another example is El Faouar's triconch. The triconch was connected to the large church located to the east, which was supposed to be one of the cathedrals of the ancient city of Belalis Maior. Inscribed in an irregular rectangle its length is 11 meters. On the sides of the central apse there are two rooms, of different sizes, that communicate only with the outside through the entrances.



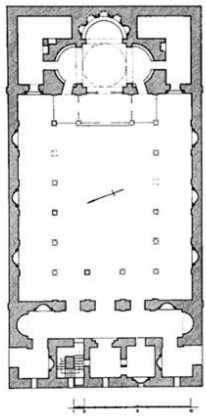
White Convent.



Monastery of Apa Bane.



Red Convent.



Early Christian basilica in Denderah.

Figure 4. Christian churches in Egypt.

Egypt is a northeastern African state. The country has experienced an intense process of Christianization which has translated into a massive adhesion of the Egyptian population to the Coptic Church. An influence of Coptic art is found in the large white church “Deir el-Abyad” (V century AD) in Sohag, built by Abbot Schenute. The church is characterized by a basilica with three naves and a triconch presbytery. The triconch terminations also include the church of the Red Convent “Deir el-Aḥmar” (V century AD), the church of Denderah (V century AD) and the Apa Bane monastery “Dayr Abu Fanah”, (V century AD). The buildings of urban worship had a rich sculptural decoration, while the monastic churches were largely devoid of them. The Red Convent building complex refers to the first Christian basilicas that, proposing the longitudinal canonical hall, find in the Presbyterian zone the privileged architectural core, structured in a triconch system. The church, with three naves, is devoid of narcissus and has on the south side, a side corridor (or pseudo-narthex) used as an entrance. The triabsidated presbytery is flanked by two symmetrical environments, with an inverted L plan, and is decorated by a double row of elegant columns that include deep niches. Of similar configuration is the church of the White Convent that was built almost entirely with burial materials of the Pharaonic period. Externally of parallelepiped shape, it has three aisles that run on the short side and a tricon-shaped presbytery, articulated with columns along the curved walls. The church is preceded by a narthex and accompanied by a long hall on the long east side, both terminated on the short side with a colonnade abdidiola On the west bank of the Nile is the town of Denderah, whose Christian church was built using the temple hall of Hathor. The three-nave plan diagram has a broadly connotative three-part apse, almost an autonomous branch. The apse is a triconch, with central dome and two lateral environments (*prothesis and diaconicon*) in communication with the lateral apses and naves. Not far from the Nile Valley, they are the ruins of Apa Bane Monastery. This church also has a trichonch ending. The semi-circular apse is adorned with circular columns. The transverse front space is narrow and has a simple rectangular form. The original plant had an isolated triconch, later the triconch's apses were transformed into two rectangular environments.

The triconch architectural configuration was a very appreciated typology for its elegance and for the possibility to diversify the use of the tripartite space as shown by the wide diffusion in different cultures and geographic areas, and for the different uses it has had in a remarkable chronological arch.

References

Demirci, D. (2016). Aksu Zindan Mağarası, Bazilikal Planlı ve Trikonkhos Apsisli Manastır Kilisesi Üzerine Bir Değerlendirme. Aralık, 183-214.

Falcioni, P., Pietrangeli, A. (2004). Il «Convento Rosso» e il suo territorio: alle origini di un sito monastico. In Progetto Progetto Pilota Deir el Ahmar, Deir Anba Bishoi «Convento Rosso». Roma: Università degli Studi Roma Tre, 119-127.

GROSSMANN, P. (2002). Christliche Architektur in Ägypten, Leiden: Brill, 516-519.

Gsell, S. (1901). Les monuments antiques de l'Algérie. Paris: Fontemoing Éditeur, 109-110.

GCRIS

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture,

Planning, and Design, 17-19 October 2018, Ankara, Turkey

Large-scale ecosystems regeneration: enabling the transition to a circular economy in the Vesuvius coastal area

Rossella Franchino[1*], Serena Viola[2]

[1]*Department of Architecture and Industrial Design, Università degli Studi della Campania, Aversa (CE), Italia, rossella.franchino@unicampania.it*
[2]*DiARC, Università degli Studi di Napoli Federico II, Napoli, Italia, serena.viola@unina.it*

Abstract: The paper faces the issues related with the reversal of a dissipative metabolism traditionally characterizing settlements, decoupling growth from finite resource consumption, forecasting performances' upgrade, social engagement, institutions empowerment. Taking into account the Ellen MacArthur Foundation paradigm (2017), ecosystems regeneration is supposed to be able to drive the transition towards a circular economy, where the value of resources is maintained for as long as possible. Taking into account a systemic and performance approach, the design strategy is tested in the Vesuvius coastal area. The regeneration methodology here proposed, focuses on the relations between technological regimes and spaces**,** defining compatibility ranges for shortening the loops and promoting inclusive technological innovations.

Keywords: Regeneration; transition; closing the loop.

Introduction (Serena Viola)

For long, the term regeneration has been used as an umbrella concept with a special focus on protection, preservation and transfer of natural and manufactured resources to future generations. In Europe, starting from the '90s, the need to recover abandoned urban spaces informs several approaches and strategies (Bianchini, Parkinson, 1993; Griffiths, 1995; Evans, Shaw, 2006). Academic research and urban policy makers focus on creating or rebranding, culturally led settlements that suffer problems of economic or social degradation and impoverishment (Bailey, Miles e Stark, 2004; Comunian, Chapain, Clifton, 2010).

Referred to large scale ecosystems, the circular economy model introduced by the Ellen MacArthur Foundation (2017) leads to the ability of maximizing -through reuse, maintenance and rehabilitation - the value of settlements, activating social, economic and environmental synergies (Fusco Girard, 2014). The application of the circular paradigm to regeneration lies in the idea that an ever-growing economic development and profitability can happen without an ever-growing pressure on the environment (Stahel, 2016).The aim of giving up the make-use-dispose linear consumption approaches - cradle to grave -, in the name of closed loops - cradle to cradle - marks the pathway to urban symbiosis where spaces and processes are assumed as renewable material and immaterial resources that should be reused, respecting the planetary bindings (Raworth, 2017).

Research methodology at the territorial scale (Rossella Franchino)

Intervening on the development of the urban territory in order to find an alternative to the model that has unfortunately emerged during the last century, any transformation and rebalancing interventions must necessarily address, with particular attention, environmental compatibility (Franchino et al., 2011). The territory as a whole, which consists of a set of important architectural and functional features that are surrounded and interrelated with the environmental air, water and soil matrices, should therefore be configured by technological interventions validated within a more general environmental compatibility debate. The overall aim of studying environmental compatibility also specialises in a number of specific objectives, which essentially consist of the ability to detect natural and anthropogenic environmental aspects as well as contain its transformations within the context of secure sustainability.

The territory should, therefore, be conceived as an organism with a dynamic equilibrium achieved through the technological control of complex functions. The compatible and sustainable territory should be configured as an urban ecosystem, with high ecological and environmental standards in which each process is controlled so that its impact, and consequently the induced irreversible degradation, is the minimum possible in relation to the process constraints. It is worth considering the territory as an actual ecosystem (Adler, Tanner 2013) (Aitkenhead-Peterson) penetrating the assessments of the interrelationships between natural and anthropogenic phenomena as well as those providing tools and methods for its rebalancing.

In order to address a recovery study with the aforementioned conditions, the analysis and design technologies that can be used in environmental restoration interventions differ from the traditional ones used for a single building or in building contexts, since being applied to the environment, they must consider a complexity of variously interrelated factors.

The environmental transformations are dynamic and depend essentially on how the moving systems are inserted and possibly alter the static systems.

Precisely due to this specificity, an appropriate analysis method could be the matrix, where the environmental characteristics are associated to the factors that have an influence on them with a gradual assessment reported in the intersection element. The system, based on the matrix representation, despite its schematic nature, can represent a methodology that allows to approach the complexity of the object under analysis.

This methodology also allows to observe the environment in its uniqueness and unrepeatability since everywhere physical and biological transformation processes can be configured which do not appear anywhere else except for their basic characteristics.

The methodological specificities at the building scale (Serena Viola)

Researches and practical experiences in large-scale ecosystems, converge in identifying regeneration as complex knowledge-based processes, aimed at re-circulating waste - physical, social, cultural ... - determined by transitions (Grin et al., 2010). Assuming the Torre Annunziata settlements as case study, the paper focuses on the synergies that for centuries afford the material culture, drawing reciprocities between the constructive and productive processes. During the 20th century, several uncontrolled pressures compromise the agri – food manufacturing culture. Taking into account a systemic and performance approach, at the building scale, three phases support the definition of regenerative scenarios:

- Outlining the relationships between places and manufacturing, in terms of processes, products and waste;
- Mapping the transition processes occurring at the architectural and urban scales;
- Defining compatibility ranges for shortening the loops and promoting inclusive technological innovations based on waste re-use.

Findings and Discussion at the territorial scale (Rossella Franchino)

In order to obtain an applicative definition of the concepts previously presented is illustrated below a case study focuses on the environmental and functional requalification of the decommissioned railway lines between Gragnano and Castellammare di Stabia. The case study examined is particularly interesting since it refer to open urban spaces which, in some cases, have highly compromised ecological-environmental conditions, and their transformation corresponds to a renewal of the urban context.

The aim is to carry out an intervention that, though not restoring the railway, always includes the linking function through a thematic route that by joining the two urban centres of Gragnano and Castellammare di Stabia can express the continuity of the territory. While including the realisation of a vast linear park and an arena space, the most significant aspect of the intervention is the urban farm to which the context of street food is associated. This urban farm, which is the core of the requalification, is linked to the concept of “productivity” highly representative of the territory.

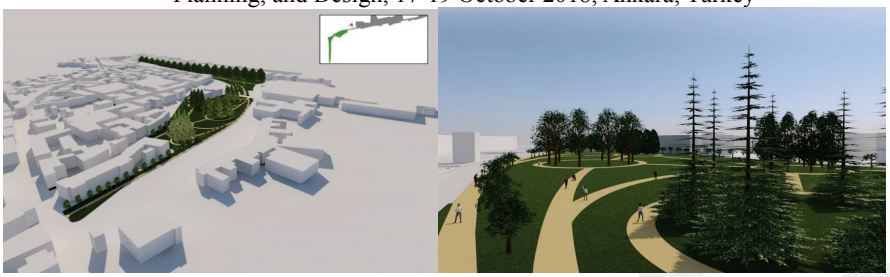


Figure 1. General view (elaborated by Tommaso Famoso).

Findings and Discussion at the building scale (Serena Viola)

An imbalance between a demand for innovation and the available solutions, marks the scenario in which Torre Annunziata, as other settlements along Vesuvius coast, opens today to meet the circular economy issues. With a population density of 5,348.6 inhabitants per square km, the settlement shows worrying rates of social and building discomfort. The exceptional nature of the asset is not perceived by residents who progressively lose their relationship with the reasons that for centuries guided any technological transition. Cultural changes in the agri – food manufacturing and a renewed consumer awareness are the two nucleus for inclusive processes of regeneration based on reducing, reusing and recycling waste in order to promote synergies between identities and economies. Promoting a renewed idea of manufacturing, the regeneration bets on: the adaptability of layouts, joining, splitting up or rearranging environmental units and reconnecting spaces; the connectivity between functions, improving or decreasing the use surface, changing the facilities in the building and/or outside the building; the integrability of devices and systems with natural resources.

Figure 2. Regeneration approach for the manufacturing system in Torre Annunziata

Conclusion

Recognizing a predominant role in the cumulative impact of minor improvements, a tailored technological approach supports the definition of design solutions. The theoretical hypothesis of reasoning about technological transitions is that only nature has the power to overcome waste creation, leading backin a harmonious unity, the fundamental disorder of reality. The preponderance of nature can contrast material and immaterial waste, returning productive vocation to places and holding communities together.

With such premises this paper has studied the application of natural resources in the sustainable management of urban transformation and has shown, through appropriately structured case studies, the significant environmental benefits arising from the use of principles of nature as a management model. Using nature's own ability to control the negative effects of urban transformation and focusing on promoting inclusive technological innovations is, among other things, not only environmentally, but also economically convenient.

References

Adler R.F.,& Tanner C. J. (2013) *Urban Ecosystems Ecological principles for the Built Environments*, Cambridge University Press.

Aitkenhead-Peterson J.,& Volder A. (Ed.) (2010) *Urban Ecosystem Ecology*, Agronomy Monograph 55.

Bailey, C., Miles, S., & Stark, P. (2004) Culture-led urban regeneration and the revitalisation of identities in Newcastle, Gateshead and the North East of England, International Journal of Cultural Policy, 10(1), pp. 47-66.

Bianchini, F.,& Parkinson, M. (Eds) (1993). *Cultural Policy and Urban Regeneration: the West European Experience*. Manchester: Manchester University Press.

Comunian, R., Chapain, C.,& Clifton, N. (2010).Location, location, location: exploring the complex relationship between creative industries and place. Creative Industries Journal 3 (1), 5-10.

Ellen MacArthur Foundation (2017). Cities in the Circular Economy: An Initial Exploration.Retrieved from: www.ellenmacarthurfoundation.org

Evans, G.,& Shaw, P. (2006). Literature Review: Culture and Regeneration. Arts Research Digest, vol. 37.

Amorin M., Franchino R.,& Higro M. (2011), *Le reti ambientali come incontro tra due complessità - Environmental network as a match between two complexities*, La scuola di Pitagora editrice, Napoli.

Fusco Girard, L. (2014). The role of cultural urban landscape towards a new urban economics: new structural assets for increasing economic productivity through hybrid processes. Housing Policies and Urban Economics HoPUE. vol. 1, no. 1, pp.3–27.

Griffiths, R. (1995). Cultural strategies and new modes of urban intervention. Cities, 12(4), pp. 253-265.

Grin, J., Schot, J., & Rotmans, J. (2010). Transitions to sustainable development. New directions in the study of long term transformative change.New York: Routledge, NY.

Raworth, K. (2017). Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist, Chicago, IL : Penguin.

Stahel, W. R. (2016). The circular economy. Nature, International weekly journal of science, vol. 531, p. 435 – 438.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

BIM Technology and Material Innovation: From Efficiency to Environmental Compatibility

Rossella Franchino*[1], Caterina Frettoloso[1], Nicola Pisacane[1]

[1]*Department of Architecture and Industrial Design, Università degli Studi della Campania, Aversa (CE), Italia, rossella.franchino@unicampania.it, caterina.frettoloso@unicampania.it, nicola.pisacane@unicampania.it*

Abstract: The paper focused on definition of environmental performances criteria of the building materials for the efficient envelope for the design control according to the life cycle of the envelope building and to the performance of the building in environmental terms. This research proposes an open database fulfillment on BIM (Building Information Modeling) platform to classify characteristics and performance of building innovative materials. The database integrated with the parametric modeling of the building envelope will allow not only the geometric and spatial description of the element and the listing of the information related to the quantities, but also the classification of the properties of each component. This information, integrated with the other data coming from the building and the context, will be elaborated with appropriate algorithms in order to optimize the performance of materials with particular attention to the environmental dimension.

Keywords: Database, environmental compatibility**,** load capacity of materials

Introduction

Among the major concerns of modern man, the most pressing are without doubt the environmental ones. The environmental issue, closely linked to the energy one, significantly conditions the study, implementation and management of new technologies, both innovative as well as evolutionary. This is particularly felt in all areas and especially in the construction sector, which is characterized by a high consumption of natural resources as well as a strong impact on the environment and on the subsystems that characterize it: water, air and soil.

For this very reason, combining progress and sustainability has been very difficult and the remarkable technological growth that has characterized the last century has often had a negative impact on the environment, with it being fundamental that technological progress is closely linked to environmental sustainability interventions for the construction of a better future. This is particularly important, in the construction industry which has a decisive influence on the territory as well as on the consumption of resources, with it being characterized by a high environmental impact for which technological progress and sustainability must be an inseparable combination (Khatib, 2016). Thus, this work focuses on the role of innovative materials for construction and in particular smart materials as key elements of sustainable technological progress in the construction sector.

Innovative materials have optimized properties when compared to traditional materials, making it possible to obtain innovative performances by adapting their physical and chemical characteristics. The introduction of innovative materials has disrupted the relationship between the building industry and construction materials in that while traditional ones have always played a static function, innovative ones are characterized by their having acquired a dynamic function that allows them to adapt to environmental changes. This has made it possible to extend the frontiers of dialogue between the building and the surrounding environment so that it can also be achieved through the careful use of materials. Smart materials are particularly suitable for these applications, which in the context of innovative materials are characterized by the ability to change in response to external stimuli and are characterized by the fact that they are able to exploit environmental resources using the principles of nature for their functioning by stimulating the strategies proposed by nature itself (De Martino et al., 2014).

The work intends to take stock of the initial phase of a more extensive research still underway, illustrating the approach and the tools. In particular, the study deepens the characteristics of a series of smart materials (the paper proposes a short consideration on the smart fibers), highlighting above all the aspects linked to the environmental dimension.

Parametric modeling and database platform to classify characteristics and performance of innovative materials

Methods of understanding and communication of architecture are strongly influenced by the affirmation of digital culture and the development of information technology. The diffusion of dedicated software and the constant growth of computational computing power has encouraged the progressive integration of the two-dimensional rendering with the virtual representation of the architectural object in three-dimensional space. For some years, digital representation technologies use software based on algorithms that simulate the actual physical behavior of light and the response of materials to it, ensuring a photo-realistic rendering of the represented object, further enriched by digital graphic post-production techniques (Akanmu et al., 2015).

The result of this process is an overall digital representation of the physical and functional characteristics of the building expressed by the geometric model and the information associated with its parts (constantly updated) that include data on construction

materials, components and structural techniques, at the time and the costs of realization, previous interventions, state of conservation, etc.

One of the main advantages deriving from the use of parametric modeling through the BIM (Building Information Modeling) methodology is the possibility of sharing this information among the various specialized professional figures involved in the planning and implementation of new construction projects or on existing assets (Eastman et al., 2011).

The frame of the BIM model, the result of these processes, is a solid basis for cataloging the information and properties of the materials related to the building components (Irizary et al., 2013; Osello, 2015). Integrated database with parametric modeling of the building will allow not only the geometric and spatial description of the element and the listing of the information related to the quantities, but also the classification of the properties of each component. This information, integrated with the other data coming from building and context is elaborated with appropriate algorithms in order to optimize the performance of materials with particular attention to the energetic and environmental dimensions.

Findings and Discussions: focus on smart fabrics and building facades

Technical fabrics, despite the difficulties related to the lack of policies and investments aimed at their development, represent an interesting area in which to test new innovative technologies that are not exclusively aimed at the fashion industry. In fact, thanks to the propensity of textile fibres to integrate and interact with other materials, they present interesting applications in the field of Electronics and Communication, Transport, Public Safety and Construction, offering a variety of innovative products. Over the past few years, in the building sector, there has been a widespread use of fibres, classified as smart, for isolation materials and components as well as, in general, to improve the energy efficiency of the building envelope and as light-weight structural materials and elements, with them offering numerous design opportunities.

This interest in technical fabrics is also supported by the numerous benefits associated with the environmental and economic sustainability of the products currently available on the market, as well as by the positive results of the ongoing trials. The fabrics can play a strategic role “in the post-peak oil economy. One of the lightest and nimblest of building materials, fabric is easy to transport and install, and has a relatively low embodied energy and carbon footprint—making it a choice material in adaptive reuse situations. Furthermore, new technologies demonstrate the extent to which fabric is a highly adaptive, multifunctional

material, capable of addressing a variety of future building needs far beyond the level of passive sheltering" (Brownell, 2011).

Smart materials are often called "controlled complexity" materials so as to highlight that they are materials whose "impurities and anisotropy are specially made, thanks to the support of chemistry, for a special performance. They are materials that take different aspects and original properties, tailored to specific functions: the materials are "functionalized", reacting to external stresses due to substances that change from time to time, the chemical and physical characteristics of the material" (Goodeisgn, 2014).

Michelle Addington and Daniel L. Schodek (2005) identify several classes of smart materials that summarize the current products that can be found in some cases: "High-performance fabrics with materials or weaves designed to accomplish some specific objective; Fabrics that exhibit some form of property change; Fabrics that provide an energy exchange function; Fabrics that in some way are specifically intended to act as sensors, energy distribution, or communication networks".

An analysis carried out on different projects clearly highlights how the building envelope is the most preferred place for the testing of smart fabrics. The functionalized textile fibres, when referring to the function of controlling the flow of energy and matter, can offer numerous possibilities from a technological and formal point of view. Depending on the specific characteristics of interaction with the surrounding environment, they can play a key role in meeting the diverse needs of sustainability, safety and protection of existing assets as well as the comfort perception.

Conclusions

The BIM model could support the industrial production to promote production cycles that integrate the optimization of the performance of materials with environmental compatibility for achieving the energy efficiency of the building and the protection of ecosystems and biological cycles of nature. This can allow not only to pursue an approach that adapts the industrial models to nature and assimilates the materials to natural elements able, therefore, to regenerate but also to widen the frontiers of dialogue between the building and the surrounding environmental context, also through the careful use of materials.

Note: The paragraph "Introduction" is edited by Rossella Franchino. The paragraphs "Parametric modeling and database platform to classify characteristics and performance of

innovative materials " is edited by Nicola Pisacane. The paragraph "Findings and Discussions: focus on smart fabrics and building facades " is edited by Caterina Frettoloso.

References

Brownell B. (2011, June), *Driving the future of fabric structures*. Retrieved from https://advancedtextilessource.com/2011/06/01/driving-the-future-of-fabric-structures/

GooDesign (editorial staff) (2014, May) *Smart Materials: Sensitive Fabric e Active Protection Systems*. Retrieved from https://goodesignblog.com/2014/05/07/smart-materials-sensitive-fabric-e-active-protection-systems/

Addington M., Schodek D. (2005) *Smart Materials and New Technologies For the architecture and design professions*. Elsevier Linacre House, Jordan Hill, Oxford, UK, p. 159 - p. 88.

Akanmu A., Asfari B., Olatunji O. (2015) *BIM-Based Decision Support System for Material Selection Based on Supplier Rating*, in "Buildings" n.5

De Martino R., Franchino R., Frettoloso C., Pisacane N. (2014) "*The load capacity of smart materials in the application to the construction sector*", in Maria Voyatzaki (a cura di), *What's the Matter? Materiality and Materialism at the Age of Computation*

Eastman C., Teicholz P., Sacks R., Liston K. (2011) *BIM handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors*, 2. ed., Wiley, Hoboken, NJ, USA

Irizary J., Karan E. P., Jalaei F. (2013) *Integrating BIM and GIS to improve the visual monitoring of construction supply chain management*, in Automation in Construction, n.31

Khatib J. (2016) *Sustainability of Construction Materials*, 2. ed., Elsevier

Osello A. (2015) *Building Information Modelling. Geographic Information System. Augmented Reality per il Facility Managemen*t, Dario Flaccovio Editore, Palermo

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Cities seek resilience: a network for a revalue urban identity

Caterina Frettoloso[1*], Paola Gallo[2]

[1*]*Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli,, Aversa, Italy, caterina.frettoloso@unicampania.it*
[2]*Department of Architecture, University of Florence, Florence, Italy, paola.gallo@unifi.it*

Abstract: How to address climate change in cities and human settlements in the future represents one of the most pressing challenges facing urban policy-makers today. This because climate change will affect extreme events as well as health effects associated with impacts on air quality. So the principal questions to respond for the future city designers and architects will be: How city in the future facing climate change? What are the urban models we want? What spatial innovations? These questions require critical answers that call into question both the environmental and spatial implications as result of the proposals made by architects and urban planners, and the proposed urban growth model till now, which does not take into account the effects of urban concentration without an ecological balance. This paper offers a brief overview on a method for projects of urban areas and infrastructures related to consequences of Climate Change.

Keywords: Resilience; urban network; environmental quality

Introduction

Growing awareness of climate change as well as the exhaustion of non-renewable resources, have led to a growing interest in the development of new technologies for use cleaner and cheaper energy sources but first along to an urban approach more balanced. This transition is not merely technical; it has impacts on all spheres of human society, including on industrial networks, infrastructures, social practices, regulations and landscapes (Smil, 2010).

So what lessons can we learn from tangible and intangible relationships, both among the components of the urban systems (natural and artificial) as well as between the systems itself and the urban environment? The climate change in cities swill affect extreme events (such as heat waves) as well as health effects associated with impacts on air quality. So the principal questions to respond for the future city designers and architects will be: How city in the future facing climate change? What are the urban models we want? What spatial innovations?

An urban open space network is characterized not only by the set of isolated spaces but also, by the connective tissue that detects the system of relationships established between them, relationships that influence the users' way of enjoying, both physically and perceptually, the city itself. It is therefore possible to read a network through two dimensions that co-exist, the physical and formal, as well as the relational one in terms of connections and interactions (Pinto, Remesar, Brandão, Nunes da Silva, 2010).How to address climate change in cities and human settlements represents one of the most pressing challenges facing urban policy-makers today

and require critical answers that call into question both the environmental and spatial implications and the proposed urban growth model till now, which does not take into account the effects of urban concentration without an ecological balance. Today many concrete solutions exist; they only require to be set up in order to create a real alternative to the existing development model based on global cities competition and limitless growth.

A systemic methodology

Public spaces in a resilient city should not be regarded as places that are "nice to have", but rather as places that "must be had": this is what emerges from the analysis of the case studies that are part of an interesting study, "The City Resilience Index", carried out by the Arup group and supported by the Rockefeller Foundation. Reconsidering the role of our public spaces can no longer be delayed, especially in light of the rapid urbanization and climate change that have led to new scenarios affecting different project areas which can restore places capable of supporting the resilience: from the multifunctional dimension to that of real and virtual networks, from the spatial-functional flexibility to the ecological-environmental dimension.

The study involved the development of a network model that works in different ways: connects major points of a given urban context (cultural sites, environmental or strategic areas from a functional point of view); It provides an integrated system of connection and resting/shared spaces maximizing the accessibility and soft mobility; increases the ecological environmental quality interfacing (overlapping or intersection) with the local ecological network (De Martino, Franchino, Frettoloso, 2016).

From a methodological point of view, the construction of a network implies identifying the system of relationships between the different nodes of the network. This approach, with a technological matrix, includes an analysis of the urban context where the intervention is to be carried out, with it being divided into the following two levels: the first, oriented towards highlighting the aspects of the ecosystem type and the second, the technological/environmental ones. Starting from the identification of the requalification objectives, it will be possible to define the needs framework which can be fulfilled by identifying the requirements of the system that is the basis for the definition of meta-project interventions necessary to ensure sufficient quality to the network elements and, more generally, the quality of life in the urban context.

Findings and Discussion about the connectivity issue

The proposed model is characterized by an organized set of functional areas that constitutes the backbone of the network upon which it will be possible to attach, depending on the application context, additional elements. The connectivity of these spaces will characterize the articulation and readability of the network highlighting, if present, the hierarchy of elements set in place. The pedestrian/cycle network will therefore, be the primary connection system that can allow either physical (paths, roads, and bike paths) and/or perceptual communication between the elements of the network facilitating the accessibility of the individual areas and increasing the use of the entire system without creating barriers and promoting new ways of use.

The connection areas, that part of the territory where there is such an overlap/intersection between the open spaces of the functional network and the territorial ecological network, has a key role in the model and is characterized by a higher naturalness than the other functional areas. Thinking in macro terms, from a performance point of view, these areas should ensure the permeability of the soil, contribute to a rational management of rainwater and, in general, be a place of experimentation of strategies aimed at reducing the environmental impacts resulting from anthropic activities. Maintaining high levels of environmental quality will have a positive effect on urban quality, creating, first of all, more comfortable open air living conditions that are appropriate to the needs of the users.

The connection areas, however, require some sort of interface with the urban context. The area assigned this task in the model is defined as a buffer and will be placed at the edge of the connecting areas with a dual purpose: to protect and preserve the environmental values of the ecological network intercepted as well as bring the city nearer to the users, to its use in the perspective of a responsible use of the environment and the participation in the exploitation mechanisms that the network should trigger (Pagano, 2006).

As the network penetrates the city, it is necessary to intervene, with a capillary action, with the natural and artificial systems oriented to regenerating, from a microclimate and energy point of view, the urban fabric and open spaces. These areas, defined as mitigation and adaptation areas, are intended not only to accommodate recreational, relaxation or cultural activities but, in particular, small green spaces which share the functional and environmental principles of pocket parks. The current debate on the challenge that sustainable cities must face in meeting the ambitious carbon neutral goal, orientates the urban and building projects to focus on the issue of mitigation and adaptation to the climate (Roma Capitale, 2014). Thus, the

inclusion in the model of such functional areas can help to increase the resilience of the urban environment through the correct balancing of the surfaces that characterize the lay-out of the space (in terms of reflection and permeability coefficients) and implementing strategies for the rational management of the water cycle.

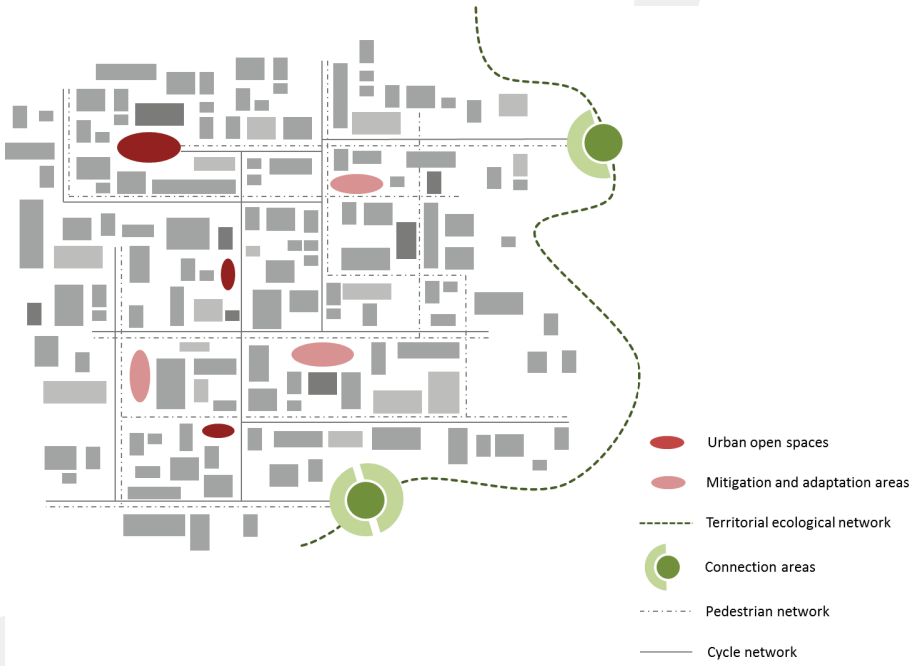


Figure 1. Development of a network model (Frettoloso, 2017).

Conclusion

Adaptation and mitigation, as well resilience and sustainability are parallel and complementary terms; they should be implemented as urban policies, strategies and actions, at different levels to respectively limit the effects and act on the causes of climate change. The proposal network approach allows a territorial natural resources conservation to reduce the climate change effect, all the while take into consideration all the connections between natural and artificial city systems to enhance landscape values and urban identity quality.

Note: The paragraphs “Introduction" and “Conclusion" are edited by Paola Gallo. The paragraphs “A systemic methodology" and “Findings and Discussion about the connectivity issue" are edited by Caterina Frettoloso.

References

De Martino R., Franchino R., Frettoloso C. (2016), Sistemi di reti e connettività nei processi di rigenerazione dei contesti antropizzati, *TECHNE* 11, 209-216.

Pinto A. J., Remesar A., Brandão P., Nunes da Silva F. (2010), Planning Public Spaces Networks Towards Urban Cohesion. In Proceedings of the 46th ISOCARP Congress, Nairobi, KEN.

Pagano, C. (2006), “Reti di aree verdi, reti ecologiche e riqualificazione urbana” in Fonti, L. (Ed.), Parchi, reti ecologiche e riqualificazione urbana, Alinea editrice, Firenze.

Roma Capitale (2014), Roma Capitale per i quartieri climaticamente neutrali, Esperienze europee a confronto. Retrieved from https://www.comune.roma.it/PCR/resources/cms/documents/CLUE_Pubblicazione.pdf.

Smil, V., (2010). *Energy Transitions: History, Requirements, Prospects*. Praeger, Santa Barbara, CA.DOI: 10.1016/j.eist.2011.10.007

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Energy Efficiencies of Cultural Heritage Through Recovery of Damages by Natural Event: The Case of The Gallery of Nations Inside the Church of Michelucci In Florence

Paola Gallo[1*], Leonardo Boganini[2]

[1]*Department of Architecture, University of Florence, Florence, Italy, paola.gallo@unifi.it*
[2] *Interuniversity Center ABITA, Department of Architecture, University of Florence, Florence, Italy, leonardo.boganini@unifi.it*

Abstract: The historic and value buildings are the trademark of numerous European cities; they gives uniqueness to our cities and are a living symbol of Europe's rich cultural heritage and reflect society's identity. So it is important fill up the gap between conservation of value buildings and sustainability, which is not an antagonism at all. The work main objective is to verify the feasibility of a performance improvement of a value building, as national cultural heritage, in terms of energy saving and sustainable materials use. Since reduction in energy demand assumed as feasible value, the paper aims to demonstrate that the historic environment and its heritage assets should be conserved and enjoyed for the quality of life they bring to this and future generations although, a sustainable use and preservation of value buildings requires broad and long term compromises between social, economic and environmental aspects.

Keywords: Energy recovery, sustainable materials, cultural heritage

Introduction

Historic buildings today play an important role for the community compared to what happened in the past. Such buildings, in fact, beyond their beauty and recognition of their value, are essential as the bearers of our historical identity. Cultural heritage is a significant force for 21st century Europe; not only is it at the heart of what it means to be European, it is being discovered by both governments and citizens as a means of improving economic performance, people's lives and living environments.

At the same time, sustainability is about overlapping environmental, social and economic requirements and the need to bring them all into harmony: all of them are relevant to older buildings, but for the purposes of value, the greatest emphasis must lie on the environmental aspect, and specifically the use of fossil energy.

The need to recovery, in terms of energy, the historic building heritage and therefore the possibility to act on to ensure optimal performance, however, pose the difficult question on the evaluation if intervention technology to reduce energy consumption, by mean of new materials and techniques, is considered a "threat", while acknowledging that effectively

contributes to the use and the long-term preservation of an existing historic building and then to the preservation of its cultural value.

This work show the results, about the partial recovery of "San Giovanni Battista Church" (Chiesa dell'Autostrada del Sole) roof, architect Giovani Michelucci design, damaged in March 2015 by a storm that has caused serious damage.

After the disastrous event, this value building reported several damages to the "Nations Gallery" roof; in detail the storm caused the detachment of external copper layer of this church area and the deterioration of underlying layers. The "Società Autostrade", building's owners, instructed the CHM_Lab (Architectural Department of University of Florence), to project the recovering of the roof. The approach of the research group was been to propose an improving of global building performance, through the integration of new and sustainable materials for the roof system, without changing dimension, the external language and technological original approach.

Figure 1. The San Giovanni Battista Church realized by Michelucci: the damage of the gallery of Nation roof after the storm

The study is collocated inside the theory of Cultural Heritage refurbishment inside the technical approaches (Plevoets, Van Cleempoel 2011): based on the direct survey and indirect analysis of project design, the study want illustrate the possibility of improving the energy consumption and environmental performance of cultural heritage, preserving historic parts of the building (Pfluger R., Baldracchi, P. 2011).

Before starting to refurbish an existing building in fact, it is fundamental to carry out an analysis of the actual existing building's performance and condition to understand how its performance can be improved to achieve current benchmarks in terms of comfort, security

and energy saving. A baseline can be established by conducting an accurate audit, carried out as a systematic examination and measurement of key aspects of all the building.

Methods and approach to the study

The study was divided in two different phases:

1 The survey: direct and indirect study about the technological and historic aspects of the building;

2 The project: definition of technical approach and proposal for the restoration of original layers.

After the first studies, carried on through the definition (in terms of material and technology used) each roof single layer, to evaluate the total performance in terms of energy, the research group developed the proposal project.
In detail the proposal respect the original project in terms of:

- Single layers dimensions
- Recover of peculiar existing elements (copper external layer, structural wood elements)

To develop all the process, was necessary: the analysis of original Michelucci's project first, three invasive essay on the roof system and the investigation of the survey campaigns, developed by the church's owner (Società Autostrade s.p.a.) in the 2007 and 2011[1].

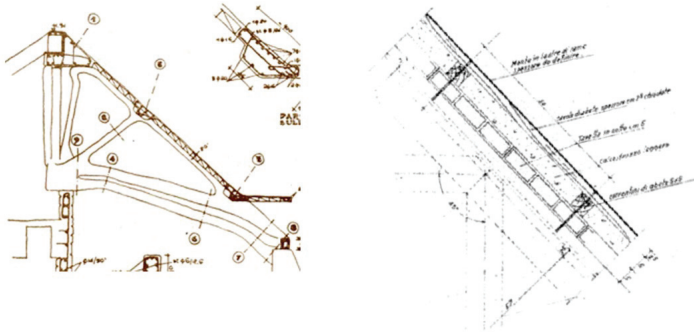


Figure 2. Original technical draw of the roof designed by Giovanni Michelucci architect

[1] Internal reports of surveys by Prof. Ing. Sandro Chiostrini (2007) - Graphic drawings of "*Project of ordinary and extraordinary maintenance works*"; "*Report on the conservation state of building*" by Arch. Capitini (2011).

Discussion and results

Starting from first analysis of the original project, it was possible to hypothesize the structure of the roof "Nations Gallery" covering: flooring blocks and concrete for the principal structure, reinforced by rafters cast in place along the roof slope; the whole laid on reinforced concrete bearing beams. This principal structure would have been completed with a non-reinforced concrete slab with insulation material added, where are fixed the wooden cross beams and floor, useful to support the copper finish. This particular covering was implemented coupled with the double-seaming technique. In parallel a direct analysis was developed through two different test. From the comparison between the direct survey and the original project it was emerged, as was usually in the Church construction period, that the technological solutions adopted, were defined entrusting their execution to the experience of the workers who directly performed them in the construction site. Indeed we find several incongruence from the survey to the original design, especially in the thicknesses of single layers and in the composition of insulating material. Following the damage caused by the storm, the owner realized a temporary covering with a layer of waterproofing sheath, with the aim to reduce the future damage and protect the roof underlay: this type of recover, not programmed, has pointed out some critical deterioration of several roof substrate, making necessary a long-term forecast of maintenance.

So In this context we have defined the real composition of Nation Gallery roof as follow (from inside to outside):

- finishing layer plaster in cement mortar (1cm)
- roof structure (as described above) (18 cm)
- concrete slab non reinforced (2 cm)

On this structure we identified:

- wooden cross beams (in fir wood probably) 5x6 cm, distancing 50 cm from each other.
- Insulation expanded polystyrene panels (4 cm) integrate in the wood cross beams (distance 50cm).
- lightened screed (with vermiculite / pumice) about 2/3 cm in bad conservation: in several area appear crumbled or lacking;

- bituminous covering about 3/5 mm. The state of the membrane in some areas is broke and does not guarantee the perfect water tightness of the underlying layers.

Following this phase, it was therefore possible to develop a simulation through a thermo-hygrometric analysis of the roof, carried out by a software tool (TERMUS-G by Acca); in detail has been developed an investigation on three different case study: the first on the roof system current layers, realized after the urgent recover intervention; the second on the building roof layers still present in the undamaged covering portion; the third on proposed layer, designed to improve building thermal and environmental performance. The last one proposed layer, was designed out aiming at the achievement of the regulatory limits of national rules in terms of energy performance, even if these target are not concerning historical buildings as the San Giovanni Battista Church.

The main objective has been to verify a possible building performance improvement, inside the constraint aspects, since on this building we have two rules level: the first direct, imposed by urban regulation and second indirect, required by landscape protection; both limits the change of the roof external linguistic aspect and its layers composition. This limits constricted the research group to propose a simple intervention aimed exclusively to improve the materials characteristics used, through integration of new material with high energy and environmental performance.

Following this approach the improvement proposed project has foreseen the replacement of the existing polystyrene panels, with an insulating PET panel, produced by the plastic bottles recycling chain, together with the wooden cross beams replacement. Below the three results are showed.

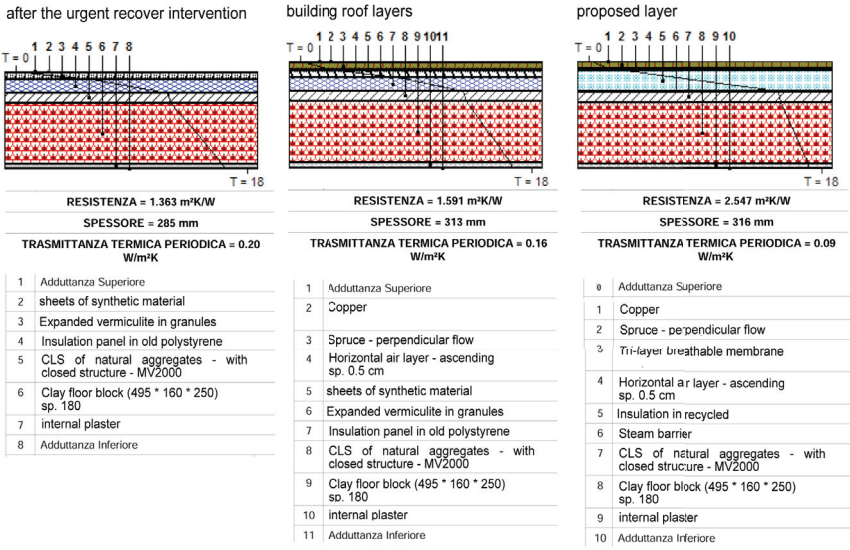


Figure 3. *Simulation results of the* three case studies

Conclusion

In conclusion it's possible overtake the limitations derived by the constraints, through the improvement of qualitative of materials with similar performance: in this case, with replacement the existing insulation material in EPS with a better one, the transmittance value progress from 0,628 W/mq K to 0,393 W/mq K. Though this performance is not comparable with Italian normative limits, defined only for new buildings (ref. 0,28 W/mq K for Florence zone), this type of approach can be used to restore the cultural heritage since the use of congruent materials (new too) in the retrofit bring two important benefit. The first in term of maintenance and management: new material usually, have a long life cycle, so it's possible reduce the number of interventions and improve the time-life building. The second one is related to improving the comfort indoor reducing maintenance cost, in relation to energy consumption. It's important underline that this approach carry out by the restricted research group, has been added in the San Giovanni Battista Church conservation program: one of the results expected by wider research conducted by DM_SHS Lab. In fact the research programme foreseen an user and technical manual in order to simplify and uniform the retrofit activity on this historical value building avoiding useless interventions.

Acknowledgments: This research was supported by Autostrade per l'Italia s.p.a.. We thank our colleagues from DM_SHS Lab (Documentation and Management of Small Historical Settlements) of Department of Architecture of University of Florence who provided technical and practical support insight that assisted these partial research results.

References

Plevoets B., Van Cleempoel K. (2011). *Adaptive reuse as a strategy towards conservation of cultural heritage: a literature review.* In Structural studies, repairs and maintenance of Heritage Architecture XII ed. Brebbia C.A; Binda L. - WITpress Southampton, UK

Dall'0' (2011) *Green energy audit. Manuale operativo per la diagnosi energetica e ambientale degli edifici.* Edizione Ambiente – Milano, IT

Camuffo (2014) *Microclimate for cultural Heritage – Conservation, restoration and maintenance of indoor and outdoor monuments*. Elsevier, NL

Pfluger R., Baldracchi, P. (2011) *Report on Energy Efficiency Solutions for Historic Buildings*, Bolzano,

Pohl, W., (2009) *Energy efficient daylight solutions, trends and chances*; VELUX Symposium Rotterdam

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

A museum system of design/craft for sustainable development in southern Italy

Claudio Gambardella[1*], Dario Russo[2]

[1] Department of Architecture and Industrial Design, Università degli Studi della Campania "Luigi Vanvitelli", Aversa, Italy, claudio.gambardella@unicampania.it*
[2]Department of Architecture, Università degli Studi di Palermo, Palermo, Italy, dario.russo18@unipa.it

Abstract: In this extended abstract we are going to explain an academic project entitled "THE SYSTEM OF TERRITORIAL DESIGN SYSTEMS. *Cultural tourism, craftsmanship and design for the local development of the production enterprises of excellence in Southern Italy and Made in Italy*". It is based on the cooperation among designers and artisans in order to encourage the development of local craft-based production, by creating a REGIONAL MUSEUM SYSTEM OF DESIGN AND APPLIED ARTS in the five regions of Southern Italy. Then, the "SYSTEM OF THE SYSTEMS" is constituted of the five specific museum systems to be created in each region; these systems - especially in Campania and Sicily – can then represent an ambitious and strategic project of sustainable development in Southern Italy. The final aim is to allow companies of Southern Italy to take part in the "Made in Italy" process, so spreading the Italian Handmade as the Design of Italy.

Keywords: social sustainability; crafts; artidesign; handmade in Italy; museum systems.

Introduction

Wolfgang Sachs tells that sustainability's essence is situated in the "particular relation" between people rather than people and nature. According to the German scholar, this notion represents the basis for a new ethic approach, which extends the principal of equity to the human community in a temporal perspective that invests present and future (Sachs 2001, 2001a). This approach has a particular meaning concerning the difference between countries from the North and the South of the world: social justice's imperative on global scale, cannot just think about the impact that the economical development has on the environment and on next generation's conditions.

If we then refer social sustainability within a territorial system, we can exalt subjects' capability to efficaciously cooperate together, because of the same project's perception, encouraged by a concertation between the different institutional levels. Implicit social aspects' importance in sustainable development concern business' world.

Methods

Craftwork, which in about one hundred and thirty years had a varying role in the dialectic relationship with the Culture of Project, from Arts and Crafts Movement to Bauhaus School, and now it has been reconsidered by well-known scholars as Richard Sennett, in Italy can to aim becoming an underlying element for a "Design of Countries". This sort of "new design" could play a key role for the "renaissance" of "Made in Italy".

The idea moves from the project of Seconda Università di Napoli, regarding the Regional Museum System of Design and Applied Arts and developed in 2003 for the Campania Region Department of Productive Activities. It considers to realize a System of Regional Museum Systems, each one provided with a "museum of companies", to be located in areas with high touristic, working as a connector for participant museums and companies.

In other words, a museum for contemporary design, conceived principally as exceptional place where present new Handmade in Italy products, originated by design and craftsmanship working together. This System should assign to Universities, Local Governments and professional organizations gathered in territorial tasks the role of steering committee, aiming to enhance the relations between communities and places, to restore the proto-industrial business viability that characterised the Southern regions in the pre-Unification period; finally, to promote local development thanks also to tourism industry and sustaining new business start-ups and employment of young grad students, giving them an alternative to flee abroad.

In these perspective, South Italy reveals an extraordinary material culture. If we look back on our past and we do make as a strength point the tradition of the meridional industry of The Kingdom of the Two Sicilies, this culture of materials could be part of Handmade in Italy, a conceptual extension of the term *artidesign*, of which Filippo Alison and Renato De Fusco have already analysed in 1991. Artidesign, or third genre between design and craftsmanship, is a specific activity which produces objects intended to last a long time, completely adaptable, of huge value, far away from disposable objects of low industrial profile. Moreover, "History as kingdom of long duration suits artidesign better than industry. While the crafted object, like a work of art, has possibly no expiry date, on the contrary its value becomes bigger day by day; different is the industrial product which is destined to end, to be consumed, making place to a new series of objects" (De Fusco & Rinaldi, 2015, p. 186).

Furthermore, the "less advanced" South should not need to travel through again progress' steps to get in the line with emerging countries because – metaphorically speaking –

could catch the development-progress train at the last stop without taking it at the terminus. The train of the 3rd Industrial Revolution Phase 2.0 (someone talks about the 4th Phase) is the 3D printer. “More than other factors useful to South development, the makers phenomenon seems to be the best solution. Their technology is made up of crossing digital and analogical and their icon tool is the 3D printer” (De Fusco et al., 2015, pp. 188-189).

3D printer is known for its handcrafted dimension, and it is widely participatory and open-source, easy to use, and it has low production costs (if we consider the costs big industries deal with) they are advanced characteristic for a developing South. “This new technology is capable of bringing back the productive/handcrafted activity to a local dimension which is no longer global, because delivery and distribution costs will be higher than productive ones. It is not who does not see the incredible opportunity for the regions of the South in the return to the location of the productive activity” (De Fusco et al., 2015, p. 190). If we come back on the metaphor of the development-progress train, “it seems that makers issue can be considered as one of the most important station of this itinerary (De Fusco et al., 2015, p. 191). [...] we have another question: besides its consumer role, will the South still be a producer of that kind of objects in the next future? These opportunities seem must not be underestimated and we should not miss out them” (De Fusco et al., 2015, p. 193).

We can understand how the consequence of all this is not only a complete change in “doing” business, targeting more and more on the possibility of a ubiquitous governance of the production processes; but also in “making” design, with unexpected implications regarding economy, labour and its managing, the concept of factory, as well as more strictly cultural aspects, like the harmonisation of technology and craftwork.

Briefly we list all the general aims of the project:

• Creation of an advanced network composed of companies, designers, creatives and innovators
• Promotion of excellent territorial crafts
• Awareness-building among local communities about knowledge of material culture, for establishing a new feeling of rootedness and belonging to their sites
• Economic growth of local craft enterprises
• Reorganisation of productive chains by means of design
• Integration of ancient manufacturing and new technologies
• Enhancement of ancient and contemporary manufactures of excellence in Southern Italy and strategic promotion of Handmade in Italy culture internationally
• Support of employment of young graduates.

Conclusion

The System can then represent an ambitious and strategic project of sustainable development in Southern Italy.

Economical growth, employment of young graduates, development of local handcrafted activities, betting at the same time on tradition and innovation, developing of social cohesion belonging to territory's community, all these become the ingredients of a sustainable development made up of a big museum system in Southern Italy. This is a project which guides the sustainable development of a huge portion of the country converting its weaknesses (absence of industries while quite the opposite happens in Northern Italy) in new opportunities, this happens because it has its roots into a virtuous interaction between design and craftsmanship. In this context, smallest companies of artisans become connective cells which regenerate a whole territory promoting Made in Italy's rebirth linked to places of great handcrafted vocation and new business models will be promoted in the new scenery of Handmade in Italy.

References

Alison F., De Fusco R. (1991). *L'Artidesign*. Napoli: Electa.

Bodei R. (2010). *La vita delle cose*. Roma-Bari: Editori Laterza.

De Fusco R., Rusciano R.R. (2015). *Design e Mezzogiorno tra storia e metafora*. Bari: Progedit.

Granelli A. (2010). *Artigiani del digitale. Come creare valore con le nuove tecnologie*. Bologna: Luca Sossella Editore.

La Pietra, U. (2015). *Abitare con Arte. Ricerche e opere nelle arti applicate e nel design*. Mantova: Corraini.

Manzini, E. (2015). *Design, When Everybody Designs: An Introduction to Design for Social Innovation*. Cambridge: The Mit Press.

Morace F., Santoro B. (2014). *Italian factor. Moltiplicare il valore di un Paese*. Milano: Egea.

Spadolini M. B. (2015). Università, design e nuovo artigianato. In Tosi, F., Lotti, G., Follesa, S., Rinaldi, A. (cur.). Artigianato Design Innovazione. Le nuove prospettive del saper fare. Firenze: DIDA.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Charterhouses in Campania: *San Martino*, a case to be reconsidered.

María Fernanda, García Marino[1]

[1]*Department of Architecture and Industrial Design - Università degli Studi della Campania "Luigi Vanvitelli" Aversa (CE), Italy.2, marifmarino@gmail.com*

Abstract: The Carthusian monumental complexes of southern Italy are part of a rich historical and artistic heritage. They were for about six centuries, real factories of culture but also fundamental knots - perfectly inserted in the territory - for the economic and social development of the surrounding population. Of the three Carthusian complexes of the South, that of *San Martino*, is a perfect example of the problems concerning the transformation processes that involve a moment, in particular, when these changes point to the deep changes in the original order. The monument is also revealed as the result of the evolution occurred in the parameters and criteria on patrimonial interventions, the monument is also prove as the result of the evolution occurred in the parameters and criteria on patrimonial interventions, as well as cultural policies and social sensitivity. It proposes a reading from the point of view of the morphogenesis and the philosophy of architecture.

Keywords: Heritage, Architecture; Charterhouse.

Introduction

"Places have memories, memory is inscribed in the world" (Hillman, 2004, pp.94-96) on the meaning of architecture - an operating mode poised between experimenting and realizing the forms of living and, at the same time, an activity linked to interiority and thought, a dual nature that should be preserved in its entirety. Principle often overlooked, especially in the case of change use, which in the intent of creating exhibition spaces initiates a real process of genetic mutation. An example is the Carthusian complex of San Martino which later became the City Museum. Innovative technical procedures procured further distortions with the obliteration of six centuries of spiritual and housing habits. Today, despite the interventions conducted in the 90s in the sign of a recovery of the original value, a Charterhouse at the crossroads, uncertain whether to continue to be Museum of the City, or re-appropriation of his soul. Architecture – says Calvino, referring to the city and the elements that compose it - consists of the relations between the measures of its space and the events of its past (Calvino, 2016, pp.34-45).

The Architectural iconography

The Carthusian order was founded in 1804 by St. Bruno of Colony. The first monastery was that of the Grand Chartreuse, Grenoble, France, from which it derives the name of the order. In 1090, St. Bruno established the monastery of Santo Stefano al Bosco at

Serra San Bruno in Calabria. These will be the architectural model of all the other buildings of the order, an interdependent scheme from spirituality and strict Carthusian Rule. Their iconographic model articulates in two principal nucleuses. The first is the "high house", destined for the hermitic and partly cenobitic life of the Carthusian "fathers"; the second is the "low house", the kingdom of the Law Fathers (accommodations, courthouse, the workrooms, pharmacy). The "high house" is divided into two zones: the cenobitic (church, cloisters, refectory, treasury, library, apartment of the prior, etc.) and the hermit area, with the large cloister cells and cemetery (*Certose e Certosini in Europa,* 1990, pp. 10-19). A scheme that has remained intact, in the great Certosa di San Lorenzo in Padula, the first of the Carthusian complexes founded during the XIV century.

Figure 1. Main courtyard. Charterhouse of Padula, Cilento, Italy (Gazzetta di Salerno, 2013)

The Charterhouse of San Martino

In 1325 the foundation of the Neapolitan Charterhouse of San Martino, even within the framework of the previously described fixed scheme, it presents architectural peculiarities dictated by the diversity, historical, socio-economic and orographic nature of the territories in which it is inserted. San Martino dominates the city of Naples: a safe location for the protective proximity of Castel Sant'Elmo.

The imposing complex was built at the behest of Robert of Anjou on the project and conducted by Tino Camaino (Siena 1280 - Naples 1337), architect and sculptor, who at his death was replaced by architect Atanasio Primary. Also to Camaino is attributed the primary

plant of the castle where different elements and details (for example, the battlements) relate it to the Charterhouse.

Figure.2. Overall view of Charterhouse of San Martino, Napoli, Italy (W. Moroder, 2016)

A gradual metamorphosis: from Charterhouse to Museum

The following is a brief historical profile of this process, of which five phases can be identified: 1) XIV-XV century. On February 26, 1325, the monastery of San Martino was consecrated by the will of Carlo the Illustrious, son of Robert of Anjou. Of the original Gothic structure remains only the spaces that correspond to the underground (Doria, 1985). 2) XVI century, no relevant amends the original structure remains essentially unaltered. The most significant changes occur during the Catholic-Reformation period with the presence of the architect G.A. Dosio, who specially intervenes for the Cloister of the Prosecutors and the Great Cloister. 3) XVII century is characterized by the personality of the architect and sculptor C. Fanzago, intervened for the Church and for the Great Cloister and realizes the busts of the saints and the balustrade of the cemetery. 4) XVIII century some interventions directed by the architect Tagliacozzi Canale, the changes made concern only the decorative and scenography aspects. 5) XVIII-XIX century. Great political-religious changes have a strong impact on the function of the building and thus on its physiognomy. The most important episodes are: French occupation (1799); First suppression of religious orders (1800-

1804); House of War Invalids (1812-1831); return of the Carthusian monks (1866-1867) and second suppression, as well as the establishment of the City Museum (1867). The monastery became property of the state, was already itself a museum full of works by important artists called over time by the monks. The new role of the Charterhouse triggers a process leading to the monument to the progressive loss of its identity, with the insertion of works and collections and exhibition, although of great importance, but that had nothing to do with its original value of monastery.

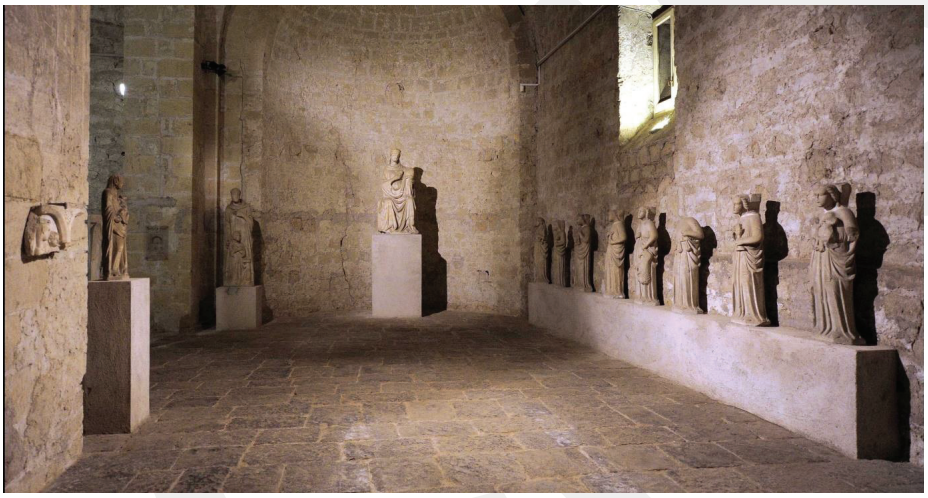


Figure 3. The original gothic structure, XIV century, today is the section of the museum dedicated to sculpture. Italy (Pressphoto - OS, 2015).

The structural interventions: the denied Chartreuse

Between 1871 and 1872 under the direction of G. Fiorelli becomes a section of the National Museum. The aim was to create a space that would document the tradition, art and history of the city. No substantial changes are made to the architectural structure, only some environments are being restored to be used to set up the exhibition course. Since 1882, with F. Niccolini and in the context of a more "functional" project, the more relevant structural and content changes are triggered, the integral transformation of the Prior room and the adjacent lodge, the terrace of Pharmacy which gives rise to two large salons to expose the boat of Charles of Bourbon. From 1898 with Spinazzola, the architectural distortion is carried forward in a more unstoppable way. The cells of the monks, are partly demolished, in part put into communication occluding access to the cloister. All of this in order to create exhibition spaces in harmony with the museological criteria of the time and to meet the need for

distribution of steadily increasing collections. In the '20s of the twentieth century, innovative technical processes (reinforced concrete) involve further structural changes. For the East of the Great Cloister, engineer Guerra designs new floors with concrete floors - hidden by *fanzaghian* fake vaults - at a higher altitude than the original, which will bring to the demolition of the laboratories placed on the second floor of the cells. It also builds a new hall encompassing the area between the courtyard and the entrance hall and part of the Prior. Finally, the wooden roofs of some rooms are being replaced by concrete slabs with coffered effect. In 1939, B. Molajoli suggested that the historical and artistic sections should be two separate but interconnected museum circuits. During the war, the structural conditions worsen as an indirect result of the bombardments and the various uses to which the building is subjected. Director since 1945 G. Doria, entrusted architect De Felice the task of realizing the idea of Molajoli. The transformation process is completed with the total renovation of the cells in the north side. It will also proceed to make a change the ancient kitchens to host the Nativity Section. The novitiate area has the same fortune (*La Certosa e il Museo di San Martino*, 2000 pp. 11-23).

Figure.4. Great Cloister of San Martino by Cosimo Fanzago, XVII century (J. Savoie, 2011).

Conclusion

In 1994, following the example of the Charterhouse of Padula, A. Pezzullo elaborated a project for San Martino, decidedly more innovative in comparison with the previous events. It is carry out a conservative restoration, focused into the reversibility of the interventions and the compatibility of materials, which aims to reproduce the original value of the monastery through the recovery of some of the spaces related to the life of the monks, adapting to these needs the museum and not the opposite. In this way, it proposes a harmonic use, where the historical and cultural aspect of the monument becomes the higher value element. Progressively, based on careful philological study and without altering the close link between the monastery and its landscape, it is restored the reading spaces and daily life of the monks. After the first actions aimed at a change of direction in the 1990s, today the Charterhouse of San Martino is in a stalling phase. The new approach to the monument, did not give further results. Built according to precise standards based on the rule of San Bruno, San Martino was inhabited and lived by them since the XIV until the XIX century: six centuries of traditions. Therefore the first coherent consideration is the traditional cultural property. It's urgent to think of a state policy in that the monument-space is understood as a source of knowledge, cultural wealth and the engine of work, and which favors initiatives and investments. In this sense, a first-order aspect is the development of qualified cultural projects. Hillman concludes «The question is what the place wants, not what we want» (Hillman, 2004).

References

BACHELARD, G. (2006*). La poetica dello spazio*. Bari: Dedalo.

CALVINO, I. (2016). *Le città invisibil.* Milano: Mondadori.

Certose e Certosini in Europa: Atti del Convegno alla Certosa di San Lorenzo (1990). 24 Sett. 1988 (Vol. 1-2). Padula 22, 23, Soprintendenza ai Beni Ambientali, Architettonici, Artistici e Storici di Salerno e Avellino. Napoli: Sergio Civita Editore.

DE MARTINI, V.(1988). *La Certosa ritrovata.* Catalogo della mostra, Padula, Certosa di San Lorenzo. Soprintendenza per i Beni Ambientali Architettonici Artistici e Storici di Salerno e Avellino. Roma: De Luca Edizioni d'Arte.

DORIA, Gino (1985). *Il Museo e la Certosa di San Martino. Arte – Storia – Poesia.* Napoli: Mauro Editori.

La Certosa e il Museo di San Martino (2000). Soprintendeza per i Beni Artistici e Storici di Napoli. Napoli: Electa,.

HILLMAN, J. (2004) *L'anima dei luoghi*. Milano: Rizzoli.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sensory spatial appraisal of the Child Medical Unit of Mustapha Pacha hospital in Algiers

N. GHIDA[1], K. BOUSSORA[2]

[1] *Laboratoire Ville Architecture et Patrimoine- LVAP- Ecole Polytechnique d'Architecture et d'Urbanisme -EPAU / Email: n.ghida@epau-alger.edu.dz*

[2] *Laboratoire Ville Architecture et Patrimoine- LVAP- Ecole Polytechnique d'Architecture et d'Urbanisme -EPAU / Email: k.boussora@epau-alger.edu.dz*

Abstract: The research takes as a case study the Children Medical Unit. The objective of this research is to evaluate the spatial sensory criteria of children in the Clinical Medical Unit through Evidence Based Design approach. This approaches consists to evaluate the impact of spaces on child welfare. This research combines three steps: First, data collection regrouping historical insights regarding the unit. Second the observation of the spatial paths hospitalization of children. Third, a photo elicitation semi structured interview in order to evaluate the main lived spaces. The outcomes will contribute to healthcare facilities refurbishment operation on sensory spatial appraisals through taste, sight, touch, smell, and sound. The study will impact the healthcare facilities architecture in Algeria and expose the need of the expertise concerns regarding the sensitive aspects of ancient healthcare architecture and architectural sensory appraisals.

Keywords: hospital; child perception; sensory appraisal.

1.Introduction

Child scientific studies are a recent field of study comparing to the interest of adults needs in different disciplines. (FAPEO, 2008) In fact, it is only in 1924 that United Nations ratified the first international convention of children rights. Its main objectives are to contribute to child well-being through health, education, and participation. In Algeria, child healthcare convention is applied since 1992. Beside free education and healthcare actions. This convention includes child participation. In 2009, the collaboration of the UNICEF and the Algerian ministry of Family and the Feminine Condition have taken the experience of evaluating children perception, attitude and right of participation. The study highlights the challenges of including child perception into collective actions. Beside this study, there is a particular interest regarding child use of space and particularly in the city (Ould Madhi, 1986) Studies confirm that being hospitalized in a room with a window on natural views has more

positive impact on inpatient healing than brick wall exposure (Ulrich, 1984). Besides vegetation, pets (Bishop, 2008) water views have a significant positive impact on inpatients. Evaluation of spaces used by hospitalized patients proves the contribution of space to heal inpatients and improves outcomes (Lawson, Phiri, & Wells-Thorpe, 2003) Architectural spaces linked to better outcomes – when positive to hospitalized persons- or stressful in healthcare facilities might be the room (C. C. Andrade & Devlin, 2015) as well as spaces of social interaction and leisure (Earls & Carlson, 2001). The outdoor spaces of healthcare facilities are as well an important space of safety, positive effects and relaxation (Sherman et al., 2005) Being part of the memory of child it has a positive impact on child health improvement. Reducing pain: Through entertainment, therapy nature sights and sounds. Spending more time outside with natural contacts is a healing factor (Jonveaux et al., 2013) Our study aims to evaluate the spatial use of children in the Medical Unit of Mustapha Pacha hospital - CHU- during child hospitalization. The welfare indicators of healthcare design are difficult to point out through a literature research, due to the complexity of the field. .(Adams, Theodore, Goldenberg, McLaren, & McKeever, 2010)

2.Methods

2.1 Structure of the method: The method is structured through three steps:

- A data collection through statistics, architectural surveys and layouts to understand the organization and the use of spaces in the service.
- The observation of the child' uses of space and his interaction in the unit.
- A photo elicitation semi structured interview with the hospitalized children.

2.2Presentation of the general case study and interests:

The Medical Unit of Mustapha Pacha hospital receives more than 300 children per 24h and can offer more than 108 beds. Its recognize medical services attracts Algerians from all over the country to benefit from cares. It is important to explain the layout of the service in order to understand the study case choice of the spatial evaluation location. The medical care service unit of Mustapha Pacha is a complex structure composed of five main services:

- An Emergency service
- A day hospital (hospital du jour) : outside inpatients service.
- Pediatric and oncological services: as an inpatients service.

- Vaccination services.
- Radiology services.

Our study is concerned by the evaluation of spaces used by hospitalized children. As a first pilot study attempt, our choice focused on the Unit 4 -Hutinel pediatric service- of the Medical Unit of Mustapha Pacha hospital child perceived spatial evaluation. The study implicated mainly children, but parents and medical staff where indirectly concerned with ethical permissions. 19 children were interviewed (Table1) . The semi structured interview lasted 30 minutes with each child and with the presence of a parent.

Table1: Age and number of the hospitalized children interviewed. Author, January 2018.

Girls		Boys		Total
8 years old	3girls.	8 year old	4 boys.	
14 years old	2girls	10 year old	1 boy.	
9 years old.	3 girls	12 years old.	/3 boys	
15 years old.	1 girl	14 year old	2 boys .	
Total	9		10	19

2.3 Observation of the children spatial use:

An observation of hospitalized children paths was held in order to understand the interaction of users and spaces.

The observation was made each day during February 2018. A grid of observation was made for notetaking as well as for pictures. The grid contains: child spatial interaction information, pictures of used spaces and a commented section for any details.

The photo of the observation step were taken in natural daylight and at 12.00 were the sun effect is neutral. This leaded to photo Elicitation semi structured interviews with children to appraise space with qualitative criteria.

2.4 Interview:

Selective pictures of the most used spaces during the observation were used to the photo elicitation semi structured interview. Children Photo Elicitation semi structured Interviews were organized after parental ethical agreements. The semi structured interview

was structured with precise question regarding the liveable spaces used by child: the playroom, the room, the corridor, the medical care room, sanitary space, the outdoor space.

2.5.1 Data and sample:

10 boys and 9 girls were chosen on the basic of their age: 6-15 years old.

Some criteria of sample selection:

- The authorization of the parents and the medical team/
- The age of children
- The child ability and availability to communicate
- The temper of the child.

The Data collected, were compared to the grid established during the research regarding child spatial perceptual evaluation.

2.5.2 Plan and process of the interview:

The photo elicitation method, offers the possibility of interacting more easily with children through interviews with photo presentation. (Epstein et al., 2006) The questions were centered around the spaces used by children. They were about the feel of children and their satisfaction of healthcare service design. The semi structured form of the interview was important due to the spontaneous child interaction. The photo elicitation was important to help child to understand some questions.

3.Findings and Discussion

3.1. General physical aspects and senses indicator: Spatial observation offered us the starting point of the research important information: Children paths in the Medical Unit of Mustapha Pacha hospital: 6 main spaces are concerned with child spatial use during hospitalization: (1) The room space 100% of the time , (2) Corridor 100% , (3)Playroom space, (4) Medical Care Room (5) Sanitary space, (5)The outdoor space of the medical unit service 40%. Children express enthusiasm to particular spaces: the room and the playroom space. 100% of answers regarding the question of which place do you like the most here was about the playroom. 80% of them reported the sadness and bored when the playroom is closed. 80% of them adore their room too. It procures safety, calm and comfort: especially with the parent presence. The group result was homogenous between gender. Children were

concerned about calm, safety, amusement and learning, comfort and outdoor access. They reported their wish to have access to the outdoor space of the service. Even if it is possible but they have to be under parent or medical staff close watch.

3.2. The playroom as a space of collective cohesion, learning and personal confidence: They appreciate the functionality of the space: availability of games, drawing tools, laptops and toys. It is a place where they spent 4 to 5 hours per a day. The space offered them the possibility to express, to learn and to laugh. They have the possibility to personalize the space with personal drawings and paintings. They regret the inaccessibility of the space during all the day: it is only opened from 10 to 16 due to administrative matters : availability of the psychologist in charge of the space.

3.3. The room as a comfort, safe and secure physical indicator: 80% of the answers regarding the room were positive: children express joy while presenting their room and the physical elements composing it: 80% appreciated and "adored" the use of colours on walls and were "happy" to indicate us the figures, drawing and painting in their walls.

3.4. The Corridor space of amusement, pain, access and freedom: The corridor is 100% used by children in order to prospect the spaces around the room. It is a direct physical design element connecting the spatial element used by child. It is a longitudinal surface of 18m fois 2m . It connects rooms and is used by mothers during the day as a siting place. Children use it as a playground when the access to the playroom and to the outside is forbidden.

It is used as a running course from 70% of children. 100 % of the interviewed boys use it as an improvised football field.

3.5. The Medical Care Room: Children expresses pain, tears, fright and silences when talking about the medical care room. They avoid going inside it. It is only used when medical treatment or nursing services are needed.

The space is neutral: no ornaments and no colours. 100% of children (boys and girls) describe the feeling of being in danger on the space. Even if the parents accompany them or the medical staff reassure them during treatment times. They express the fear of the space.

3.6. The Sanitary space: The sanitary space is used for sanitary used only for needs. The children are satisfied of the sanitary space equipment and use. The availability of water is

fundamental for them. On the other hand, 40% of the children expresses the difficulty to have access to the washbasin " it is high and it is difficult for me to use it easily. My mom has to help me" They express as well the fear of being alone in dark angles of this space.

3.7. The outdoor space: 40% of the older children has the ability to go outside when parents are around. (from 12 to 15 year old). The others have less chance due to their parent's availability and disposition to keep a close watch on them.

Children express happiness, joy and confidence explaining how, when and how many times they use the external space. The unit has a small external space where children have access sometimes. The access is under the medical staff acceptance and with parent are use it with the medical service acceptance and parent presence. They feel energize (full of energy) and play around some minutes (20minutes maximum) Not all the children has the privilege to go out. Parents point out the danger of the space: presence of cars, presence of external hospital users. They do not feel safe when children ask to go out. Child appreciate the presence of greenery and light outside. During one of the interviews, a child went out with his mother in order to stay some minutes at sunlight. He told her : " I miss the sun".

Discussions:

The objective of this study was to evaluate the spatial sensory criteria of children in the Medical Unit through an Evidence Based Design approach. We also aimed to explore three steps: data collection observation with Photo Elicitation Interviews. Following Evidence Based Design to evaluate child healthcare facilities, our results prove the importance of space on child well-being and medical improvements to have better outcomes. Physical elements are indirectly outlined by children to define their architectural needs to feel better. Feeling joyful, happy and calm is part of psychological welfare. The evaluation of child liveable spaces is mandatory to understand the spatial ergonomic use and the senses expressed by children during healing process at the hospital. The use of physiological measurement should expose the impact of space on child sensorial perception. The brain function should prove objectively child architectural needs during hospitalisation. The medical care evaluation shows the necessity of design to deliver change to child fear of treatment. Children are aware about their relation with outdoor.

Conclusion:

Architectural healthcare well-being indicators are part of sensory qualitative appraisals: touch is more for material comfort, vision is for layout organization, colours, furniture and nature appraisals in space. Smells are part of hospital waste management and natural healing smells: aromatherapy. Hearing should be adaptable with isolation and matching acoustic building materials. Spatial occupancy of hospitalized children in the Medical Unit of Mustapha Pacha hospital has some positive physical design elements which insure better outcomes. Social interaction is mandatory to child development and welfare: spaces to NGOs are needed to organize child events and informative or solidarity meetings for parents**.** Entertainment through Art and educational session in healthcare facilities promote child confidence and welfare. Integrating this approach in all the unit space is fundamental to afford children who cannot move every day to the playroom. Social interaction is mandatory to child development and welfare: spaces to NGOs are needed.

References:

Adams, A., Theodore, D., Goldenberg, E., McLaren, C., & McKeever, P. (2010). Kids in the atrium: Comparing architectural intentions and children's experiences in a pediatric hospital lobby. Social Science & Medicine, 70(5), 658–667.

Andrade, C. C., & Devlin, A. S. (2015). Stress reduction in the hospital room: Applying Ulrich's theory of supportive design. Journal of Environmental Psychology, 41, 125–134. https://doi.org/10.1016/j.jenvp.2014.12.001

BIRCH, J., CURTIS, P., & JAMES, A. (2007). Sense and Sensibilities: In Search of the Child-Friendly Hospital. Built Environment (1978-), 33(4), 405–416.

Bishop, K. G. (2008). From their perspectives: children and young people's experience of a paediatric hospital environment and its relationship to their feeling of well-being.

Earls, F., & Carlson, M. (2001). The social ecology of child health and well-being. Annual Review of Public Health, 22(1), 143–166.

Epstein, I., Stevens, B., McKeever, P., & Baruchel, S. (2006). Photo Elicitation Interview (PEI): Using Photos to Elicit Children's Perspectives. International Journal of Qualitative Methods, 5(3), 1–11. https://doi.org/10.1177/160940690600500301

FAPEO. (2008, September). L'evolution de la place de l'enfant dans la société. Les Analyses de la FAPEO. Fédération des Associations de Parents de l'Enseignement Officiel.

Jonveaux, T. R., Batt, M., Fescharek, R., Benetos, A., Trognon, A., Bah Chuzeville, S., … Demarche, L. (2013). Healing gardens and cognitive behavioral units in the management of Alzheimer's disease patients: the Nancy experience. Journal of Alzheimer's Disease, 34(1), 325–338.

Lawson, B., Phiri, M., & Wells-Thorpe, J. (2003). The architectural healthcare environment and its effects on patient health outcomes: A report on an NHS Estates Funded Research Project. Stationery Office London, England.

Ould Madhi, D. (1986). Jeux et enjeux: l'activité ludique et corporelle de l'enfant urbain en Algérie. Cahiers de La Méditerranée, 32(1), 67–78.

Sherman, S. A., Varni, J. W., Ulrich, R. S., & Malcarne, V. L. (2005). Post-occupancy evaluation of healing gardens in a pediatric cancer center. Landscape and Urban Planning, 73(2–3), 167–183.

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. Science, 224(4647), 420–421

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Cultural Routes in South Italy: methods and projects

Anna Giannetti[1*], Elena Manzo[2]

[1]*Dipartimento di Architettura e Disegno Industriale, Università della Campania Luigi Vanvitelli Naples, Italy, anna.giannetti@unicampania.it; elena.manzo@unicampania.it*

Abstract: The authors of this article provide an explanation of the first goals obtained from a 2017 research on the architectonical redevelopment of places, which have lost their identity. The study, carried on with multidisciplinary approach, involved the researcher's teams of Università della Campania "Luigi Vanvitelli", Università degli Studi di Napoli, Politecnico di Torino and Politecnico di Milano. Focused on the history of the territory, the aim has been to design an infrastructure network of bicycle and walking routes among Italian cultural heritage trails, based on integration between excellences or masterpieces and abandoned architectures, high nature value places, archaeological and historical sites. This in order to establish connections between fragmented places, to draw an alternative to the current development model and to improve ecotourism.
More specifically, moving from a *Placeness* idea as a conveniently broad term that allows the researcher to consider everything to do with the different qualities, uses and experience of *place*, we have individuated networks of homogenous cyclo-pedestrian routs, able to be supportive not only to the slow tourism, but also to the local mobility.
Different aspects of this thematic investigation have merged in several proposes, one of those is showed below.

Keywords: history of architecture; eco-sustainable infrastructure system; cultural routes; slow tourism.

Introduction:

Basing on 1989 Oxford Dictionary*, Placeness* is a very rare word and means "the quality of having or occupying a place" and later "the quality reminiscent of a particular locality or place". On spite of that, in the last decades, scholars agreed that it is a conveniently broad term, allows to consider everything to do with the diverse qualities, uses and experience of *place*, because it should intend as a concept that relates somewhere, here, there, elsewhere, home, routes and rootlessness.

In fact, *"Non-place Urban Realm"* was the term proposed (Webber 1964) to suggest a new era, in which accessibility has become more important than propinquity and furthermore connection across regions and continents. Of course, "*Non-Place"* has been used in urban anthropology (Augé (1992) 1995) in a more specific sense to refer to a space that, in contrast to places in traditional cultures, is not relational, historical or concerned with identity. A "Non-place" is product of "super modernity", where experiences are contractual because we have brought a ticket, as a driver, a customer, a traveler, even if it is not in opposition to place, but is tangled up with it because «in the concrete reality of today's world, places and spaces, places and non-places intertwine and tangle together. The possibility of non-place is never

absent from any place» (Augé 1995: 107).

Complex patterns of multicentered experiences and transnationalism blend elements of place and "Placelessness" in countless different ways. If «a place can be defined as relational, historical and concerned with identity, then a space which cannot be defined as relational, or historical or concerned with identity, will be a non-place» (Augé 1995: 77).

Therefore, if "Non-place" makes it convenient and easy to experience elsewhere and communicate in different places. "Place" is where we feel we belong. In one word we need roots and places. However, working on identity could mean that a place can be a constellation of trajectories, open, not bounded, ever changing.

In 2016 the Council of Europe certified 32 Cultural Routes (BERTI E.:2012) across common memories, histories, landscapes, tangible and intangible heritage into the respect of diversities and particularities, promoting heritage tourism, that means attracting visitors from abroad and locally, and conservation. These Cultural Routes are a paradigm of management and administration.

Our team's goal has been to design routes in which with the meaning of both terms – Places and Placeness - is widened.

As example of first goals achieved, this dissertation shows the Volturno's cyclo-route, that is one of the case studio analysed.

The blueprint, based on a plan which has been carefully documented and developed on precise fundamental selections, is structured to include, in perfect synergy, historical infrastructures (STOPANI R.:2005), memory of the old water way from Capua to Pozzuoli (Giannetti 1985:261), natural sites until the sea, particularly the amazing Variconi's Oasis, landscape and indigenous cultures, which are between the Volturno's mouth and Capua.

Figure 1. The *Viae Romanae* as the eternal underground of Mediterranean Sea. (www.sashat.me) The basic grind of Cultural Routes.

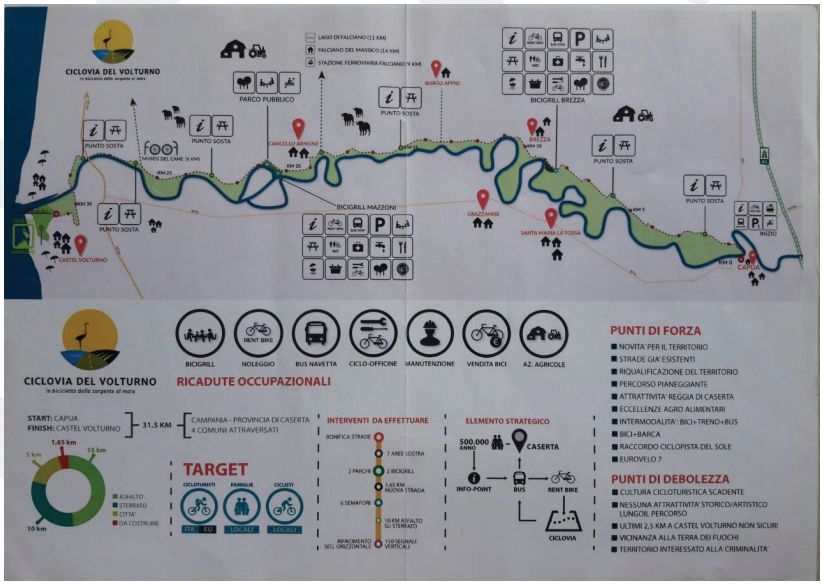


Figure. 2 *Ciclovia del Volturno* Project (arch. F. Cangiano, Fiab Campania)

Methods

The methodology is based on a deep knowledge of the areas, attained through an in-depth study of the territory's history, combined with analysis of the physiographical, socio-economic and cultural characteristics and tangible and intangible values, in interdisciplinary synergy (CLANCY M. (ed. by): 2018). The History of Architecture has been a crucial part for correctly classifying the trails as it identifies best practices and, preliminarily, it establishes the difference between simple environmentally sustainable "green" routes and "paths".

The nature of the study carried on is evidenced by the network of researchers involved, whose diversity has enabled them to integrate their skills in the History of Architecture, step by step, with a view to repurposing application models.

Moving from:

- historical guides to identify non-drivable roads;
- historical cartography and databases of abandoned railways (AIG) (CORTESI G., ROVALDI U. (ed. by): 2011) to reconstruct abandoned sections;
- historical and geo-pedological cartography to glean information on the evolution of the region in terms of settlement and land use;
- catalogues and records from the Authorities.

The researchers have designed several different kinds of homogenous cyclo-pedestrian routs or green ways and they are going to make a geo-referenced map in order to support their study

Furthermore, the case studies were based on statistically estimated data, including: AUDIMOB data; CENSIS budget; CREA and ISTAT Agricultural data.

Conclusion

Beginning the historical study of anthropized landscapes with artistic-cultural, architectural and naturalistic emergencies, and then defining green networks of "trails", designed according to the identity values of the places, which they are both territorial, as well as the connection of the sections realized or envisaged by FIAB – means to assign to these networks, first of all, a role as instruments of knowledge of the territory, which, at the same time, restore and re-evaluate the space and the memory of the places (DE CASTRO M.:2010). This can stimulate economic-social and tourist developments for the benefit of both local communities and managers of sites of artistic and natural interest (DI MARCELLO R.:2016). This is especially in line with the aim of aligning managers with UNESCO's requests, which encourages member countries to identify, protect and preserve the

properties of cultural and natural heritage, by drafting "key indicators" on the functioning of sites of historical interest, cultural, artistic, architectural and landscape [UNESCO 2005].

So, expected results are to conceive them as a function of the knowledge of places and the historical recovery of their artistic and cultural values, in order to favour the revival of regional urban economies, especially considering how, on an international level, planners from all over the world today interpret similar territorial operations (MOLZ J. G. :2012).

For this porpoise, the research expects also to develop a study and feasibility model that can be transferred from the academic sphere of basic research to application, to open a dialogue with public and private organisations, while being aware of the complexity of recreating, in different contexts, examples of "success" in local development.

References

AUGÈ M. *Non-places. Introduction to an Anthropology of Supermodernity*, (1992), Verso, **1995**.

BERTI E. (2012), «Itinerari culturali del Consiglio d'Europa tra ricerca di identità e progetto di paesaggio», FUP.

CLANCY M. (ed. by) (2018), «*Slow tourism, food and cities: pace and the search for the good life*», Routledge

CORTESI G., ROVALDI U. (ed. by) (2011), «*Dalle rotaie alle bici: indagini sulle ferrovie dismesse recuperate all'uso ciclistico*», FIAB

DE CASTRO M. (2010), «*Mobilità sostenibile. Approcci, metodi e strumenti di governante*», Altravista

DI MARCELLO R. (2016), «*I turismi in bicicletta come strumenti di sviluppo del territorio. Analisi e prospettive in Europa e in Italia*», Homeless Book.

GIANNETTI A. (1985) *La strada dalla città al territorio: la riorganizzazione spaziale del Regno di Napoli nel Cinquecento*, in C. De Seta, a cura di, *Insediamenti e Territorio*, *Storia d'Italia, Annali*, vol.8, pp. 243-285, Torino, Giulio Einaudi.

MOLZ J. G. (2012), «*Travel connections: tourism, technology and togetherness in a mobile world*», Routledge

STOPANI R. (2005), «*Guida ai percorsi della Via Francigena nell'Italia Meridionale»,* Le Lettere

WEBBER M.M.*, The Urban Place and the Nonplace Urban Realm*, in M,M.Webber, ed., *Explorations into Urban Structure*, University of Philadelphia Press, 1963, pp. 79-153.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Giovan Battista Piranesi: the drawing of the vernacular in the representation of the solidity of the eighteenth century.

Paolo Giordano[1]

[1]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, paolo.giordano@unicampania.it*

Abstract: Not only the elaboration of rigorous architectural documentation transforms knowledge into a precious reservoir of formal models and technical solutions available to the creativity of moderns through a subjective invention deduced from the previously analysed objective reality. An invention that, not responding to the aesthetic dictates of the seventeenth century baroque past or to those of the future nineteenth century historicist eclecticism, is situated in that complex historical conjuncture of eighteenth century determinism. In this perspective, the hybridization between determinism and detectable romanticism in depictions of the solidity of *Piranesi* should not interpreted as a mere sum of caprice of drawings but rather as a complex series of likely inventions that put on the scene. The same time, an improbable graphic sequence, if related to the conformation structure of the foundations of the analysed monuments, and completely reliable, if compared to the relative construction technique illustrated in the detailed drawings.

Keywords: Giovan Battista Piranesi; drawing; vernacular; solidity; eighteenth century

Introduction

Going well beyond the *Bernini* pseudo-geological inventions and the graphic reconstructions of the mythical monuments of Antiquity developed by *Johann Bernhard Fischer von Erlach*, published in 1721 in his *Entwurff Einer Historischen Architectur*, many drawings by *Giovan Battista Piranesi* represent an entirely innovative chapter in the history of the drawing of architecture applied to the vernacular exaltation of the *firmitas*. In contrast to the controversy triggered by the arrival in Rome, in 1755, of *Johann Joachim Winckelmann*, proponent of the greatness and architectural simplicity of classical Greece. The copy of the Venetian architect is concretiz, among others, through the publication of the publishing work entitled Roman Antiquities of the time of the first Republic and of the first emperors: a full graphical analysis of great visual impact on the monuments of ancient Rome divided into four volumes and printed in 1756.

Methods

The representative methodology adopted by *Giovan Battista Piranesi* is based on a graphical survey capable of staging, table after table, a series of information concerning, above all, the condition of the ancient monument analysed through extensive perspective views in urban areas. It is hypothetical original state of ruin, represented, as a whole, with plan drawings, elevation and section as well as perspectival view close together and capable,

as a whole, of evoking a veritable vernacular architecture. Finally, the relative constructive system explained with detailed drawings tending to reconstruct the laying methods of the stone monoliths and the connection of the different hypogean and epigee parts, constituting the architecture or the analyzed infrastructure. Between the latter two iconographic typologies are found, in *Roman Antiquities*, some representations of monuments that lend themselves, more than others, to realize the idea of vernacular solidity in the work of *Giovan Battista Piranesi*. The tables related to the *Fabricio Bridge*, the *Ferrato Bridge*, the *Teatro di Marcello*, the *Elio bridge* and the *Sepulcher of Hadrian* configure a suggestive series of engravings in which the matter, the mass and the stone cohesion of the walls represented are proposed as a whole thematic elements able to explain the true architectural substance of the analysed works. These are drawings that, in the same layout, adequately illustrate the material qualities of the masonry and, specifically, the related construction assembly techniques that the Romans would use to raise, from the subsoil, their impressive works. The graphic descriptions at the same time hovering between a rational technical analysis of the elements necessary for the realization of the relative wall fixtures and a vernacular reconfiguration hypothesis of the foundations based on a substantial oversizing of the same.

Discussion

In this sense, the tables concerning the configurative models of the hypogeal structures and the relative construction methods of the walls represent, in the four volumes of Roman Antiquities, the most appropriate graphic documentation to explain, through the documentary attitude and inventive propensity of *Giovan Battista Piranesi*. The adaptation to the organizing principles of the *Vitruvian firmitas* traceable, once again, within that mythical relationship between the solidity of the architecture on the ground and the appropriateness of the materials in relation to their correct constructive application. In this regard, the contrast between the scientific descriptive of the technical drawings illustrating the masonry apparatus and the inventive propensity tending to magnify not only the size of the buildings depicted but also and above all the amount of stone material required, in foundation, must not appear paradoxical, to support them. In fact, the depiction of *Piranesi vernacular solidity*, not limited to the elaboration of rigorous architectural documentation, transforms knowledge into a precious reservoir of formal models and technical solutions available to the creativity of moderns through a subjective invention deduced from the previously analysed objective reality. An invention that, not responding to the aesthetic dictates of the seventeenth-century

baroque past or those of the future nineteenth century historic eclecticism. Is located in that complex historical conjuncture of eighteenth century determinism attested to the positions of *David Hume*, in turn influenced by the *pre Romantic* cultural climate of the sublime, promoted by *Edmund Burke* in 1756, and legitimized, finally, by *Immanuel Kant* through a conception of beauty understood as a product of the oversized. In this perspective, the hybridization between determinism and detectable romanticism in depictions of *Piranesi* solidity should not be interpreted as a mere sum of drawings but rather as a complex series of likely inventions that put on the scene, at the same time, an improbable graphic sequence. If related to the conformation structure of the foundations of the analysed monuments, and completely reliable, if compared to the relative construction technique illustrated in the detailed drawings. In this sense, the series of engravings concerning both the tables concerning the *Theater of Marcello* and those relating to the underground foundations of the *Hadrian's Sepulcher* include the drawings relating to the opposite *Ponte Elio*. Strongly incisions in the which combine the reliefs of "epigee" architectural configurations - romantically depicted as vestiges of the ancient grandeur of Rome purified by successive stratifications - with the visionary illustrations of improbable and overabundant hypogean structures, however, drawn with a wealth of technical details and construction details. If the drawings of the above-ground configurations appear interesting for their documentary reconstruction concerning the original definition of the morphological elements of Roman antiquity. The *Marcello theater* and the *Hadrian's Sepulcher* are in fact depicted without the addition of the above posthumous edifications or the *Renaissance* palace designed by *Baldassarre Peruzzi* on one side and, on the other, the impending medieval bulk of *Castel Sant'Angelo* - on the other hand. The illustrations of the structures located below the ground line are stimulating as well as for their technical-graphic characterization also for the relative descriptive qualification provided by the telegraphic didactic notes, with an alphabetical index, inserted at the base of the tables. Specifically, the tables illustrating the *Teatro di Marcello* propose a configurable hypothesis of the foundations defined by a tight series of shoe weighing on a base consisting of a quadruple row of enormous stone blocks resting, in turn, on a compact wooden raft composed of pointed poles in the ground. The evocative view of a part of the bases of the *Teatro di Marcello*, drawn in an accidental perspective and framing a small portion of the hypothetical foundations of the monument, shows, in a single illustration, both the imaginary external appearance of the cyclopean structure and the particular technical characteristics of the internal stone texture. The contemporary presence of

unreal architectural elements and real technical-constructive descriptions is the main testimony of the stylistic hybridization produced by the confluence of scientific determinism and imaginative romanticism in the *Piranesi* interpretation of the *Vitruvian firmitas*. A hybridization capable of enhancing the tectonic solidity of the credible inventions of *Giovan Battista Piranesi* as illustrated also and above all in the famous sequence of panels depicting the *Sepulcher of Hadrian* and the adjacent *Elio Bridge*. The illustrated table, depicting the constructive section of the walls of the aforementioned perspective view, in its technical integration of the overall graphic documentation of the *Sepulcher of Hadrian*, assumes the task of transforming the *Piranesi* unreality into clear tectonic ideality attributing scientific credibility to the invention configurative of the oversized reinforcement spurs at the base of the funeral mausoleum. The conceptual transformation deriving from the graphic implementation given to the invention views from the technical tables, allowing the change of an unreal interpretation into an ideal description, represents the added symbolic value, from the graphic work of *Giovan Battista Piranesi*, to the representation of solidity eighteenth century. An ideal gravity of architectural substance as expressed by the spectacular illustrations relating to the substructures of the *Elio Bridge*: a powerful overlapping of more than forty rows pseudoisodomas, made up of enormous stone blocks, between which large portions of diagonally peacock tail weaves are insert able to counteract the thrusts of the overlying stacks of the bridge.

Conclusion

In this perspective, the ideal tectonic expressiveness of the drawings of *Giovanni Battista Piranesi* represents a powerful testimony of the nineteenth century architectural culture aimed at affirming, peremptorily and unequivocally. The primacy of Roman construction technique in opposition to the supremacy of Greek aesthetics claimed by its principal cultural antagonist *Johann Joachim Winckelmann* defender and supporter of the classicist language in nineteenth century European architectural culture. The peremptory affirmation, as the Venetian architect writes, to anyone who will examine all the internal and external parts of these *Edifizj* represents, in the final analysis, a cultural proclamation against the structural dematerialization of architecture that, during the nineteenth century. It will spread on the European continent: a new cultural and planning trend, advocated both by *Hellenizing* classicism of German character and by neo Gothic structuralism of *Franco British* derivation, which will end up eroding and erasing the vernacular beauty of *Piranesi solidity*.

References

Giordano P. (2002). *Le questioni del disegno*. Napoli: Edizioni Scientifiche Italiane.
Giordano P. (2014). *L'albergo dei poveri a Napoli. Il ridisegno, il rilievo e la riconfigurazione dell'architettura monumentale*. Napoli: La scuola di Pitagora editrice.
Giordano P. (2015). *Il disegno della firmitas*, Napoli: La scuola di Pitagora editrice.
Giordano P. (2016). *Il disegno della utilitas*, Napoli: La scuola di Pitagora editrice.
Magnago Lampugnani V. (1982). *La realtà dell'immagine. Disegni di architettura del XX secolo*, Stoccarda.
Vagnetti L. (1958). *Disegno e architettura*, Genova.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Determining the Attitude-Behavior Gap Towards Sustainable Communities

Can Gölgelioğlu[1], Simge Özdal Oktay[2]

[1]*City and Regional Planning, Cankaya University, Ankara, Turkey, golgelioglu@cankaya.edu.tr*
[2]*City and Regional Planning, Cankaya University, Ankara, Turkey, sozdal@cankaya.edu.tr*

Abstract: The purpose of this paper is to examine the attitude-behavior gap in terms of education levels and sustainable actions in different communities of Ankara. The research particularly aimed to determine the public attitude toward sustainable living, the insights of barriers and limitations that different communities face in action. In this scope, a 19-item questionnaire was applied to 220 people in eight different neighborhoods. The results show that the attitude and behaviors of individuals against sustainability are inconsistent, regardless of differences in education levels and socio-economic profiles. These outcomes display that there is a need for a new understanding towards the public perception of sustainability as well as to provide a baseline for future development of policy and decision-making processes of sustainable communities.

Keywords: sustainability, attitude-behavior gap, education levels, sustainability awareness

Introduction

Sustainability is a multifaceted process which involves not only environmental, economic or social pillars, but also unpredictable changes, national politics and spontaneous individual and collective actions. Similar with complex, self-organizing systems, actions are influenced by personal attitudes, and attitudes shape the daily collective behaviors. Since the beginning of the 60's, many researches on attitude-behavior relation emphasized the inconsistency between these two (Weigel, Vernon, & Tognacci, 1974; Wicker, 1969). Accordingly, attitudes are defined by positive and negative feelings towards subjects, which are defined by general verbal-measures, a representation of a notion or an action general verbal-measures. On the other hand, behavior defines particular and actual actions in daily affairs (Armitage & Christian, 2003; Weigel et al., 1974; Wicker, 1969)

Armitage and Christian (2003) define that a course of action requires a belief or a motivation. The authors state that behavioral beliefs (e.g. smoking causes cancer), normative beliefs (e.g. social pressure), and control beliefs (e.g. we can cope with cancer) do construct one's intentions "*as the key mediator of attitude-behavior relations*" (p. 187). In relation, Guagnano et al. (1995) claim that behavior depends on the strength of continuous attitudes. Accordingly, external and internal influences have significant impacts on attitudes that can

cause behavior change. Kollmuss and Agyeman (2002) expand this idea and define the external factors as demographic, political, economic factors; and internal factors as motivation, knowledge, priorities, emotions, personality. The authors suggest that evaluating social and cultural factors separately because of possible overlaps. By focusing on environmental sustainability, they use environmental knowledge and awareness, and pro-environmental behavior to explain the gap. As a result, their study reveals that despite the strong correlation between education level and environmental knowledge, it does not necessarily result in pro-environmental behavior (Kollmuss & Agyeman, 2002). Chaplin and Wyton (2014) also discuss the link between students' perception of sustainable development and actual behavior in daily life. Their findings suggests that one's perception changes according to time and resources and there should be a 'gain or loss' for behavioral change in favor of sustainability i.e. such as reward for the participant, a penalty for non-participant or an expected behavior should have demonstrable effects to the participants (Barr, 2006; Chaplin & Wyton, 2014; Kollmuss & Agyeman, 2002).

In these frameworks, this study aims to investigate the engagement of communities with sustainable living, and to discuss the attitude-behavior gap over different neighborhoods in Ankara. Therefore, firstly, the notion of the attitude-behavior gap was discussed in terms of sustainable development and social trends. Afterwards, the attitudes and behaviors against sustainability were examined due a 19-item face to face survey data (n=220). Finally, the attitude-behavior gap was examined, and results are discussed along with the conflicts of sustainable development in terms of environmental, social, and economic attitudes and behaviors.

Method

19-item face to face surveys were applied to 220 participants to measure the gaps between attitudes and behaviors. Participants were selected from different age groups and socio-economic backgrounds, including full-time/part-time workers, retirees, tradesmen, housewives, students etc. By collecting the qualitative and quantitative data, analyses are done to observe the correlations between attitude, behavior and education level of the participants. The main survey questions focused on the personal attitudes on sustainability pillars and behavioral patterns in daily life. By this way, descriptive analyses of possible gaps are tried to be identified through correlations.

In 220 surveys, profile distributions are gathered as in Table 1. Because of the controversial debates on environmental awareness, gender, age groups, and education level were distributed as heterogonous as possible.

The results show that, in eight neighborhoods, 1.4% of the respondents do have no education, 18.6% have only primary-school education, 39.6% do have high school education, and 39.6% studied high education and above.

Table 1 - Respondent Profiles (n=220)

Gender	
Male	49.1%
Female	51.9%
Age-Groups	
12-18 years old	4.1%
18-30 years old	24.1%
30-45 years old	31.4%
+60 years old	40.5%
Education Level	
No Education	1.4%
Primary School	18.6%
High School	39.6%
Bachelor's Degree	36.4%
Master's Degree	3.2%
Doctorate Degree	0.9%
Occupation	
Unemployed	5%
Student	16.4%
Part-Time	2.7%
Full Time	19.1%
Self-employment	17.3%
Retired	20.9%
Other	18.6%

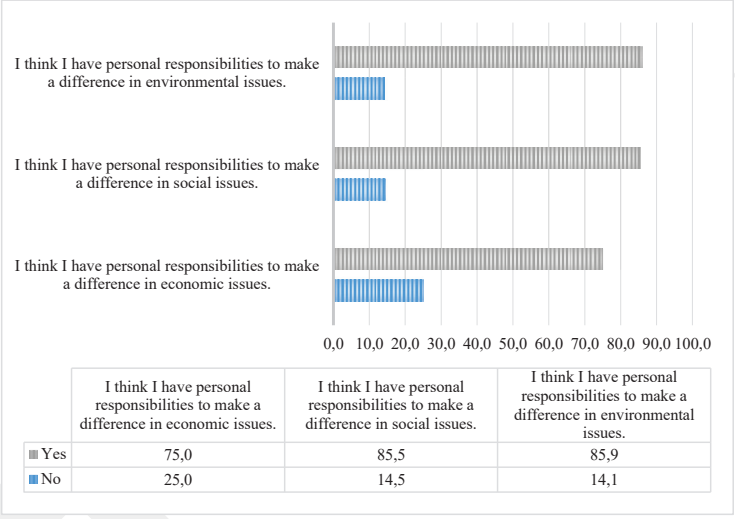
(Created by the authors)

Findings and Discussion

Participants were asked whether they have individual responsibilities in environmental, social and economic topics in order to measure possible attitude-behavior gaps. Afterwards, their behavior patterns are evaluated in terms of several actions such as mass-transport, recycling, voting, community involvement, consumption control, local market usage.

In all pillars, significant positive attitudes were obtained as 85.9% of respondents stated that they have individual responsibilities in environmental issues, 85.5% indicated their social responsibilities and 75% claimed individual responsibilities in economic issues (Table 2).

Table 2 - Attitudes on Personal Responsibilities



	I think I have personal responsibilities to make a difference in economic issues.	I think I have personal responsibilities to make a difference in social issues.	I think I have personal responsibilities to make a difference in environmental issues.
Yes	75,0	85,5	85,9
No	25,0	14,5	14,1

(Created by the authors)

189 of 220 respondents (85.9%) stated that they have individual responsibilities for environmental problems (Table 3). While mass transport (71%) and local market (75%) behaviors have significant high consistencies, recycling habits (56%), car-share (34%) and meat consumption (25%) show significant gaps in terms of positive attitude feedbacks.

Table 3 - Environmental Responsibility * Attitude-Behavior Frequencies

	N egative	ositive	Attitude-Behavior

			Consistency
Do you use mass transport?	54	35	71%
Do you show attention to your house heat?	68	21	64%
Do you have recycle habits?	83	06	56%
Do you cycle or walk often?	91	8	51%
Do you do car-share?	124	5	34%
Do you control your meat consumption?	140	9	25%

* N=189/220 positive responses on

"I think I have personal responsibilities to make a difference in environmental issues."

188 of 220 respondents (85.5%) stated that they have individual responsibilities for societal problems. There is a serious tendency for 'voting in elections' (90%), but interestingly, the rate of 'participation in civil society' and 'local initiatives' consistency rates remain only at 17% and 13% (Table 4). Especially when we consider the significance relation between community engagement and sustainable policies, the findings point crucial implementation gaps for community engagements.

Table 4 - Social Responsibility * Attitude-Behavior Frequencies

	Negative	Positive	Attitude-Behavior Consistency
Do you vote?	19	169	90%
Do you participate in civil society?	156	32	17%
Do you participate in local communities?	163	25	13%

* N=188/220 positive responses on

"I think I have personal responsibilities to make a difference in social issues."

165 of 220 respondents (75%) stated that they have individual responsibilities for economic problems (Table 5). One of the most significant responses is revealed as local market behavior consistency which can provide significant contribution to transport costs and local economy. However, this cannot be directly correlated to an economic awareness since 41% of the respondents stated that they do not pay attention to general consumption habits.

Table 5 - Economic Responsibility * Attitude-Behavior Frequencies

	N o	es	Atti tude-Behavior Consistency
Do you go to the local market/bazaar?	49	43	86.6 %
Do you give attention to your general consumption?	67	8	59 %

* N=165/220 positive responses on

"I think I have personal responsibilities to make a difference in economic issues."

The findings show a negative relation tendency between education levels and attitude-behavior consistencies. While positive attitudes towards sustainability increase in line with high education levels, low education groups show more sustainable behaviors. The examination of this situation can be critical for revealing the links between sustainability awareness and the capacity of action in policy implementation. The attitude and behavior gaps point possible deficiencies that we can experience in its three pillars i.e. environmental, social and economic.

Firstly, people with higher education levels use less public transport, although the behavior is very important for CO2 emissions in urban areas (Figure 1). Furthermore, even if the well-educated people think that they are more aware of the benefits of recycling on water and air pollution, recycling patterns are distributed independently of education levels. (Figure 2).

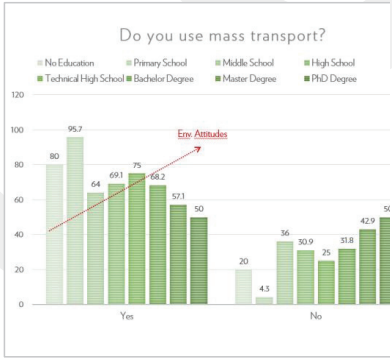


Figure 1 - Mass Transport Behaviours & Education Levels

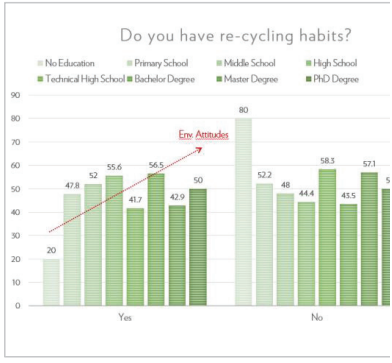


Figure 2 - Recycling Behaviours & Education Levels

Secondly, the biggest gap for education levels is observed in terms of local market/bazaar benefits in economic pillar. The findings show that while this behavior decreases at higher education levels (Figure 3), it increases in low education groups. However, given the random distribution of consumption control (Figure 4), it is also possible to consider the results not only in terms of awareness, but also in terms of economic conditions i.e. purchasing power.

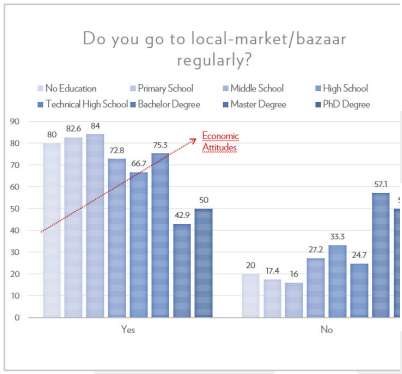


Figure 3 - Local Market Usage & Education Levels

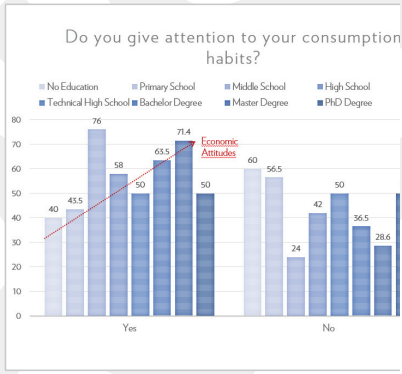


Figure 4 - Consumption Control - Education Levels

Moreover, the findings show attitudes and behaviors are consistent with the level of education but insufficient in terms of participation at community level in social pillar. Accordingly, while voting and education levels do show a positive relation, the participation in local communities/initiatives remain considerably low in all groups. The attitude-behavior gap in community participation should be examined in terms of potential inadequate policies or weak governance conditions i.e. miscommunication between authorities, local governments and communities.

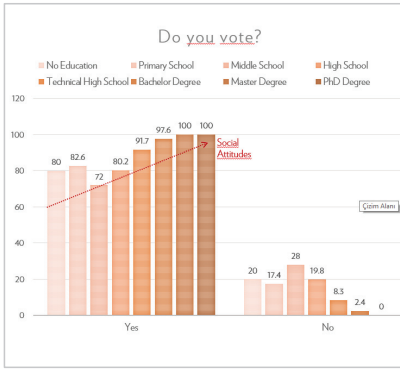


Figure 5 - Voting Behaviour & Education Levels

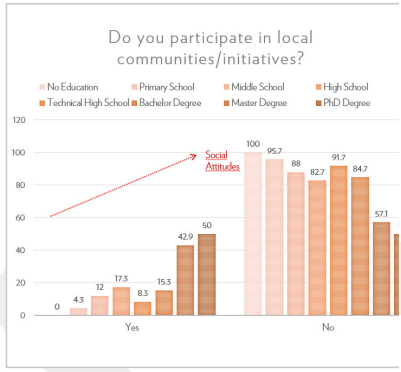


Figure 6 - Community Participation & Education Levels

Conclusion

Sustainable development is a long-debated notion which involves several challenges in the application process. Behaviorist theories such as Lefebvre (1996), Portugali (2000), Harvey (2014) discusses that these challenges are mainly as a result of spontaneous and unpredictable individual behavior patterns (Harvey, 2012; Lefebvre, 1996; Portugali, 2000). The result of this research reveals that the correlation between environmental *attitude* and education is strong, yet *attitude-behavior gap* is getting larger as education level increases. This is directly related to the relationship between education level and economic situation, and thus to the consumption habits.

The largest gap is calculated in the social pillar of sustainability. Even though 90% of the respondents have positive attitudes towards social responsibility, only 17% of them responded positive to being part of a civil society, and only 13% of 220 respondents participate to a local community initiative. This result can be interpreted in terms of inefficient communication tools used by local governments to increase insufficient awareness and action of the public.

The findings can help to develop an overall understanding of the correlation between the individual's verbal attitudes and real-life actions towards sustainable living. The findings support the idea of the external influences (e.g. consumption habits, economic levels, cultural patterns, beliefs) on individual behavior patterns. One can interpret the high gaps of attitude

and behavior do not reveal only because of low education levels but an inadequate awareness and disconnected policy implementations in sustainability policies.

References

Armitage, C. J., & Christian, J. (2003). From attitudes to behavior: Basic and applied research on the theory of planned behavior. *Current Psychology*, *22*(3), 187–195. https://doi.org/10.1007/s12144-003-1015-5

Barr, S. (2006). Environmental action in the home: Investigating the value-action gap. *Geography*, *91*(1), 43–54. https://doi.org/10.2307/40574132

Chaplin, G., & Wyton, P. (2014). Student Engagement with Sustainability: Understanding the Value-Action Gap. *International Journal of Sustainability in Higher Education*, *15*(4), 404–417.

Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on Attitude-Behavior Relationships: A Natural Experiment with Curbside Recycling. *Environment and Behavior*, *27*(5), 699–718. https://doi.org/10.1177/0013916595275005

Harvey, D. (2012). *Rebel Cities From the Right to the City to the Right to the Urban Revolution*. *Verso* (1st ed.). London.

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why Do People Behave Environmentally and What are the Barriers to Pro-Environmental Behaviour. *Environmental Education Research*, *8*(3), 239–260. https://doi.org/10.1080/1350462022014540

Lefebvre, H. (1996). *Writings on Cities* (1st ed.). Oxford: Blackwell Publishers.

Portugali, J. (2000). *Self-Organization and the City*. Heidelberg: Springer. https://doi.org/10.1007/978-3-662-04099-7

Weigel, R. H., Vernon, D. T., & Tognacci, L. N. (1974). Specificity of the attitude as a determinant of attitude-behavior congruence. *Journal of Personality and Social Psychology*, *30*(6), 724–728. https://doi.org/10.1037/h0037540

Wicker, A. W. (1969). Attitudes versus Actions: The Relationship of Verbal and Overt Behavioral Responses to Attitude Objects. *Journal of Social Issues*, *25*(4), 41–78. https://doi.org/10.1111/j.1540-4560.1969.tb00619.x

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Spolia Reconsidered in Terms of Sustainability

Hale Gönül[1]

[1]*Architecture Department, MSGSU, İstanbul, Turkey, hale.gonul@msgsu.edu.tr*

Abstract: The motivation behind using *spolia* is usually explained in political, symbolic and cultural terms, although it is reasonable to accept that every culture and period has its own causes, and multiple reasons are prevalent at a time. However, in fact, using *spolia* is also a matter of sustainability in terms of cultural continuity, economical/practical concerns and the optimum use of building materials. In this context, *spolia* will be discussed in relation to the sustainability of culture, materials and building techniques in this paper.

Keywords: *spolia*; sustainability; historical building practices; cultural continuity; reuse

Introduction

The term *spolia* is explained as the use of Greek and Roman building parts in Late Antique and Medieval monuments (Kinney, 1995). The practice was extensively used in Byzantine, Islamic, Seljuk and Ottoman architecture.

Maybe the most curious case about *spolia* is the cultural and/or practical motivation behind it. Although the causes for using *spolia* can be totally different at different cultures and times, the 5 main reasons put forward by Esch (1969) explaining the concept in Medieval Italy, is highly interpretive. These are;

- the value of the material itself
- mysticism: fighting evil spirits
- adoption of non-Christian (usually pagan) elements into Christian culture
- political legitimating
- aesthetics

This list can be extended with economic and practical issues, challenging the previous culture and/or proving to be the successor of it as well as cultural appropriation or continuity. Here, sustainability stands out to be a main concern, both in terms of cultural continuity and the adoption of materials and building techniques.

Cultural Continuity

The overabundance of Antique *spolia* used in Early Christian structures is usually considered as a sign of cultural appropriation. The oldest structure significant in terms of *spolia* is the Arch of Constantine in Rome. Built in 315, the arch contains statues and friezes from times of Trajan, Hadrianus and Marcus Aurelius. Despite the fame of Arch in *spolia*

studies, Constantine's interest in antique material is not limited to it. Set aside the overabundant use of antique material in Lateran Basilica and old St. Peter's (Bosman, 2004 and Bosman, 2013), he also transferred the Serpent Column from Delphi to Constantinople Hippodrome. It is reasonable that Constantine, the first Roman emperor converting to Christianity, tried to show that although he embraced a different religion, is still the successor of great emperors before him and inheritor of Antique pagan Rome (Kiilerich, 2006). So, *spolia* is part of a "political program" (Pensabene, 2017) here and a "sign of continuity" (Kiilerich, 2006); whereas the adoption of the basilica typology as the form of the church also signifies such a continuity in the architectural language (Bosman, 2013).

The widespread use of *spolia* in Islamic architecture can also be evaluated in this frame. Especially the usage of architectural elements with figures and statues are considered as highly symbolic due to the prohibition of figures in Islamic art (Redford, 1993) (Fig 1). Redford (1993) links such usage of symbolic material to the ideology of Seljuks who wanted to embrace the ancient Antique culture of Anatolia and render it as part of their mythology.

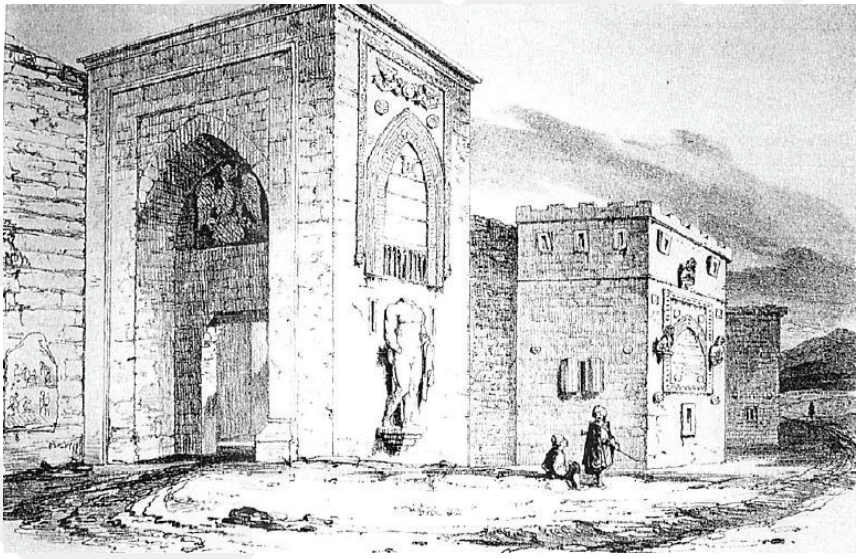


Figure 1. Konya Castle (1221) depicted by Leon de la Borde in *Voyage de l'Asie Mineure* (Redford, 1993). The walls hold a considerable amount of figurative elements such as antique reliefs, panels and statues.

The symbolic meaning is also a sign of political power and dominance as well as cultural appropriation. Of the 4 columns supporting the dome of Süleymaniye, one was

brought from Baalbek, one from Alexandria, one from Fatih Kıztaşı (İstanbul) and the other was found in Topkapı Palace[1] (Sai Mustafa Çelebi, 2002). In Tezkiretü'l-Bünyan (16th Century), these 4 columns are explained with great praise and even are likened to the 4 Caliphs of Islam (Sai Mustafa Çelebi, 2002) (fig 2). It is of course a symbol of the sultan having the power in different parts of the world, just as Constantine tried to show with the Serpent Column.

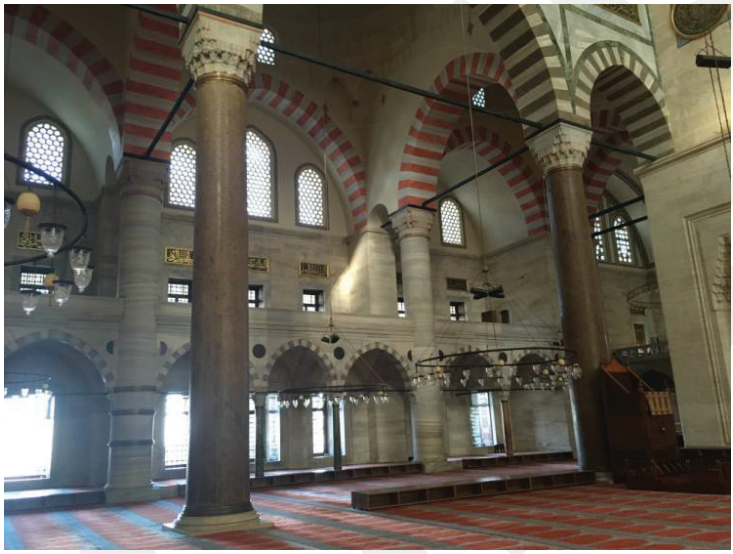


Figure 2. columns supporting the dome of Süleymaniye (photo: author)

Adoption of Construction Techniques

However, *spolia* has some other practical reasons; which are the economical concerns and the adoption of building technologies of an earlier culture. This hypothesis can also explain the wide usage of stones with symbols of Christianity in Early Ottoman architecture, just as in the case of İznik Hacı Özbek Mosque where a capital with a Christian cross was used (Ousterhout, 1995) (fig 3). Ousterhout (1995) claims that the usage of Antique and Byzantine material and forms in Early Ottoman architecture is actually a sign of continuity between Byzantine and Ottoman architectural practices. He further claims that Ottomans only

[1] Fatih constituted a place in the 2nd court of Topkapı Palace where *spolia* was collected and stored.

had a real break with Byzantine architecture in 1453 (Ousterhout, 1995). It makes sense considering that the *spolia* used after the mid 15th Century bear no reference of other cultures anymore (Tanyeli and Tanyeli, 1989)[2].

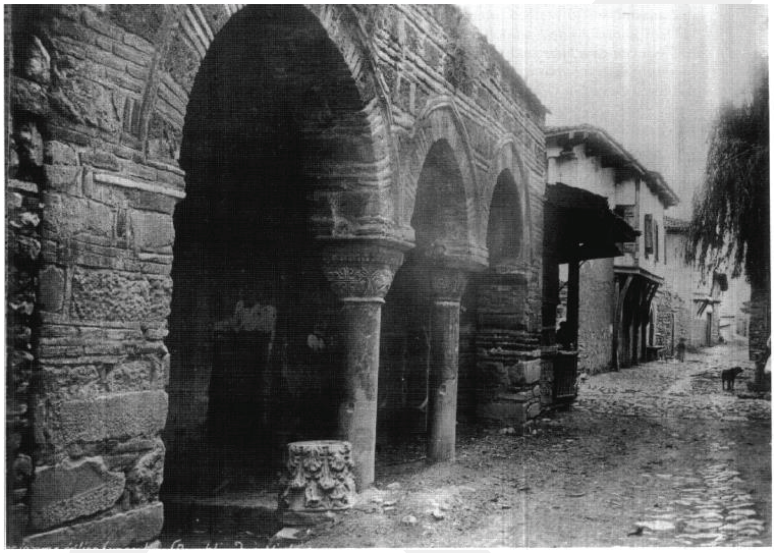


Figure 3. İznik Hacı Özbek Mosque (Ousterhout, 1995) (photo: Berggren)

Another evidence for this argument is the decrease of the interest in *spolia* and even disapproval in later times of both Ottoman and Christian architecture. For example, while the four columns of Süleymaniye Mosque are praised in Tezkiretü'l-Bünyan, there is not even any mention of them in Usûl-i Mi'mârî-i Osmânî (1873). In the same publication, while talking of the *spolia* columns in the nartex of Bursa Yeşil Mosque, it is written that they are from Byzantine ruins of minor importance, and that fortunately they were used in a darker part of the mosque, so that they do not cause much "harm" to the building (Ovalıoğlu, 2011). At the same century, also Viollet le Duc contemns the use of *spolia* and even claims that using *spolia* was an obstacle in the development of Medieval architecture (Kinney, 2006).

[2] Tanyeli and Tanyeli (1989) claim that up to the mid of 16. century, all of the columns used in Ottoman architecture were spolia.

Spolia from the Same Culture

Another practice indicating the economical concerns behind using *spolia* is the usage of material from the same culture. It is known that in Ottoman architecture, *spolia* did not come only from Byzantine and Antique ruins, but also taken from standing Ottoman structures (Barkan, 1972). In the construction of Süleymaniye Mosque, antique material was taken from private houses and castle walls (Barkan, 1972). Also, Ottomans did not hesitate to use their building stock as *spolia* (Tanyeli and Tanyeli, 1989). Though not very common, even material was taken from mosques, such as the marbles taken from İznik Hayrettin Paşa Masjid to be used in Süleymaniye (Barkan, 1972).

Conclusion

Although it is seen that symbolic and political meanings are an important motivation in the use of *spolia*, sustainability still stands out as a main issue. Cultural continuity, the adoption of building technologies and of course the economic and practical use of material with recycling are all aspects that can be evaluated as part of sustainability in the use of *spolia*. As there is no known text explaining the causes of using *spolia*, every study is subject to stay hypothetical to a certain extent and therefore this study is highly open to debate just like all other modern studies on the subject.

References

Reprinted Ottoman Sources

Ekici, C., Gündoğdu, R., Ovalıoğlu, İ, & Önal E. F. (2011). *Osmanlı Mimarisi*. İstanbul: Çamlıca Basım Yayın.

Sai Mustafa Çelebi (2002). Yapılar Kitabı, Tezkiretü'l-Bünyan ve Tezkiretü'l-Ebniye (Mimar Sinan'ın Anıları). İstanbul: Koçbank Yayınları.

Modern Sources

Barkan, Ö. L. (1972). *Süleymaniye Camii ve İmareti İnşaatı (1550-1557)* (Vol 1). Ankara: Türk Tarih Kurumu.

Bosman, L. (2004). The Power of Tradition: Spolia in the Architecture of St. Peter's in the Vatican. Hilversum: Uitgeverij Verloren.

Bosman, L. (2013). *Spolia* in the fourth-century basilica. In R. Mckitterick, J. Osborne, ... (Eds.), *Old Saint Peter's, Rome* (pp. 65-80). Cambridge: Cambridge University Press.

Esch, A. (1969). Spolien: Zum Wiederverwendung antike Baustücke und Skulpturen in mittelalterlichen Italien. *Archiv für Kunstgeschichte, 51*, 1-64.

Kiilerich, B. (2006). Antiquus et modernus: Spolia in Medieval Art - Western, Byzantine and Islamic. *Medioevo: Il tempo degli Antichi, Atti del Convegno Internazionale di Studi Parma (24-28 September 2003)* (pp. 135-145). Milan.

Kinney, D. (1995). Rape or Restitution of the Past? Interpreting Spolia. In S.C. Scott (ed.), *The Art of Interpreting* (pp. 52-67). Pennsylvania: Pennsylvania State University.

Kinney, D. (2006). The Concept of Spolia. In C. Rudolph (ed.), *A Companion to Medieval Art: Romanesque and Gothic in Northern Europe* (pp. 233-252). Malden: Blackwell Publishing.

Ousterhout, R. (1995)**.** Ethnic Identity and Cultural Appropriatio*n in Early Ottoman Architecture.* Muqarnas, An Annual on Islamic Art and Architecture, 12*,* 48-62.

Pensabene. P. (2017). Architectural Spolia and Urban Transformation in Rome from the Fourth to the Thirteenth Century. In S. Altekamp (Ed.), *Perspektiven der Spolienforschung 2. Zentren und Konjunkturen der Spoliierung* (pp. 177–233). Berlin: Edition Topoi.

Redford, S. (1993). The Seljuqs of Rum and the Antique. *Muqarnas, An Annual on Islamic Art and Architecture*, *10*, 148-156.

Tanyeli, U. and Tanyeli, G. (1989). Osmanlı Mimarlığında Devşirme Malzeme Kullanımı (XVI.-XVIII. Yüzyıl). *Sanat Tarihi Araştırmaları Dergisi, 4*, 23-31.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Bell towers: Structural types and seismic safety

Mariateresa Guadagnuolo[1*], Marianna Aurilio[2], Anna Tafuro[3] and Giuseppe Faella[4]

[1]Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli,, Aversa, Italy, m.guadagnuolo@unicampania.it*
[2]Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli,, Aversa, Italy, marianna.aurilio@unicampania.it
[3]Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli,, Aversa, Italy, anna.tafuro@unicampania.it
[4]Department of Architecture and Industrial Design - Università degli Studi della Campania Luigi Vanvitelli,, Aversa, Italy, giuseppe.faella@unicampania.it

Abstract: Masonry towers constitute a huge amount of the Italian built heritage. Therefore, their preservation has a significant social importance. They are unique architectural typologies, usually conceived in ancient time exclusively to withstand vertical loads. So it is really important, in the contest of the preservation and conservation, the level of structural knowledge on those structure before operating on them. In this paper are cataloged the morphological characteristics proper of structures to tower in masonry. The activity developed by the authors has been addressed towards the classification of damages occurred, taking into account the most recurring failure mechanisms due to both the global structural response and the local mechanisms involving specific macro-elements. The objective to create a sort of abacus that can be useful for seismic risk analysis in the most critical situations of the present manufactured articles on the territory. An early introduction of the perspectives of such an activity are therefore illustrated.

Keywords: Seismic behaviour; Bell tower; Structural types; Caserta.

Introduction

Most of historical structures has deteriorated over time by natural and environmental effects, because of inadequate preservation, which is considered a fundamental issue in the cultural life of modern society. Therefore, if the actual behavior of structures is known, protective measures can be supplied.

The uniqueness of the cultural patrimony requires the processes aimed at the prevention of the degradation phenomena and finalized to the structural safety.

Particularly diffused patrimony being such, the tools of evaluation must be rigorous but sufficiently agile from to be applied to territorial staircase; they are based on a scrupulous harvest of information, on the check of the structural behavior following the knowledge and on the formulation of a preliminary qualitative judgment on the level of seismic risk.

The constructive typology of bell towers is generally distinguishable in base to its prevailing vertical development and constitutes a remarkable whole the patrimony built in Italy.

In the literature, there are several research studies dealing with the seismic assessment and the vulnerability analysis of masonry towers, with regard to different aspects: mechanical and numerical analysis by computational (Milani, 2012) or simplified approaches (Curti, 2008; Guadagnuolo, 2014, 2018), experimental testing methods and structural identification (Binda, 2005; Ivorra, 2006), modal identification through experimental data of full-scale environmental vibration testing (D'Ambrisi, 2012), seismic assessment by nonlinear static analysis.

Bell tower behavior

The seismic behavior of this typology is dependent from some specific factors: the slenderness of the structure; the degree of clamping of the walls; the possible presence of lower adjacent structures, in degree to furnish a horizontal tie; the presence in the part summit of slender architectural elements or however vulnerabilities.

The clamping of the walls of a building structure to prevailing vertical development is functional to guarantee that this involves as a shelf inserted to the base, with an in partnership rigidity to the whole building section and not as a whole separate walls. The traditional techniques to guarantee a good clamping among the walls are: the weaving of the corners ones; the presence of metal rings.

Bell towers are in contact with other lower structures. In these structures, the presence of horizontal constraints at different heights can deeply modify the seismic behavior: limiting the slenderness, introducing localized stiffening elements and producing stress concentrations, thus the vulnerability is greatly increased. The seismic response of bell towers can be subject to structure types: a) isolated; b) embedded; c) adjacent to building of cult (see Figure 1).

a) S. Maria Assunta in cielo Caiazzo (CE)

b) S. Maria Maggiore Piedimonte Matese (CE)

c) S. Barbara Liberi (CE)

Figure 1. Bell tower: a) isolated, b) embedded, c) adjacent.

The vulnerability of all the structures to prevailing vertical development, it's tightly connected to the presence of possible indicators of fragility. Thrusting elements, presence of openings at the corner, decorations at the top and presence of vaults and arches are fragility indicators. Contrast elements, corner connections, longitudinal and transversal ties are instead the protection devices. (see Figure 2).

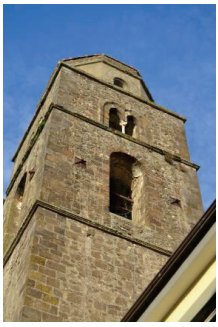
Analogous considerations are value for the elements often present on the summit of the towers. The bell cells, have often an autonomous behavior in comparison to the bell towers. Their seismic behavior can result particularly vulnerable because there are many holes which produces slender column moderately loaded, with breakups to cut for slide.

In the case of other structures, slender and polling, set in summit, their vulnerability is due to the modest vertical load, that guarantees a limited stabilizing effect in the respects of the turnover. Even more critical it is the effect of amplification of the seismic motion that is verified in the tallest parts of the construction.

Bell towers: seismic safety

In order to assess the seismic safety at territorial scale of bell towers, a LV1 procedure based on the methodology proposed in the Italian National "Guidelines for evaluation and mitigation of seismic risk to cultural heritage" (MIT,2011) will be applied.

The simplified mechanical model LV1 for towers, bell towers, and other tall and slender structures is identified, based on failure hypothesis due to combined axial force and bending moment. The model considers towers as cantilevers which, if loaded by lateral forces in addition to their dead loads, may be subject to crises in a generic section due to crushing in the



a) Contrast elements

b) corner connections

c) longitudinal and transversal ties

Figure 2. Seismic devices of the bell towers.

compressed zone, after the reduction of the effective un-cracked area due to non-tensile-strength.

The level LV1 allows the evaluation of the acceleration of collapse through simplified methods, based on a limited number of geometric parameters and mechanics or that they use qualitative tools. In the case of rather stumpy towers breakups are found to cut, while in presence of a slender structures quality vertical lesions are verified, that depart from the bell cell and they have the tendency to divide the structure in parts.

The Campania region seems to be a good scenario to be investigated for planning such a future activity. Indeed, as a perspective for the mitigation of seismic risk, the South of Italy, and in particular the Neapolitan territory, is characterized by very high seismic hazard and, above all, a considerable exposition factor. In fact, the high presence and the different concentration of bell tower due to the ancient history of the Campania region, reveals a very high seismic fragility of such area.

A survey of all the bell towers belonging to this area is in progress, with the aim to evaluate the main representative typologies in terms of architectural style, constitutive materials, geometry, vulnerability elements etc., recognize possible failure mechanisms and apply a simply methodology to evaluate possible seismic risk.

Conclusion

The bell towers seismic behavior is complicated due to the vulnerability of the basic elements, which usually are quite slender due to aesthetic reasons, but, first of all, by the interaction with surrounding building. Therefore, their structural behaviour should be analysed considering both the global behaviour of the construction, in a whole with the adjacent building, and by considering the activation of possible local failure mechanisms that may affect only limited portion of the structure.

This paper, which is included in a research program dealing with the seismic safety of historic city centres and urban agglomerations, focuses on bell towers behaviour, providing a survey of their main influencing typological aspects, the plano-altimetrical morphology, the geometry and the material of the basic constitutive elements. It has been observed that the seismic global response of bell towers is strongly influenced by the shape of the plan, but also by its interconnection with adjacent contiguous structures. On the other hand, the local seismic and structural behaviour of towers is related to the one of the main constitutive elements,

namely vaults, openings tower or bell cell, building thickness and the relevant interconnections, which may be very vulnerable under seismic excitation.

A survey of all the bell towers belonging to Campania is in progress, with the aim to stimulate the adoption of useful strategies for seismic risk mitigation at regional scale.

References

Binda L., Zanzi L., Lualdi M., Condoleo P., (2005). The use of georadar to assess damage to a masonry bell tower in Cremona. *NDT & E International, 38*, Italy. (171-179).

Curti E., Parodi S., Podestà S., (2008). Simplified models for seismic vulnerability analysis of bell towers, *Structural Analysis of Historic Construction, Taylor & Francis Group, London.* ISBN 9780415468725.

D'Ambrisi A., Mariani V., Mezzi M., (2012) Seismic assessment of a historical masonry tower with nonlinear static and dynamic analyses tuned on ambient vibration tests, *Engineering Structures 36*, 210–219.

Ivorra S., Pallares F. J., (2006). Dynamic investigations on a masonry bell tower*, Engineeering Structures, 28*, (660-667).

Guadagnuolo M., Nuzzo M., Faella G., (2014). Seismic Safety of the "Corpus Domini" Bell Tower, *XII Forum Internazionale di Studi "Le Vie dei Mercanti" – Best pratice in Heritage, Conservation, Management from the world to Pompeii*, Aversa-Capri, Italia, Giugno 12-14, ISBN: 978-88-6542-347-9.

Guadagnuolo M., Nuzzo M., Faella G., (2018) The Corpus Domini Bell Tower: Conservation and Safety, *14th International Conference on Building Pathology and Constructions Repair*, CINPAR 2018, 20-22 June 2018, Firenze, Italy.

Milani G., Casolo S., Naliato A., Tralli A.G., (2012). Seismic assessment of a medieval masonry tower in Northern Italy by limit, nonlinear static, and full dynamic analyses, *International Journal of Architectural Heritage,* 6:5, (489-524*)*, DOI:10.1080/15583058.2011.588987.

MIT, (2011). DIRETTIVA P.C.M. 9 febbraio 2011*. S.O.* Gazzetta Ufficiale (n. 54).

MIT, (2008) D.M. 14 gennaio 2008 - Norme Tecniche per le costruzioni*,* Italy.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Integrated approaches and strategies for enhancing sustainable development of Italian small villages in the South of Italy

Giuseppe Guida[1*], Claudia de Biase[2], Fabiana Forte[3], Adriana Galderisi[4]

[1] *Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli Aversa, Italy, claudia.debiase@unicampania.it*
[2] *Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli Aversa, Italy, giuseppe.guida2@unicampania.it*
[3] *Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli Aversa, Italy, fabiana.forte@unicampania.it*
[4]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli Aversa, Italy, adriana.galderisi@unicampania.it*

Abstract: The contribution provides hints for promoting, according to integrated perspectives, a sustainable development of small villages, which represent the 70% of Italian Municipalities. Many of these villages suffered in the last decades a significant socio-economic decline due to their geographical location, being placed in mountainous and scarcely accessible areas, often prone to different natural hazards, and to massive migrations due to the lack of jobs and urban facilities. However, these villages might represent a key resource for Italy, being very often characterized by relevant historical and architectural values as well as by a significant natural heritage and a robust agricultural tradition. Hence, after a brief overview of the peculiarities of Italian Small Villages, we will focus on the recent initiatives recently launched in Italy in favour of small villages, by critically discussing their strengths and weaknesses in respect to specific case studies in the South of Italy.

Keywords: small villages, socio-economic decline; integrated policies

Italian small villages: the root causes of socio-economic decline

Nowadays in Europe over 70% of population lives in urban areas and this amount is expected to further increase in the next decades. It is estimated, indeed, that the rate of urban population will reach 80% in 2050. The concentration of population in large urban areas and its consequent decline in rural areas has led to significant territorial imbalance, characterized by the gathering of people, assets, economic activities, equipment and facilities in urban areas that induces a growing marginalization and, very often, a total abandonment of small villages. This phenomenon significantly characterizes Italy, where about 70% of existing municipalities count nowadays a population of less than 5,000 inhabitants: these municipalities cover a total area that exceeds the 50% of the national surface, even though they host only the 16% of the Italian population (ANCI-IFEL, 2015). Over the past few decades, indeed, small villages have suffered a prominent reduction in resident population. From the end of the Nineties, population decline in small villages has been estimated by the Italian Institute of Statistics equal to 6,5%. Furthermore, resident population in small villages is characterized by a growing ageing, with share of population over sixty-five equal to 22.7% (Ance, 2017). In respect to the availability of essential facilities (schools, hospitals, etc.), only the 36% of small villages is located in close proximity to medium-large cities where essential facilities are available (supply poles), showing therefore a good accessibility to them. On the opposite, the 64% of small villages, mainly in Southern Italian regions (Basilicata and Calabria) and in the major islands (Sicily and Sardinia), are far or very far from supply poles, with a limited accessibility to essential services. Furthermore, most of the Italian small villages are located in mountain (41.3%) and hilly areas (40.7%). The prevailing location of small villages along the Alpine arc or the Apennine Mountains implies that most of them fall

into areas characterized by high seismic and hydrogeological hazard levels. Numerous small villages (35%) are included in areas classified as seismic zone 1 or 2: these villages are mostly located in Central and Southern Italy. Furthermore, over the 36% of them, mostly located in Molise, Marche, Basilicata, Calabria and Sicily, fall into areas characterized by very high or high levels of attention to landslides.
Hence, based on the data mentioned above and according to numerous Italian scholars (Bassanelli, 2009; Pirlone, 2016), the roots of the socio-economic decline of small villages in Italy have to be identified in the complex and dramatic intertwining of socio-economic and environmental factors. The increasing socio-economic decline depends, in fact, not only on their limited accessibility, often due to the morphology of the sites, on the significant lack of essential facilities and job opportunities, but also on their exposure to geophysical (e.g. earthquakes) and climate-related (e.g. drought, fires, etc.) hazards, affecting an ageing population and a building stock often lacking adequate maintenance.
According to this premises, in the following the main strategies and initiatives currently launched in Italy to reverse socio-economic decline in inner areas and to revitalize small villages will be presented. Then, based on a case study methodology, strategies and initiatives so far promoted in respect to some "pilot areas" located in the South of Italy will be critically discussed.

Italian policies for inner areas
Italian landscape is characterized by a "network of relations between urban areas, rural areas and minor centers - which defines an interdependent space in which the major centers, offering services to citizens, act as attractors for the population" (UVAL, 2014). Since the Eighties of the last century, in fact, polycentric organization of the Italian territory has been characterized by two subsystems: the urban system composed by large and medium cities and the territorial system formed by small towns and villages mostly located in inner areas. Starting from this assumption, but especially from the fact that small towns and villages located in inner areas suffer significant difficulties while developing a strong social activism, in 2014 the Italian Strategy for inners areas has been launched. It includes 72 areas, composed by 1,077 Municipalities that require interventions aimed to protect, recover and revitalize, overcoming the urban-rural dichotomy. The Strategy pursues 5 intermediate objectives:
1. increase in the well-being of the local population;
2. increase in local demand for work (and employment);
3. increase in the use of local capital;
4. reduction of the social costs of de-anthropization.
5. strengthening of local development factors.

These five intermediate objectives are pursued through two types of actions, with a national and local dimension:
a. Adjustment of the quality/quantity of the offer of essential services;
b. Local development projects.

Furthermore, in 2017 some measures for supporting and enhancing small municipalities' development (LAW 158/2017) were introduced.

Tools and economic incentives for Italian small villages
Among the several reasons of the socio-economic marginality of the small villages (both in the inner areas and on the coast), there is no doubt that the negative demographic dynamics is one of the main causes, as in the concept of "spiral of marginality" (Buran, Aimone, Ferlaino, Migliore, 1998). In the last years, the increasing attention on these areas with an extraordinary "territorial capital" (Camagni, 2009), have seen the development of several strategies and tools, also legislative, aimed at the safeguard and the economic development of this

territories. Referring to the previous paragraph for the main initiatives promoted by the Italian Government in the last years, we will focus here on the crucial issue of the financial resources for the implementation of the strategies, starting from the opportunities of the European Union (Europe 2020) and from the national financial concessions, as the measures of INVITALIA, the National Agency for inward investment and economic development, owned by the Italian Ministry of Economy. The Agency, committed to reviving crisis areas, mainly in the South of Italy, manages all national incentives that encourage the creation of new companies and innovative startups. One of the most interesting measures to stimulate youth entrepreneurship in the South regions of Italy – "Resto al Sud"- is conceived also for encouraging the repopulation of inner areas and small villages, as in the Campania region. The institution of the "Lands Bank" (Law 28 July 2016, n. 154), contrasting the abandonment of agricultural land, promotes access to farm and forest land by private entrepreneurs, especially young farmers. The informatics tool allows knowing and identifying the number of available lands, the area, the type of cultivated land, the cadastral information and the map. This new tool could be particularly effective also in the perspective of a different way in conceiving the urban planning tools for the management of these territories. Highlighting the potentials of some fiscal incentives, as the "tax concession" system (*fiscalità di vantaggio*), both for the enterprises and the economic activities and for the market property, this part of the study try to identify further possible operational strategies for the valorization of the territorial and the human capital – especially young people – of the small villages in the South of Italy. Perspectives of development for these areas, characterized by competitive factors "non-relocatable", are possible only through a shared approach (cohesion) in contrasting the depopulation, the territorial vulnerability, in offering services and territorial equipment able to create new attractiveness.

Italian Small Villages: the case study of the South of Italy

Among the municipalities on which it is possible to intervene there are also all the municipalities characterized by marked economic backwardness or in which there has been a significant decrease of resident population; in those with conditions of settlement illness, defined on the basis of the age index, the percentage of employed with respect to the resident population and the index of rurality and municipalities characterized by inadequacy of essential social services and located in areas marked by difficulties in communication and from the distance from the big urban centers. It is clear, therefore, that these are small municipalities in inner areas. The Italian strategy for inner areas is organized on 72 project areas and 20 pilot areas. The project areas related to South Italy are described in Table 1:

NATIONAL STRATEGY FOR INTERNAL AREAS -Municipalities of South of Italy in the project areas			
Regions	**Projects areas**	**N. areas**	**N. munic.**
Abruzzo	Basso Sangro-Trigno, Subequana, Val Fino-Vestina, Valle Roveto	4	88
Molise	Alto Medio Sannio, Fortore, Mainarde, Matese	4	72
Campania	Alta Irpinia, Cilento Interno, Tammaro-Titerno, Vallo di Diano	4	93
Puglia	Monti Dauni	1	29
Basilicata	Alto Bradano, Marmo Platano, Mercure Alto Sinni Val Sarmento, Montagna Materana	4	42
Calabria	Grecanica, Ionico-Serre, Reventino-Savuto, Sila e Presila	4	58
Sicilia	Calatino, Madonie, Nebrodi, Sicane, Val Simeto	5	65
Sardegna	Alta Marmilla, Gennargentu-Mandrolisai	2	31
	Total	**28**	**478**

Table 1

The municipalities of the so-called inner areas are widely spread throughout the national territory, although it is possible to detect a greater number in the central-southern regions and along the Apennines. Many of the "ultraperipheral" municipalities are concentrated in the central-southern part of Basilicata, along the north-west coast of Calabria on the border with Campania, in Sardinia (ANCI-IFEL, 2015b).

In addition to the difficulties that characterize all Italian small villages located in the inner areas, in the South of Italy the structural problems of the territory, the greater fragility and exposure to risks (in particular the hydro-geological and seismic risks) and the economic weakness of the entire South, in many cases still linked to the identity (and quality) tradition of agriculture, have to be added. The data show, in fact, a tendency of the inner areas of the regions of Southern Italy (Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicily, Sardinia) to a more widespread agricultural specialization than the average of those in Central-Northern Italy.

In this paper, strategies and initiatives so far promoted in respect to some "pilot areas" located in the South of Italy will be critically discussed, highlighting strengths and weaknesses of current strategies and providing some hints for enhancing sustainable development of small villages that, due to their relevant historical and architectural values, a significant natural heritage and a robust agricultural tradition represent key resources for a more balanced development of the whole Italian country

Concluding Remarks

In the last decade, devoted policies and tools for inner areas and small municipalities have been developed in Italy. They show relevant weaknesses due to the lack of an integrated approach both to the problem setting, which focuses on specific issues without grasping the multiple roots of the socio-economic decline of small villages in inner areas, and to the problem solving, leading to a significant fragmentation of the proposed policies and tools, in the lack of a coordinating strategy capable to strengthen the potential synergies among the different initiatives.

These weaknesses appear even more relevant in the case of inner areas and small municipalities located in the South of Italy, due to a more disadvantaged socio-economic context that requires specific approaches and policies capable to link these initiatives and tools to wider development policies.

References

ANCE (2017). *I Borghi d'Italia. Dalla visione alla rigenerazione*. http://www.ance.it/docs/docDownload.aspx?id=41557

ANCI-IFEL(2015a). *Atlante dei Piccoli Comuni*. https://www.fondazioneifel.it/documenti-e-pubblicazioni/item/4635-atlante-dei-piccoli-comuni-2015

ANCI-IFEL (2015b), I comuni della strategia nazionale aree interne, Roma.

Bassanelli M. (2009), *Geografie dell'abbandono. Il caso della Valle di Zeri*. Politecnico di Milano. https://issuu.com/lablogpublications/docs/2010_05_bassanelli

Buran P., Aimone S., Ferlaino F., Migliore M.C. (1998). Le misure della marginalità. I fattori del disagio territoriale delle aree montane piemontesi, Working Paper n. 121/1998, IRES Piemonte, www.ires.piemonte.it/contributi.html.

Camagni Roberto, Per un concetto di capitale territoriale, in Borri D., Ferlaino F. (2009), *Crescita e sviluppo regionale: strumenti sistemi e azioni,* Franco Angeli, Milano

Crescimanno A., Ferlaino F., Rota F. S. (2009).Classificazione della marginalità dei piccoli comuni del Piemonte 2009, IRES. Istituto di Ricerche Economico Sociali del Piemonte, IRES, Piemonte

Legambiente, Piccolo (e fuori dal) comune. Cosa sta cambiando nell'Italia dei Piccoli Comuni, Legambiente-Union Camere- Symbola, Stato di avanzamento, maggio 2016

Pirlone F. (2016), *I borghi antichi abbandonati. Patrimonio da riscoprire e mettere in* sicurezza, FrancoAngeli, Milano.

UVAL (2014), *Strategia Nazionale per le Aree interne: definizione, obiettivi, strumenti e governance*, Collana Materiali Uval, Roma.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Accommodation strategies of Syrians in Turkey

Dilşa Günaydın Temel[1*], Z. Ezgi Haliloğlu Kahraman[2]

[1]*Interor Architecture and Env. Design, Atılım University, Ankara, Turkey, dilsa.gunaydin@atilim.edu.tr*
[2] *City and Regional Planning, Cankaya University, Ankara, Turkey, ekahraman@cankaya.edu.tr*

Abstract: Turkey has witnessed Syrian immigration process since 2011. Since the beginning of the process, the accommodation of Syrians has constituted one of the major problems of their migration process in Turkey. This study focusing on Syrian migration process to Turkey aims to examine the accommodation process, institutional and private accommodation alternatives, and housing strategies for Syrians in Turkey. It intends to uncover their housing practices reflecting Syrian way of life through literature review and the field study conducted in Onder Neighborhood, Ankara.

Keywords: Syrian immigrants; accommodation strategies; housing practices; Onder neighbourhood; Turkey

Introduction

Turkey has witnessed the mass influx of Syrian immigrants since 2011. Although Syrian migration process is known as a humanitarian crisis all over the world, because of its geographical closeness to Syria and welcoming policies, Turkey was affected more significantly from this process than any other country in the world. Today, the total number of Syrians living in Turkey has approximately reached to 3.576.337 (AFAD, 2018).

In 2011, Turkey declared an open-door policy towards Syrian immigrants. İçduygu (2015), discussed Turkey's policy through three elements including 'ensuring temporary protection', 'upholding the principle of neon-foulement' and 'providing optimum humanitarian assistance' (p.8.).

Since the beginning, the accommodation of Syrian immigrants has been evaluated as one of the major problems of their migration process in Turkey. At the beginning, the Turkish authorities ignored the possibility of long-term stay in the country that they concentrated on providing accommodation in camps. However, the changing conditions and the ongoing immigration have increased the number of Syrians living outside camps. By the late 2014, almost four of five Syrians were inhabited in towns and cities (İçduygu, 2015). However, one of the three Syrians living outside camps are unregistered that this situation hinders their access to basic services and protection (AFAD, 2013). This fact influences their living, working and social conditions as well. Additionally, the negative attitudes of the local community have

increased over time. Some of the reasons of these attitudes are rise in rents and housing costs, unemployment and economic competitiveness where Syrian immigrants are more visible. Recently, the public opinion has evaluated Syrians as threat to security, public order and peace (HUGO, 2014). Therefore, the earlier notion of Syrians as 'temporary quests' has turned into 'disintegrated' or 'threat to the existing social values'.

Within this framework, this study focusing on Syrian migration process in Turkey aims to examine the accommodation process and housing practices of Syrians in the country. To do this, it discusses institutional and private accommodation opportunities of Syrians in Turkey, and their housing strategies that reflect their own way of life in Turkey.

Method

The methodological framework of the study includes two parts. In the first part, the literature on Syrian accommodation process and their accommodation alternatives in Turkey was reviewed. The second part focuses on a pilot study in Onder neighbourhood. The neighbourhood which is known as a Syrian neighbourhood in Ankara is located near to the industrial district named as Siteler.

In this phase of the study, the housing practices of Syrian immigrants that reflect Syrian way of life in the neighbourhood is going to be examine under the concept of social sustainability. The study was analysed from photographs taken during field visits in May-June 2018. These practices were compared with those before war in Syria. A similar investigation was conducted to visual documents of previous studies on Syrian migration and accommodation process in order to reveal traces of socio-cultural extension and the impacts of social sustainability process in the housing environment of Syrian immigrants living in Turkey. These environments include both refugee camps and immigrant neighbourhoods.

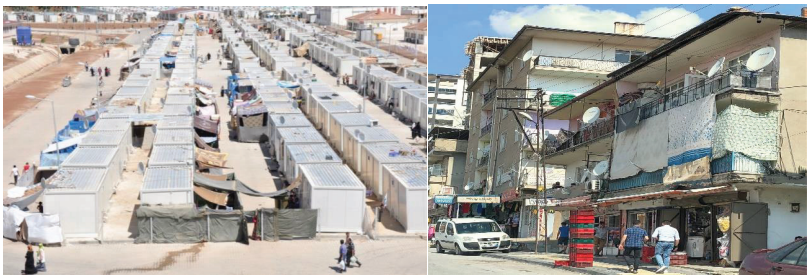


Figure 1. Examples of a tent camp and Onder Neighbourhood.

Findings and discussion

In Turkey, Syrian immigrants live either in refugee camps providing institutional accommodations or outside camps providing private accommodation. The Turkish authorities do not provide any public or private social housing opportunities for immigrants except refugee camps. In 2014, there were nearly 220.000 Syrian migrants sheltered in 22 camps locating along the Syria border and 515.000 registered urban immigrants settled down in different cities of the country (Kirişçi, 2014).

In refugee camps, there are two separate constructional sheltering opportunities for immigrants including tent and container. Due to the risk of inflammation and the lack of durability, most of the camps has switched to container-based accommodation. (https://globalnews.ca/news/3571278/syrian-refugee-camp-lebanon-fire).

According to ORSAM (2013), camps serving to Syrians in Turkey are more comfortable, standardized and controlled than those in neighbouring countries. In camps, services such as recreation, education, health and security are provided by the Turkish authorities. The physical conditions in camps are also reported better than those in urban neighbourhoods (ORSAM, 2015). Additionally, Syrian immigrants' prefering to live in cities or towns have had trouble in finding houses and jobs, paying rent, and accessing educational and health services (İçduygu, 2015).

Although camps provide relative comfort and security to immigrants, more than 1 million Syrians have preferred private accommodation in cities or towns due to three major reasons: over crowdedness in refugee camps; family ties and financial independence creating housing opportunities outside camps; and the prohibition of the camp entrance registration for immigrants who illegally got into the country (İçduygu, 2015). The major factor determining locational preferences of Syrian immigrants in

private accommodation is the closeness to the shelter of relatives who have already settled down in Turkey. Other factors shaping these preferences include the cost of living in the neighbourhood, the economic background of the immigrant and closeness of the neighbourhood to the industrial districts where the immigrant can easily find a job (Lordoğlu & Aslan, 2016).

Although the number of Syrians living in towns or cities has increased day-by-day Bariscil, Hussein and Yavuzaslan (2017) highlights the uncontrolled and irregular structure immigrant neighbourhoods.

Figure 2. Examples of Syrian House in Aleppo and in Onder Neigbourhood, Ankara.

In Figure 2, the images on the left-hand-side representing the housing environment in Aleppo before war display daily life routines of Syrian. These images show that Syrians are accustomed to use courtyards, front or backyards, or balconies of their houses. The images on the right-hand-side, in Onder neighbourhood, and also prefabricated shelters in Figure 1, exhibit that Syrians attempt to sustain their traditions of using outside the house for social interaction and gathering. These personalized spaces, which are generally used by Syrian women, have been adapted with respect to the need of secrecy. Although,

new living spaces of Syrians are mostly over-crowded, not good in quality, and lack of basic facilities, they reflect their own ways of life. The reason of their relatively high level of housing satisfaction in these settlements (Carter & Osbourne, 2009) might lie behind the fact of social and cultural sustainability. On the other hand, uncontrolled increase in the number of Syrian immigrants in Turkey has resulted in uncontrolled growth of irregular and patchwork shelters and settlements of Syrians in Turkish cities, which are lack of aesthetic values.

Conclusion

This study examining Syrian accommodation process in Turkey elicited four major findings:

(1) Syrian immigrants in Turkey are living in both refugee camps and immigrant neighbourhoods in cities/ towns. The Turkish Authorities do not provide social housing opportunities for these migrants. They are not planning to develop any special housing strategy for Syrians in the near future as well.

(2) Although camps provide relative comfort and security, most of the immigrants prefer to live outside camps due to social, economic, and legislative reasons.

(3) Locational preferences of urban immigrants are shaped by both socio-economic background of the immigrant and economic and spatial structure of the neighbourhood.

(4) Whether they live in camps or outside camps, they personalize and adapt their new environment with regard to their own way of life. However, the irregular growth of immigrant settlements threatens spatial quality and aesthetic values of cities.

References

Carter T.S. and Osborne, J. (2009). Housing and neighbourhood Challenges of Refugee Resettlement in Declining Inner-City Neighbourhoods: A Winnipeg Case Study. Journal of immigrant & Refugee Studies, 7:3, 308-327, DOI:10. 1080/15562940903150097.

Lordoğlu, K., Aslan, M. (2016). 'En fazla Suriyeli göçmen Alan Beş kentin Emek Piyasalarında Değişimi: 2011-2014'. Çalışma ve Toplum, 2016/2, 789-808.

Kirişçi, K. (2014). Syrian Refugees and Turkey's Challenges: Going Beyond Hospitality.

Washington DC: Brookings Institute.
Bariscil, A., Hussein, W.N., Yavuzaslan, A. (2017). ' Some Aspects of the Integration of Syrian Refugees in Turkey.' *Eurasian Journal of Social Sciences,* Eurasian Publications, vol. 5(4), pages 1-6.
AFAD. (2013). Syrian Refugees in Turkey 2013: Field Survey Results, Ankara: AFAD.
AFAD. (2015). Syrian Refugees in Turkey.
Içduygu, A. (2015). Syrian Refugees in Turkey - The long road ahead. *Transatlantic Council on Migration*, 1–23.
ORSAM (Ortadoğu <stratejik Arş. Merk.). (2014). Suriye'ye Komşu Ülkelerde Suriyeli Mültecilerin Durumu: Bulgular, Sonuçlar, Öneriler, Report No: 189, ORSAM: ANKARA.
ORSAM (2015). Effects of Syrian Refugees on Turkey, Report no: 195, ORSAM: ANKARA
HUGO (Hacettepe Üniv. Göç ve Siyaset Arş. Merk.). (2014). Türkiye'deki Suriyeliler: Toplumsal Kabul ve Uyum Araştırması Raporu.
http://www.30nisan.com/haber/suriyeliler_harabe_evleri_terk_etmek_istemiyorlar-13293.html
https://www.theatlantic.com/international/archive/2013/12/understanding-syria-from-pre-civil-war-to-post-assad/281989/
https://tr.pinterest.com/peregrinetulpe/tent-city/
http://www.gazeteilksayfa.com/baskente-kucuk-halep-kuruldu--15054h.htm
http://www.syriaphotoguide.com/home/aleppo-old-houses
https://www.greenprophet.com/2009/07/syrian-beehive-houses/
https://globalnews.ca/news/3571278/syrian-refugee-camp-lebanon-fire
https://www.afad.gov.tr/upload/Node/2374/files/18_06_2018_Suriye_GBM_Bilgi_Notu.pdf

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Built environment heritage as political negotiation in Famagusta, Cyprus

Ceren Hamiloğlu[1]

[1]*Architecture Department, Maltepe University, Istanbul, Turkey,*
cerenhamiloglu@maltepe.edu.tr

Abstract: This study discusses 'heritage' as a social notion through cross-readings from the literature about memory and archaeology. Its main objective is to provide a clearer basis on preservation-regeneration activities in the context of Famagusta –and the historical Walled City within the city specifically. Especially since the twentieth century preservation of the built environment has become political, with the underlying connotations about nation-identity and heritage as its legitimization. This demonstrates that heritage has become more related to the contemporary socio-political context of the built environment. Cyprus, provides a convenient site for the negotiation of heritage, identity and locality as an island that consists of two different ethnic groups. As a counter-narrative to the nationalist extremes present in the two countries in Cyprus, the study presents Famagusta and its historic Walled City as a unique landscape and an inclusive common area in which daily practices had taken place. Meanwhile, through current examples on the use of certain areas in Famagusta, speculations regarding the political resolution in Cyprus are made.

Keywords: heritage; locality; memory

Introduction

Architecture, as a discipline constructed on its precedents, is in a constant relationship with issues of history, heritage and memory. Therefore, conservation and regeneration are as important issues as building and since the 1980s-90s, these notions have shifted from a paradigm that regarded the main aspect as physicality to an idea of the conservation of non-material network of relationships.

The focus of this study is Famagusta and its Walled City which once gleamed with lively urban life until the 1970s. The study aims to designate and discuss the potentials of the conservation of certain relationships in Famagusta as a foreshadower of political resolution. The original contribution of this study is its attempt to read space, the conservation/regeneration of space and the activities occurring in those spaces as a ground to discuss the commons of the two communities (Greek and Turkish) on the island and to hint at a political resolution by revisiting these commons. In that sense, space itself is utilized to understand the existing social and political tension. Thus, specific spaces –such as the traditional market space 'Bandabuliya', the orange festival and the coast of Varosha- as well as cultural practices that could contribute to revive the urban life, people's use and connection to the street in the Walled City were discussed. Their relationship with the idea of a local and common heritage was pivotal in such instances. Turkish scholar Derya Oktay's survey studies on Famagusta inhabitants' behaviour

patterns and the satisfaction with the built environment reveals the importance of the city inhabitant's use of the city. Taking my cue from the existing literature on the identification of preservable buildings (Doratlı et al, 2001) and existing proposals for new use (Akpınar and Uraz, 2007; Faslı et al, 2007), I assert that localities and specific cultural practices sustain the materiality of an urban space. In doing so, local memory plays an important role in reminding a common ground for the people of Cyprus. In that sense, the literature on the archaeology and preservation of architecture and how this implies a political act was reviewed (Harrison, 2013; Knapp and Antoniadou, 2002; Forty and Küchler, 2001; Boyer, 1996; Lowenthal, 1995; Halbwachs, 1992).

Methods

The methodology for this research consisted of doing limited archival research on certain restoration projects (the conversion of St. Nicholas Church into a mosque, the renovation of the local market hall 'Bandabuliya'), some local cultural practices such as the Orange Festival in Famagusta, as well as local initiatives that are working towards negotiation through architectural projects. The cases were used as sources to make sociological readings of space on the use of the Walled City.

Findings and Discussion

The potentials within the Walled City cannot be evaluated without considering its natural qualities, historical experiences, social actors and the politics of space in the city of Famagusta. Together, these aspects (including both the Greek and Turkish communities) constitute the identity of the Walled City and they produce and reproduce each other through their interactions. According to Altman & Low (1992), people need to develop an attachment to a place to build their individual and collective identities. In that sense, with unplanned urban interventions, rapid urbanization and political tension, Famagusta and the Walled City lack the historical and social relationships that people could use to get attached to their environment. However, this attachment could be enhanced through activities –such as hosting workshops/lectures partnering with the university in Famagusta and that of interest of the city's inhabitants, architecture tours, planned annual culture events and many others. These could increase people's mobility and use of open spaces in the Walled City. As Akpınar & Uraz (2007) suggest, the approach to urban design and revitalization should include concepts such

as change and movement at the core of its agenda: rather than functional mass-based additions, open-ended inter-solutions that define events could lead a better use of urban spaces.

Conclusion

The Walled City of Famagusta is unique in terms of its political history, geographical position and heritage value. Therefore, architectural interventions or proposals should pay respect to the historical narrative, the local memory and most importantly, the materiality attached to particular urban spaces. The solution-making process could be evaluated within the larger frame of the political situation on the island, and perhaps could offer a solution on that basis.

There are local and international initiatives and projects that aim to discover, scrutinize and solve the tensions and nodes in Famagusta. These groups consist of architects, scholars, students and the city inhabitants who try to consider the potentials of commons to revitalize Famagusta. The initial aim should be to define a set of continuous set of events and make certain spaces re-function. It is rather the social practices, the local culture and the inhabitants' behaviour patterns that affect the use of a space.

The historical changes and potentials within the Walled City necessitate an inclusive process regarding the site's identity rather than a linear narrative of events, rulers and periods. Whatever solution the future might bring, Famagusta embeds a vast potential for the use of its urban spaces.

References

Altman, I. & Low, M. S. (1992). *Place Attachment*. Plenum Press: New York.

Boyer, M. C. (1996). *The city of collective memory: Its historical imagery and architectural entertainments.* Cambridge: MIT Press.

Doratlı, N., Önal, Ş. & Dağlı, U. (2001). Revitalizing the walled city of Gazimagusa (Famagusta). *Open House International*, 26 (1), 42-58.

Faslı, M. Paşaoğulları Şahin N., Oktay Vehbi, B., Yada Akpınar, İ. (2007). Avrupa Birliği kalkınma fonu kapsamında 'gelecek için ortaklık' projeleri: Lefkoşa, Uluslararası 18. Kentsel Tasarım ve Uygulamalar Sempozyumu Sempozyumu [International Urban Design and Aplications Symposium], İstanbul, Turkey.

Forty, A., Küchler, S. (Eds.), 2001. *The art of forgetting*. Oxford: Berg.

Halbwachs, M. (1992). *On collective memory* (L.A. Coser, Çev.). Chicago: The University of Chicago Press.

Harrison, R. (2013). *Heritage: Critical approaches*. New York: Routledge. doi: 10.4324/9780203108857

Knapp, A. B. & Antoniadou, S. (1998). Archaeology, politics and the cultural heritage of Cyprus. Meskell, L. (Ed.) içinde, *Archaeology under fire: Nationalism, politics and heritage in the Eastern Mediterranean and Middle East* (ss. 13-44). Londra: Routledge.

Lowenthal, D. (1995). *The past is a foreign country.* Cambridge: Cambridge University Press.

Yada Akpınar İ., Ulusu Uraz, T. (2007). Kültürel projeler üzerinden kentsel canlandırma ve Mağusa örneği [Urban revitalization and the example of Famagusta through cultural projects], Presented at Uluslararası 18. Kentsel Tasarım ve Uygulamalar Sempozyumu [International Urban Design and Aplications Symposium], İstanbul, Turkey.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Conceptual framework for developing next generation of Energy Performance Certification (EPC) systems

Assist. Prof. Dr. Timuçin Harputlugil[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, tharputlugil@cankaya.edu.tr*

Abstract: One of the main important tasks for sustainable development is to boost energy efficiency. Based on Energy Performance of Buildings Directive (EPBD) revealed in 2002 by European Union (EU) 40% of energy is consumed by buildings. In the same directive for energy efficiency a new model called Energy Performance Certification (EPC) is introduced and since then has been used by member and related countries. For a better sustainable development, this research aims to define conceptual framework to develop next generation of EPC with providing dynamic data gathering to monitor energy consumption of the buildings. Next generation EPC is designed to be a part of smart grid system and will be adapted as a plug-in. Considering the huge building stock in EU member and related states, new EPC will provide benefits not only for governing bodies but also energy companies (producers and suppliers) and users with real time dynamic data generation.

Keywords: Energy Performance Certificate; Energy Performance Building Directive; Energy Efficiency; Energy Performance; Smart Grid

Introduction

Energy Performance of Building Directive (EPBD) is first introduced by European Union (EU) in year 2002 stating buildings consume more than 40 % of energy usage in the community. Importance of energy performance of buildings on energy consumption is remarked and Energy Performance Certificate (EPC) is introduced with the definition of:

> A certificate recognised by the Member State or a legal person designated by it, which includes the energy performance of a building calculated according to a methodology based on the general framework (EPBD 2002).

EPC is an EU initiative and aims to improve energy efficiency in buildings across the EU member/related countries and can be defined as ID cards of buildings revealing their energy usages. EPC aims to i) inform building owners and tenants ii) allows to pass regulative requirements of member states iii) market instrument to trigger retrofit/renovation iv) define conditions for finance (Zirngibl, 2017). This research aims to define a conceptual framework to develop next generation of EPC systems based on the deeply critical analysis of existing systems and potential development opportunities based on dynamic data generation, analysis and usage.

Background

In line with the 2002 Energy Performance of Building Directive (Directive 2002/91/EC) and the recast reinforced in 2010 (Directive 2010/31/EU), most European

countries have established independent EPC systems to reveal energy performance of buildings to tenants and prospective as well as current property owners (Olaussen,J.O. et al., 2017). The reason behind the implementation of the energy certification system is the assumption that building stock has large unused energy conservation potential. This can be achieved by guiding tenants and owners on the use of energy and advising on ways to reduce it. (Harsman, B. et al. 2016).

Critically Analysis Of Current EPC Systems

Different types of EPCs are being used in EU states and worldwide. However all of these traditional EPC systems contain static data. Therefore, existing EPC formats may yield data for statistical analysis only. In this respect below given items cannot be addressed for detailed analysis. Traditional EPC systems are limited since;

- There are too many variances: there are more than 35 EPC models are used. All of them have their own calculation methodology, metrics and standards. It is hard to convert numerical values for comparative analysis (Zirngibl & Bendzalova, 2015).
- Mostly, occupant behaviour is not included: Buildings do not consume energy but occupants. Hence any calculation methodology excluding occupant behaviour may result a big gap between real usage and estimation based on calculations.
- Static data, not dynamic: Data gathered for EPC are static. Static data can not be updated and can not be used for real time data management.
- In building scale (does not cover district/neighbourhood/urban scale): EPC calculation methodologies rely on single building evaluation. On the other hand energy usage should be assessed considering interaction of buildings.
- Data gathering & quality is limited and most probably not valid: Stored data of buildings having EPC are based on calculations which are not validated with the real usage data.
- Data updating protocols are limited: EPC data collecting protocols adaptation needs several years. Whenever new calculation methodologies or new metrics are introduced it is hard/impossible to update existing EPC files/documents.
- Renovation, retrofitting logs cannot be saved: 75% of the housing stock is energy inefficient. Positive effects of renovation and/or retrofitting cannot be monitored and evaluated (Roderick van Voorst, 2017).
- Cost effectiveness (stated in EPBD) cannot be measured.

- Metrics used EU wide is different and calculation methodologies differ each other (Zirngibl & Bendzalova, 2015).
- Hard to update the data for existing building stock.
- Prediction/projection/scale up is limited.
- Nearly/net zero energy targets (stated in EPBD) adaptation is limited.
- Mostly, metrics related to waste management, recycling, emissions and renewables are not up to date.

Through a new generation

Energy systems are changing, therefore energy efficiency rating systems should also be updated/revised. It is expected to get 50% of energy from renewable sources with the year 2030 in EU. Furthermore by the year 2050 Electricity is expected to be 100% carbon free. Based on these predictions, energy efficiency in buildings should also be updated and their performance evaluation methodologies should be revised.

Assessment processes and certificates have to become more reliable, user-friendly, cost effective, have comparable good quality and be compliant with EU legislation in order to instil trust in the market and incite investments in energy efficient buildings (EU, Horizon 2020 work call). Considering huge amount of building stock in EU countries, a new generation of EPC should be developed considering the statements/topics below not only for new buildings but also for existing buildings:

- **Occupant comfort based**

Buildings do not consume energy, but occupants. Occupant behaviour has a huge effect on energy consumption and occupants behave differently. Occupants have different comfort conditions which labelling of them should be mentioned based on their energy consumption.

- **Smart Systems Focused**

EPC should be mentioned based on different kinds of sensors creating real-time data communicating with other systems for harmonization. EPC systems should be developed to monitor the consumption of the building environment not for a single building. It should also be noted that revised EPBD (2018) come up with;

i. ability of building to **manage itself**
ii. to interact with building **occupants**

iii. to take part in demand response and contribute to **grid** operation (smart readiness).

- **Methodological Transparency / Common Metrics Definition**

Transparency of energy performance certificates should be improved by ensuring that all necessary parameters for calculations, both for certification and minimum energy performance requirements, are set out and applied consistently. Common metrics should be addressed for comparative analysis of different EPC's. Besides calculation methodology should allow new metrics definition and adaptation.

- **Building Energy Passport**

Renovation, retrofitting and all other updates on the building should be logged. New system adaptations such as renewables should be easily pursued in EPC systems.

- **Integrated / Interactive**

EPC should be integrated with other automation systems of building environment. Although EPC is designed to raise awareness for the energy efficiency, new systems such as waste management, water efficiency, decreasing carbon footprint etc should also be integrated with the new generation of EPC systems

- **Dynamic**

EPC should provide real-time data. These data can be useful for ministries/governing bodies for future prediction, energy capacity estimation and creating investment policies on renewable energy sources. Energy producers/providers (ESCO's) can use these real time data for compensating the energy consumption. Occupants can benefit from this new system by analysing real-time consumption of energy, water, etc.

Conclusion

Based on an extensive literature review and analysis of past experiences; the next generation of EPC, introduced with the text is expected to be a responsive, cost-effective and user friendly system based on dynamic data gathering. The next generation of EPC system is structured considering i)occupant behaviour ii)smart systems focused iii)integrated and interactive iv)dynamic data based. Another important issue is that EPC should be taking account into harmonisation of gathered data of different buildings for development of decentralization of energy and emissions.

The next generation of EPC's are expected to be benefitted by governing bodies (governments, ministries, municipalities etc.) regulation incentives (national agencies,

building permission authorities etc.) service suppliers (energy agencies, ESCOs etc.) and users (occupants). It is believed that governing bodies will benefit for making future predictions for energy consumptions and will have a chance to define investment policies especially on renewables. Regulation incentives will be able to update their protocols and will be able to use real time data for evaluation. Service suppliers may harmonise energy production and transmission based on real time data provided. Occupants will have a chance to monitor their energy consumption instantaneously and may use energy efficiently.

Considering usage of different variations of EPCSs in EU wide, it is believed that next generation should provide developing of existing calculation methodologies, metrics and standards used. Expected key functions of the new generation of EPC can be listed as flexibility, adaptivity, responsivity and self-diagnostic. Last but not the least; the traditional EPC system needs to be evolved/updated/developed to a plug-in for smart systems as a new generation approach.

Acknowledgement: I would like to thank Prof. Dr. Birol Kılkış for his valuable contribution to develop the manuscript.

References

European Union, European Commission, Energy Performance Building Directive(EPBD), (2002). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0091&from=EN

European Union, European Commission, EPBD(recast), (2010). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0031&from=en

European Union, European Commission, Energy Efficiency Directive(EED), (2012). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN

European Union, European Commission, 2010 EPBD and 2012 EED amendments , (2018). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0844&from=EN

European Union, Horizon 2020 - Work Programme 2018-2020, (2017). Retrieved from the webpage: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-energy_en.pdf

Harsman, B., Daghbashyan, Z. & Chaudhary, P., (2016). On the quality and impact of residential energy performance certificates. Energy and Buildings, 133, pp.711-723.

Olaussen, J. O., Oust, A., & Solstad, J. T. (2017). Energy performance certificates–Informing the informed or the indifferent?. Energy Policy, 111, 246-254.

Roderick van Voorst, (2017). Developments In Energy Efficiency In Buildings In The European Union (EU), Keynote Speech, International Symposium on Energy Efficiency in Buildings, Ankara, Turkey.

Zirngbl, J., (2017). The Voluntary Common European Certification Scheme For The Energy Performance Of Non-Residential Buildings, International Symposium on Energy Efficiency in Buildings, Ankara, Turkey.

Zirngibl, J., Bendzalova, J., (2015). Technical assessment of national/regional calculation methodologies for the energy performance of buildings. EU Project Final Report. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/EPB_calculations_in_EU.pdf

European Union, European Commission, Energy Performance Building Directive(EPBD), (2002). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0091&from=EN

European Union, European Commission, EPBD(recast), (2010). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0031&from=en

European Union, European Commission, Energy Efficiency Directive(EED), (2012). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN

European Union, European Commission, 2010 EPBD and 2012 EED amendments , (2018). Retrieved from the webpage: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0844&from=EN

European Union, Horizon 2020 - Work Programme 2018-2020, (2017). Retrieved from the webpage: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-energy_en.pdf

Harsman, B., Daghbashyan, Z. & Chaudhary, P., (2016). On the quality and impact of residential energy performance certificates. *Energy and Buildings*, 133, pp.711-723.

Olaussen, J. O., Oust, A., & Solstad, J. T. (2017). Energy performance certificates–Informing the informed or the indifferent?. Energy Policy, 111, 246-254.

Roderick van Voorst, (2017). *Developments In Energy Efficiency In Buildings In The European Union (EU), Keynote Speech*, International Symposium on Energy Efficiency in Buildings, Ankara, Turkey.

Zirngbl, J., (2017). The Voluntary Common European Certification Scheme For The Energy Performance Of Non-Residential Buildings, International Symposium on Energy Efficiency in Buildings, Ankara, Turkey.

Zirngibl, J., Bendzalova, J., (2015). Technical assessment of national/regional calculation methodologies for the energy performance of buildings. EU Project Final Report. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/EPB_calculations_in_EU.pdf

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Triconch chapels in the early Christian and Byzantyne architectural tradition

Danila Jacazzi

Department of Architecture and *Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy,danila.jacazzi@unicampania.it*

Abstract: This paper collects a examination of the early Christian triconch chapels of Lycia, Karya and Antalya (Asia Minor, modern Turkey) with an analysis of their significance for the general development of ecclesiastical architecture between the fifth and sixth centuries in the Mediterranean area. Ancient and suggestive Christian archeological sites and ruins throughout the Turkish country show off the area's importance from IV to VI century. These architectures adopt typologies in which Hellenistic survivals, Byzantine and Syriane influences coexist with technical and formal elements derived by the local tradition. The existence of cultural and religious common circuits in the Mediterranean area (Italy, Tunisie and Algerie) could explain the great diffusion of unitary formal models that is recorded.

Keywords: Christian archeological sites, Triconch Chaples, Religious architecture.

Introduction

In recent years, the archaeological documentation has furnished new interesting elements about the diffusion of the triconch typology in the whole Mediterranean area. The birth of the Christian art in the period immediately subsequent to the Edict of Milan of the 313 A.D. coincides, in fact, with the formation in the Mediterranean world, particularly in Roman Africa, of a new society and of a new culture that imposes the adoption of renewed architectural models diffused in the dawning monastic centers. The existence of cultural and religious common circuits could explain the great diffusion of unitary formal models that is recorded, beginning from the IV century, in centers at times very geographically far.

To better understand the birth of the chapels with trycore, it's necessary to briefly trace out the origin, the process and the symbolic value about the triconch. Although deriving from greek τρίχωρος, the term has been used in his latin version tricorium or trichorum to identify an architectural element. Starting from the II century, the sources report the term referring to urban and suburban mansions, with a peculiar monumental and representative character. The triconch's utilization in the architecture of the late-empire mansions is very popular in Gaul, Spain and Roman Africa, in structures datables between the end of the III century and the beginning of the V century. Initially, the triconch appears as a triclinium, that is like a dining room for special events, but soon it become one of the most representative location of imperial roman villa for official ceremonies. The triconch is very popular even in the paleo-christian

architecture, where it is choosen thanks to its symbolic value: the triclinium become, according to the triconch typology, the emblematic location addressed to the Eucharistic meal. The ritual

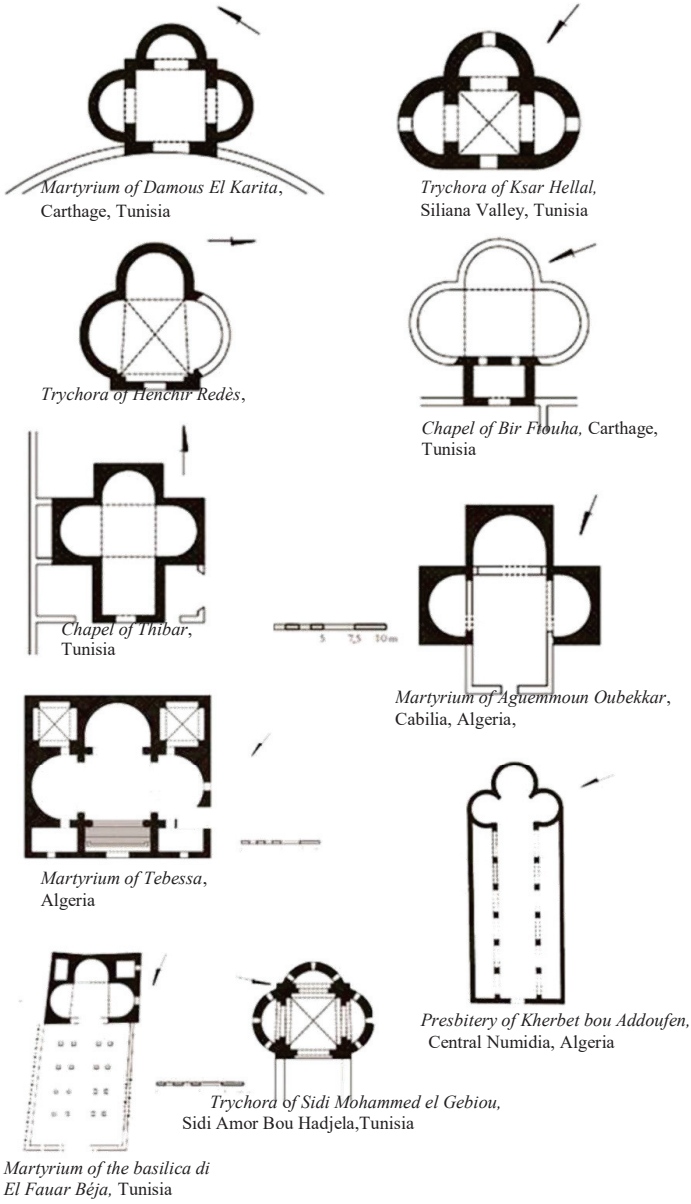


Fig. 1. *Cellae trychorae* in the North-Africa

that took place in the imperial buildings was, in fact, considered as a religious rite sancti palatii ritus, and the building itself was considered as the emperor's temple of worship. After the christianity's foundation as the cult of State, many of its ceremonial aspects were perceived on the basis of imperial terms, with a symbolic meaning, seeing Christ as the Emperor of Heaven and the paleo-christian church as the house of the Lord. Even the sources show, starting from the IV century, developed a metaphorical equivalence between the royal or imperial palatium and the Christian basilica. The Edict of Milan in 313 A.D. deeply turned the official approach of the roman state towards the church, most of all in relation to the religious practices and to the free veneration of martyrs and, then, to the realization of specific places of worship, ratifying the integration of the Christianity in the culture of the classic world.

In this context arose Costantine's architecture, in which, architectural elements connoted with ideological values shaped with imperial mold.

Methods

This paper collects a examination of the early Christian triconch chapels of Lycia, Karya and Antalya (Asia Minor, modern Turkey) with an analysis of their significance for the general development of ecclesiastical architecture between the fifth and sixth centuries in the Mediterranean area. Ancient and suggestive Christian archeological sites and ruins throughout the Turkish country show off the area's importance from IV to VI century. These architectures adopt typologies in which Hellenistic survivals, Byzantine and Syriane influences coexist with technical and formal elements derived by the local tradition.

Fig. 2. Alacahisar trichonc's ruins.

The existence of cultural and religious common circuits in the Mediterranean area (Italy, Tunisie and Algerie) could explain the great diffusion of unitary formal models that is recorded. Although not wealthy, the region has a dense concentration of churches from the late fifth century. In the case of Turkish architecture, we encounter a variety of church's plans, but we have limited our study to specific plan: the triconchos chapels. In the absence of late fifth century monuments in Constantinople, these architectures serve as indicators for building patterns adopted in the evolution of the basilica towards the more centralized forms of the sixth century.

Trying to identify the matrix and the reason of the adoption of the triconch typology for the christian basilical churches, is necessary to consider that the trychora was used also in pagan architecture for the construction of mausoleum and cemetery rooms. Numerous studies have proved the diffusion and the popularity all over the Mediterranean basin where, during Christian epoch, was used as the funerary model. Among the first testimonies there are the *trycorae* cells (Martyrium) of San Callisto's and Sant'Agnese's catacombs in Rome.

The triconch chapels presents a great apse tripartite deeply connotative, nearly an autonomous aedicule, derived by the models of the Hellenic style buildings and by the funerary tradition of roman mausoleums, which utilization was popular in the Christian architecture. This model is found in Italy in the church of Messagne (Brindisi) in the church of S. Martino (Copanello, Catanzaro), in the trichora chapel of Santa Venerina (Catania) and in the Byzantine church of Noto (Siracusa).

In post Constantinian age this type is mainly found in the funerary chapels of Tunisia and Algeria. In northern Africa, mainly in Mauritania (West Algeria), Numidia (East Algeria) and Tunisia, the triconch use is attested in a series of trychorae cells concentrated in small areas (Hippona, Cabilia, Tebessa, Damous el-Karita, Ksar Hellal, Henchir Redès, Bir Ftouha, Thibar), possibly introduced in the territories during the 5th century, in connection with the martyrs worship.

In Lycia, Karya and Antalya there are very similar triconchos chapels. In Xanthos the basilica system had three naves that were separated from each other by stylobates, which served as the base of the columns. To the north-east of the apse there was a triconch surrounded by various rooms that connected it to the basilica. Probably the triconch room was covered by a dome like the tetraconch of the cathedral of Xanthos. The function of the triconch is not yet clear. It could

have hosted either a baptismal font, a tomb or a relic. In view of its difficult access, it is also possible that it is a small pre-existing ecclesiastical cell.

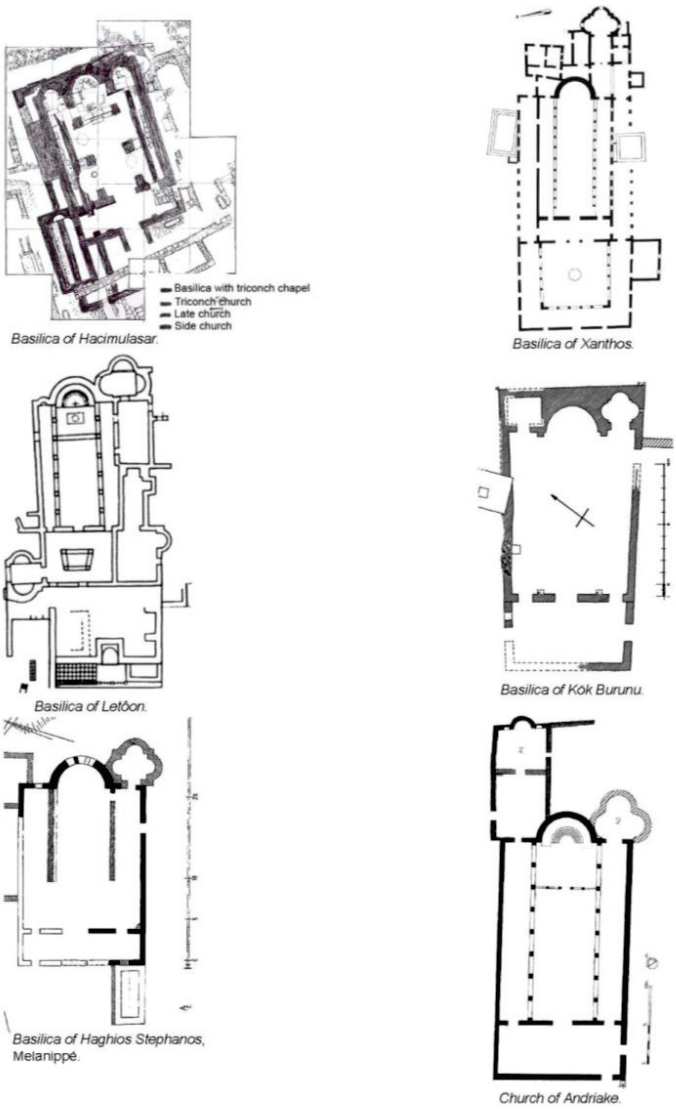
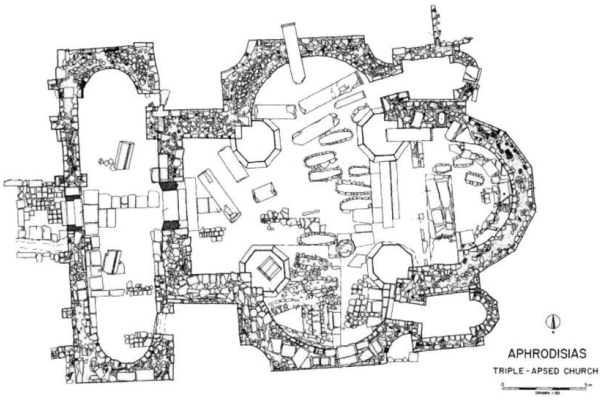


Fig. 3. Churches with triconchs chapells.

On a hill-top 5 km. south-west of Karabel , is a large church known locally as Alacahisar This again is a triconchos approached by a nave and two aisles The crowns of the apses and of the main arch are linked by fully developed pendentives, which provide the circular basis for a central dome.

In the ancient city of Melanippé the basilica of Haghios Stephanos, presented a longitudinal system with three naves of which the south-west nave one ended with a small triconch chapel added later.



Triconch Church in South-west Complex, plan.

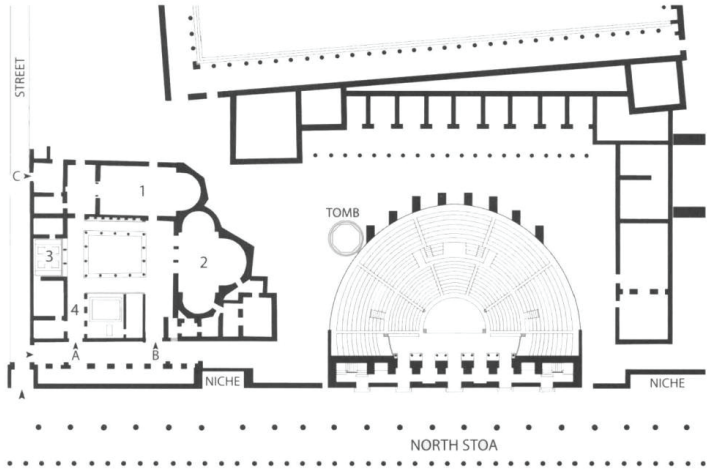


Fig.4. *Plan of Bishop's Palace on the left*: A, southwest doorway; B, south east doorway; C, northwest doorway; 1 north apsidal hall; 2 triconch room; 3 exedra-like space with mosaic floor; 4 southwest entrance corridor.

According to Grabar that the martyrion was the formal architectural archetype of the domed Byzantine church. Enlarged and reshaped for other purposes, the martyrion was ransformed into a church during the fifth and sixth centuries, safeguarding the central place of both the altar and the relics.

From this brief summary it is clear how triconch chapels have a distinct affinity even in distant territories among then. The preservations' state of monuments often prevents a more thorough study: some are known only to the plant, others are only fragments of the original buildings. In most cases, funerary triconch buildings (*memoriae*, *martyria*) pre-existed in the great basilicas dating back to the 4th century, forming the original nucleus of subsequent basilicas; in other cases they constituted the apsidal area of original basilic configurations.

Reference

Canbilen, H., Lebouteiller P., Sodini J.-P. (1996). *La basilique de l'acropole haute de Xanthos.* In: Anatolia Antiqua, Tome 4.

Duval N., Cintas, J. (1976). *Etudes d'archéologie chrétienne nord-africaine. III Le martyrium de Cincari et les martyria triconques et tétraconques en Afrique.* In *Mélanges de l'Ecole française de Rome. Antiquité*, tome 88, n. 2.

Grabar A. (1946). *Martyrium. Recherches sur le culte des Reliques et l'Art chrétienne antique*, I Paris.

Harrison, M. (1963). *Churches and Chapels of Central Lycia*. In: Anatolian Studies, 13.

Hill, S. (1996) *Byzantine Churches of Cilicia and Isauria.* Aldershot: Variorium.

Krautheimer, R. (1986). *Architettura paleocristiana e bizantina*. Torino: Einaudi.

Testini, P. (1980). *Archeologia Cristiana.* Bari: Edipuglia.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Comparison of Design Criteria about Energy in Healthcare Building According to BREEAM and LEED Certification Systems

Sevil Jahed[1]*, Cüneyt Kurtay[2]

1 Department of Architecture, GaziUniversity, Ankara, Turkey, arch.sevil.j@gmail.com

2 Department of Architecture, GaziUniversity, Ankara, Turkey, cüneytkurtay@gmail.com

Abstract: Nowadays, certification systems have evolved due to increased energy consumption and limited resources. These certificate systems provide to be sustainable by creating greener, sustainable, healthy and liveable environment with these criteria reformed in various headings. In this Study, the most applied and preferred BREEAM (Building Research Establishment Environmental Assessment Method) (1) and LEED (Leadership in Energy and Environmental Design) (2) certification systems will be researched and compared to the criteria and control systems they have established for the energy in health-based hospital buildings.

Keywords: Healthcare buildings; BREEAM; LEED; Energy; certification systems

Introduction

The aim of the study is to reveal common and different points of view, viewpoints and control systems under the headings of BREEAM and LEED on energy in health-based hospital structures. There are several titles in certification systems and energy title is chosen because of its importance. LEED v.4 for building design and construction and BREEAM international new construction 2016 systems in healthcare building taken into account in this study because of they are latest versions. There are eight categories for the LEED certification system: Sustainable sites, water efficiency energy and atmosphere, materials and resources, indoor environmental quality, innovation, location and transportation and regional priority. BREEAM certification system collected under ten categories. These are grouped under ten headings as health and wellbeing, management, energy, water, land use and ecology, transport, materials, waste, pollution and innovation. Kömürlü and others in the article named "Assessment of indoor environmental quality and water efficiency in green building certification system in developing countries'', they investigated The LEED green building certification system, address water efficiency issues in detail and establish 10% of the total points available to the water efficiency category. Thus, these two categories (i.e., indoor environmental quality, and water efficiency) have great impact on sustainability as they jointly account for 25% of the total points available (3). Yıldız and Arslan in the article named "Comparative analysis of sustainable building evaluation and certification system

through a process approach'', they investigated about some certification bodies worldwide which measures the performance of green buildings and certified them in accordance with standards such as LEED, BREEAM, GREEN STAR, CASBEE AND DNGB (4). Wu and others has reviewed the credit system in the "LEED" certification system (5) and Awadh has analysis rating systems in some certification systems such as LEED, BREEAM, GSAS. (6)

Methods

With BREEAM 2016, the LEED v.4 2017 certification system was examined and the criteria under each heading were examined and the similarities and differences were revealed by comparing the conditions of each item with each other. Therefore, the titles, criteria, requirements and scores that are important for two different certification systems have been determined.

LEED Certification System

LEED certification system about energy headlines and points are given by following.

Fundamental commissioning and verification (prerequisite): To support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

Minimum energy performance (prerequisite): To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

Building-level energy metering (prerequisite): To support energy management and identify opportunities for additional energy savings by tracking building-level energy use.

Fundamental refrigerant management (prerequisite): To reduce stratospheric ozone depletion.(1)

Enhanced commissioning (6 points): To further support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

Optimize energy performance (20 points): To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

Advanced energy metering (1 points): To support energy management and identify opportunities for additional energy savings by tracking building-level and system-level energy use.

Demand response (2 points): To increase participation in demand response technologies and programs that make energy generation and distribution systems more efficient, increase grid reliability, and reduce greenhouse gas emissions.

Renewable energy production (3 points): To reduce the environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy.

Enhanced refrigerant management (1 points): To reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to climate change.

Green power and carbon offsets (2 points): To encourage the reduction of greenhouse gas emissions through the use of grid-source, renewable energy technologies and carbon mitigation projects.

Light pollution reduction (1 point) (SS): To increase night sky access, improve night time visibility, and reduce the consequences of development for wildlife and people.

Interior lighting (1 point) (EQ): To promote occupants' productivity, comfort, and well-being by providing high-quality lighting. (1)

BREEAM Certification System

BREEAM certification system about energy headlines and points are given by following.

Reduction of energy use and carbon emissions (15 points): To recognise and encourage buildings designed to minimise operational Energy demand related table, Primary energy consumption related table and CO_2 emissions.

Energy monitoring (3 points): To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.

External lighting (1 points): To recognise and encourage the specification of energy efficient light fittings for external areas of the development.

Low carbon design (3 points): To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems. (2)

Energy efficient cold storage (3 points): To recognise and encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use.

Energy efficient transport systems (3 points): To recognise and encourage the specification of energy efficient transport systems.

Energy efficient laboratory systems (2 points): To recognise and encourage laboratory areas that are designed to be energy efficient and minimise the CO_2 emissions associated with their operational energy consumption.

Energy efficient equipment (2 points): To recognise and encourage procurement of energy efficient equipment to ensure optimum performance and energy savings in operation.

Reduction of night time light pollution (1 points): To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary obtrusive light pollution, energy consumption and nuisance to neighbouring properties.

Impact of refrigerants (4 points): To reduce the level of greenhouse gas emissions arising from the leakage of refrigerants used to heat or cool the building.

Commissioning and handover (4 points): To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants. (2)

Comparison About Energy Criteria According to BREEAM and LEED

By the following table LEED and BREEAM certification system have been compared on a similar topic basis. Some of the subtitles are taken from different main topics and compared to the relevant topic on this table. Comparisons of energy criteria are given in Table 1.

Table 1. Comparison of energy criteria

LEED Energy and Atmosphere(EA)	BREEAM Energy(ENE)
Building-Level Energy Metering Advanced Energy Metering	Energy monitoring
Green Power and Carbon Offsets	Low carbon design Reduction of energy use and carbon emissions
Fundamental Commissioning and Verification Enhanced Commissioning	Commissioning and handover (MAN 04)
Interior Lighting (EQ)	Reduction of night time light pollution

Light Pollution Reduction (SS)	(POL 04) External lighting
Fundamental Refrigerant Management Enhanced Refrigerant Management	Impact of refrigerants (POL 01)
Demand Response	-
Renewable Energy Production	-
Minimum Energy Performance	-
Optimize Energy Performance	-
-	Energy efficient laboratory systems
-	Energy efficient equipment
-	Energy efficient cold storage
-	Energy efficient transport systems

Table.1 show us some titles are same like as energy metering and monitoring, Carbon, Commissioning, lighting and refrigerants, but also in the other titles are different from the others such as demand Response, Renewable Energy Production, Minimum Energy Performance, Optimize Energy Performance, Energy efficient laboratory systems, Energy efficient equipment, Energy efficient cold storage, Energy efficient transport systems. (5)

Conclusion

BREEAM certificate system consists of 10 main criteria and the buildings examine some of the main criteria and indicate to which building the specific criteria are included. In the LEED certification system, there are 8 main headings and the hospitals are separated as a separate topic title. This section of the assessment criteria is specified or score calculation is required. LEED and BREEAM certification systems have point changes for the same criteria. This means that different weights are given to the same criteria. In addition, some criteria are not found in the other certification system. (7)

In the BREEAM certification system, it has been determined that either the general expression limit values or the use of certain computer programs or table values, the calculation methods are used in order to meet the criteria mentioned in the energy in both systems.

BREEAM general intent from energy category is encourages the specification and design of energy efficient building solutions, systems and equipment that support the sustainable use of energy in the building and sustainable management in the building's operation. Issues in this section assess measures to improve the inherent energy efficiency of the building, encourage the reduction of carbon emissions and support efficient management throughout the operational phase of the building's life.

LEED approaches energy usage from a holistic perspective, addressing energy use reduction, energy-efficient design strategies, and renewable energy sources. LEED certification system options are such as Enhanced Systems Commissioning, Envelope Commissioning, Calculation of Refrigerant Impact, No Refrigerants or Low-Impact Refrigerants, Whole-Building Energy Simulation, Whole-Building Energy Simulation and Prescriptive Compliance. BREEAM is also supported by different options such as Use of approved building energy calculation software and Energy efficient design features.

In these certification systems, each country seems to have implemented applicable national codes and regulations according to their social and technical structures. Therefore other countries need to revise in consideration of these systems and match of own country's circumstances.

References

İnternet: BREEAM International New Construction 2016, England. URL: http://www.webcitation.org/query?url=http%3A%2F%2Fwww.breeam.com%2F&date=2018-03-20, Date of access: 07.01.2018.

İnternet: LEED v4 for Building Design and Construction 2017, USA. URL: http://www.webcitation.org/query?url=https%3A%2F%2Fnew.usgbc.org%2F&date=2018-03-20, Date of access: 07.01.2018.

Kömürlü R., K., Asli, P., David, A. (2013, May). Assessment of indoor environmental quality and water efficiency in green building certification system in developing countries. Smart and Green Buildings Symposium, Ankara, Turkey.

Yıldız N., ve Arslan H. (2013, May). Comparative analysis of sustainable building evaluation and certification system through a process approach. Smart and Green Buildings Symposium, Ankara, Turkey.

Wu, P ., Song, Y ., Shou, W ., Chi, H., Chong, H.Y. and Sutrisna, M. (2017). A comprehensive analysis of the credits obtained by LEED 2009 certified green building. *Renewable and Sustainable Energy Reviews*, 68, 370-379.

Awadh, O. (2017). Sustainability and green building rating systems: LEED, BREEAM, GSAS and Estidama critical analysis. Journal of Building Engineering, 11, 25-29.

Jahed S. (2018). Comparison of design criteria in healthcare building according to international BREEAM and LEED certification systems, M. Sc. Thesis, GAZİ university graduate school of natural and applied sciences, ANKARA. (Unpublished Master's Thesis)

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustaining Cultural Heritage Sites through Interpretation and Presentation Methods: The Case of Magnesia on the Meander

Başak Kalfa Ataklı[1], Dr. Nimet Özgönül[2*]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, kalfa@cankaya.edu.tr*

[2]*Department of Architecture, Middle East Technical University, Ankara, Turkey, nimet@metu.edu.tr*

Abstract: Cultural heritage sites are in increasing demands among people. Developments in advertisement along with the improvements in transportation make these sites more accessible and attractive. Tools and approaches of displaying cultural and natural heritage sites, in this case archaeological sites, have changed skin eventually to adapt contemporary situation. Nonetheless this change has become insufficient and been in need of revision since the growing interest in archaeological sites enhances audience's expectations. This condition reveals that new methods of interpretation and presentation should be sought for effective, pleasant and didactic experience. Besides, legislations and charters encourage and even make obligatory to have interpretation and presentation methods in the cultural and natural heritage sites. Especially ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites, known as the Ename Charter (2007) is the most thorough charter on the topic, with its definitions and principles.
In this study, a specific case, that is Magnesia on the Meander, will be investigated in the light of the "sustainability" principle of the Ename Charter and evaluations will be made for the benefit of proper interpretation and presentation of the site.

Keywords: interpretation; presentation; Magnesia on the Meander; the Ename Charter; sustainable protection

Introduction

Archaeological sites are mainly considered as the documentation areas by the scholars. However, for a discipline that is related to the human and social life cannot only be restricted within academic level. What was done or created centuries ago still has architectural importance and most importantly sociological relevance for today's situation. Once the artifacts, whether they are "Nature's work, or the act or work of Man" (Tilden, 1957), are unearthed, they are in need of bonding with the people. This link can be tied with special and careful interpretation and presentation of the archaeological heritage. Thus the interpretation and presentation to the public is an important way to guarantee the protection of these heritage resources for upcoming years as well.

The main problem of a visitor encounters is that they cannot create a bond with his/her expectations with what is visible to the eye. As Sam Ham puts it "Interpretation involves

translating the technical language of a natural science or related field into terms and ideas that people who aren't scientists can readily understand." (Ham, 1992) Eventually if the data was not passed to the people, the continuity of the flow would be banned and "cultural heritage" would lose its "heritage" entity and become "cultural information".

Therefore, the interpretation and presentation of archaeological sites is an important asset for an archaeological site to be fully grasped by the visitors and sustainably protected for a long period of time.

Methods

In this study, the significance of interpretation and presentation of archaeological sites is investigated in a specific charter and an archaeological site, Magnesia on the Meander is further studied according to the "sustainability" principle and evaluations are made accordingly.

There is only one international document on the subject of interpretation and presentation of archaeological sites, that is **ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites (2007),** globally known as **ICOMOS Ename Charter Secretariat**. The charter, which aims to create guidelines for the public interpretation and the sustainable presentation of heritage sites, was first started to be studied in 2002 and took its final shape in April 2007.

The Ename Charter basically was prepared for introducing the definitions of "Interpretation, Presentation, Interpretive Infrastructure, Site Interprets and Cultural Heritage Sites" and producing principles for integrated heritage sites both for dissemination in popularity and conservation of the remains whether they are tangible or intangible (ICOMOS, 2007).

The seven principles defined by the charter are:

Principle 1: Access and Understanding
Principle 2: Information Sources
Principle 3: Attention to Setting and Context
Principle 4: Preservation of Authenticity
Principle 5: Planning for Sustainability
Principle 6: Concern for Inclusiveness
Principle 7: Importance of Research, Training, and Evaluation

The fifth principle on **sustainability** states that "The interpretation plan for a cultural heritage site must be sensitive to its natural and cultural environment, with social, financial, and

environmental sustainability among its central goals." (ICOMOS, 2007) Oxford dictionary defines sustainability as "The ability to be maintained at a certain rate or level." While considering the physical endurance of the tangible artifacts of the site, economy and management of the site are envisioned to be durable and sustained. Every aspect of the interpretation process needs to be merged with the conservation of the archaeological site. Besides, the newly introduced technical elements or tools have to be assured to be maintained from time to time.

The Case: Magnesia on the Meander

The ancient city of Magnesia is located in the boundaries of Tekin of Germencik District of Aydın. Magnesia on the Meander, the oldest archaeological settlement of the district, is situated on the road between Ortaklar and Söke. The main part of the site is situated under the northeast fertile plain of Mount Thorax (Gümüşdağ) and the bank of the River Lethaios (Gümüşçay), a tributary of Menderes (Bingöl 2007).

The foundation of the new city of Magnesia dates back to 392 BC and was ruled by several dynasties until its abandonment in 14th century AD (Bingöl 2007). However it is known as a prosperous Roman city. Due to the successive different reigns in control, from Macedonian to Aydınoğulları, buildings are in diversity with regard to their typology and period.

Figure 1: Magnesia Site Plan with Viewpoints (Magnesia Excavation Archives)

Evaluations

Archaeological sites have sustainability in their essence since they have endured for centuries. It is more than disrespectful to break their cycle by our hands. For the case of Magnesia on the Meander Archaeological Site, the following evaluations are made for the sustainable protection of the site:

- Due to the geothermal facilities growing rapidly around Magnesia, the ecosystem is changing. While it harms the people living in the neighborhood, it also causes deterioration in the archaeological remains as well. These chemical plants should not be allowed to be built near the site.
- Participation of the local community is the essence of a sustainable cultural heritage site. Local people of Tekin are already related with the site for years. However sometimes the work force is not enough for the excavations. Attraction methods should be persuaded both for Tekin and other close settlements such as Ortaklar and Söke. By this, the work in the site would not be interrupted as well as local economy would be developed.
- The Children's Festival conducted by Işık and Orhan Bingöl since 1996 is a precious event of Magnesia. Local kids can learn about Magnesia and archaeology through plays and art. This festival should be assured to endure in the presentation framework of Magnesia.
- Every intervention to the site, regarding either conservation or presentation, should not harm the artifacts and site's integrity. In other words, they should be renewable.
- Although Magnesia does not have such a problem, for a sustainable planning, mass tourism capacity of Magnesia should be done.
- While there are sponsors of Magnesia, for a cultural heritage site, more sponsors work for the best. Conservation and presentation studies can be carried out with the funding the sponsor provides.

Conclusion

Cultural heritage sites are the main information palimpsest for the humanity. From mid-20th century, archaeological sites are considered valuable not only for professionals but for public where they can learn about their culture from the first hand. Keeping them in good condition for today and future is duty of the entire humankind. Not only protecting, but also

and most importantly understanding these sites are essential for cultural development. As for this reason, interpretation and presentation approaches play vital role in this connection.

The interpretation and presentation of archaeological sites is an important asset for an archaeological site to be fully grasped by the visitors and scholars, and sustainably protected for a long period of time. This is mainly because the subject matter represents “the past” in “the present” time and without any interpretation, no one would understand what messages the heritage site has been carrying for centuries.

References

Bingöl, O., Magnesia on the Meander = Magnesia ad Maeandrum: The City of Artemis with "White Eyebrows”, Homer Kitabevi, Ankara, 2007.
Ham, S. H., Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets, Golden, CO: North American Press, 1992.
The Ename Charter, www.enamecharter.org/, last visited on July 2018
Tilden, F., Interpreting Our Heritage, Chapel Hill: University of North Carolina Press, 2007.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainability of Architectural Cultural Heritage in the Roman Imperial Period

Aygün Kalınbayrak Ercan[1]

[1]*Department of Architecture, Gaziosmanpaşa University, Tokat, Turkey, aygunkercan@gmail.com*

Abstract: This paper approaches the concepts of sustainability and architectural cultural heritage from a retrospective view and investigates the reuse of old buildings in the Roman Imperial Period. The South Gate of Xanthos and the South Gate of Perge are chosen as the case studies, both of which originally belonged to an earlier period but underwent changes in Roman times. It is argued that, the historic importance of these buildings played an important role in their reuse in terms of providing a link between the past and the present and the preservation of historical and cultural heritage.

Keywords: Sustainability; architectural cultural heritage; Roman Imperial Period.

Introduction

The reuse of existing buildings for various reasons like economic gain, energy efficiency, urban regeneration, and historic and cultural preservation is one of the key criteria of sustainable architectural studies. Yet, it is not a new concept, because the repurposing of old buildings for new or renewed intentions was also highly practiced during the Roman Imperial Period. This period can be considered as an era of intense architectural production all over the Roman Empire. Especially in the first and second century AD, provincial cities underwent a dramatic architectural and urban transformation which equipped them with necessary physical and social infrastructure for a Roman way of living. In the East, these changes were applied over already urbanized cities, such as those at the western and southern coasts of Asia Minor which were already occupied by pre-Roman societies. During the Roman reurbanization process, new Roman buildings like Roman temples, baths, aqueducts, monumental fountains, theatre stage buildings and arches were built, but at the same time some Hellenistic structures survived. In addition to the monumental public buildings like theaters, agoras and bouleuteria which continued to function with some modifications in accordance with the Roman social, architectural and urban standards; defensive architecture like city gates, which lost their military function due to the *Pax Romana* (Roman Peace), underwent functional and structural changes. Considering how costly and time-consuming it was to build monumental buildings in that time, it can be assumed that economic advantages like cost and time saving played an important role in the reutilization of existing buildings. However, another significant reason for holding on to the centuries-old buildings was the continuity and sustainability of traditions, public memory and cultural heritage that those buildings represented. This paper attempts to shed light on the

notion of historic preservation in Roman times by speculating on how the historicity of two city gates from Xanthos and Perge may have played a role in their reuse during the Imperial Period.

Methods

The concepts of sustainability and architectural cultural heritage are discussed within the scope of Roman architecture. The southern city gates at Xanthos and Perge in Asia Minor are selected as case studies, both of which originally belonged to an earlier period and were repurposed during the Roman Imperial Period. By reinterpreting the existing literature on these gates, the reasons of reusing old buildings in Roman times are examined in terms of the preservation of cultural heritage. In this way, it is also intended to expand the boundaries of sustainability studies by providing a retrospective view.

Findings and Discussion

Following the establishment of the *Pax Romana* by Augustus, the existing city walls lost their military function and instead remained as a statement of the status and wealth of a city or demolished for urban growth; while the city gates, which provided controlled access through the walls, turned into symbolic entrances to urban life. Accordingly, many gates were embellished with architectural and sculptural decorations to impress the visitors. The southern gates of both Xanthos and Perge underwent such changes during the Roman Imperial Period.

The South Gate of Xanthos was the main gate that connected Xanthos with Letoon, the federal sanctuary of Lycia, where Leto, Artemis and Apollo were worshipped. It presently consists of two gateposts and a ceremonial arch standing at the back (des Courtils, J., Cavalier, L., & Lemaître, S., 2015; Kökmen Seyirci, 2017) (see Figure 1). The gateposts belonged to the original building which was built together with the city walls in the Archaic or Classical Period; while the arch was built in AD 68-70 by Sextus Marcus Priscus, the governor of the province of Lycia. The inscriptions discovered on the posts suggest that the gate was used as a message board to perpetuate historical events. One of these inscriptions mentions the dedication of Xanthos by the Seleucid King Antiochos III to the Apollonian Triad in the second century BC (TAM II 266), while the other two celebrate the victories and dedications of Aichmon, the commander of the Lycian fleet in the first century BC (TAM II 264 and 265). It seems that the tradition continued in Imperial times. The metopes on the frieze of the arch feature the busts of the triple deities whereas the dedicatory inscription indicates that the arch was dedicated to the Emperor Vespasian (TAM II 270). While the emphasis given to the deities is an

acknowledgement of the local values and the symbolic importance of the gate as it led to Letoon; the dedication of the arch to the current emperor is an attribution to the presence of the Roman rule and an addition to the archival characteristic of the gate.

Figure 1. The South Gate of Xanthos (by the author)

The South Gate of Perge was built in the Hellenistic Period as the main entrance of the fortifications surrounding the lower city (Boatwright, 1993; Bulgurlu, 1999; Kalınbayrak, 2011). It originally consisted of an oval enclosed courtyard flanked with two circular towers. As the city spread towards the south and the city walls disappeared, the gate remained free standing within the city centre. In the Early Imperial Period, the building underwent a restoration, as a result of which the previous courtyard was demolished and a new horseshoe shaped courtyard with niched walls was built. In the early decades of the second century AD, the gate underwent another major renovation by a local elite woman called Plancia Magna as a preparation for the arrival of the Emperor Hadrian to Perge (see Figure 2). Accordingly, more niches were carved on the second stories of the courtyard walls and all the surfaces were revetted with marble. Moreover, a ceremonial arch was built at the northern end of the courtyard. Both the niches on the courtyard walls and the arch were embellished with statues according to a sculptural program. The statues of legendary Greek city founders and contemporary benefactors were put up within the niches, while the statues of the Emperor Hadrian, the imperial family and the tutelary deities of Perge were installed on the arch. This was an attempt to suit the Panhellenic ideal of Hadrian and benefit from the privileges of coming from a Greek heritage, by emphasizing the Greek roots of Perge and the city's loyalty to the

emperor and the empire. At the time of this project, the gate was the oldest surviving monumental building within the city centre, as the studies have not so far revealed any other building predating the Roman Imperial Period (Özdizbay, 2008). In this respect, choosing the only remaining Hellenistic building in Perge for such an architectural program powerfully underlines the intended message.

Figure 2. The South Gate of Perge (by the author)

Conclusion

As architectural constructions in Roman times required high cost, hard work and decades to finish a monumental building; it was, most of the time, both practical and economic to continue using existing buildings with modifications instead of demolishing and rebuilding. The case studies discussed in this paper have shown that, in addition to such practicality, the historic importance of the buildings and their place in public memory also played an important role in their preservation. In this respect, it can be argued that conscious reuse of old buildings in Roman times provided a link between the past and the present and maintained the sustainability of local architectural heritage and its historical and cultural significance.

References

Boatwright, M. T. (1993). The City Gate of Plancia Magna in Perge. In E. D'ambra (Ed.), *Roman Art in Context-An Anthology* (pp. 189-207). Englewood Cliffs: Prentice Hall.

Bulgurlu, S. (1999). *Perge Kenti Hellenistik Güney Kapısı ve Evreleri* (Unpublished doctoral dissertation). İstanbul University, İstanbul.

Kalınbayrak, A. (2011). *Elite Benefaction in Roman Asia Minor: The Case of Plancia Magna in Perge* (Unpublished master's thesis). Middle East Technical University, Ankara.

des Courtils, J., Cavalier, L., & Lemaître, S. (2015). Le rempart de Xanthos: Recherches 1993. In B. Beck-Brandt, S. Ladstätter, & B. Yener-Marksteiner (Eds.), *Turm und Tor. Siedlungsstrukturen in Lykien und benachbaren Kulturlandschaften. Akten des*

Gedenkkolloquiums für Thomas Marksteiner in Wien, November 2012, Forschungen in Limyra Band 7 (pp. 103-155). Wien: Österreichisches Archäologisches Institut.
Kökmen Seyirci, H. (2017). Ksanthos Güney Kent Kapısı ve Evreleri. *ADALYA, 20,* 181-211.
Özdizbay, A. (2008). *Perge'nin M.S. 1.-2. Yüzyıllardaki Gelişimi* (Unpublished doctoral dissertation). İstanbul University, İstanbul.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Green Design; An Environmental Concern or An Aesthetic Approach

Aliye Rahşan Karabetça[1*]

[1]*Department of Interior Architecture and Environmental Design, Kültür University, İstanbul, Turkey, a.karabetca@iku.edu.tr*

Abstract: The objective of this paper is to emphasize the importance and ethical concern of the green building design and its effects on climate change. It also aims to reveal the role of concerned designers in terms of conserving non-renewable resources and protecting environment in the field of architecture. Each designer (architects, interior architects, engineers, city planners, etc.) must find out what exactly an appropriate green design is. Apart from being an aesthetic approach, green design should be considered as an environmental concern. In his book Ecodesign, Ken Yeang explains that green design must follow the systematic rules of ecological design and it must also compete with other designs economically and must have outstanding quality in terms of user performance (Yeang, 2006).

Keywords: Green; aesthetics; environment; certification; biomimicry

Introduction

Green design has been a popular design approach in architecture since the beginning of climate change and global warming. However, this approach needs to be analysed and stated whether it is used as an aesthetic concern or an ethical choice. What is green aesthetic? Is it a kind of design approach or is it a sustainable solution for environmental protection, or both? These questions must be asked by designers before starting to design their buildings in green.

There is not a clear answer for what a green aesthetics is. But it can be briefly stated that green aesthetics, if done correctly by following the systematic rules of ecological design, may change the current situation of climate change in a positive way. According to Yeang, green designs, besides their environmental performance, must be appreciated for their aesthetics (Yeang, 2006). Thus, green design can be both ethical choice and aesthetic approach. Green design is not only a building that is designed in green; it can also be a green product or green planning for cities. When the word "green" is spelled, one might understand that green is only a colour of a building. However, green can be materials derived from nature such as strawbails, mudbircks or bamboo, or materials that are produced artificially within the limitations of ecological procedures. Green, in other terms, means the balance that must be provided by designers between human life and the health of ecosystems which humankind depends on (Krauel, 2013).

Nowadays, some governments are trying to provide this balance. This procurement is called green building certification. Green buildings and products are being certified by some councils as green products and/or green buildings. There are plenty of green buildings that were and are designed and constructed in several countries within the scope of certification system of United States Green Building Council called as Leadership in Energy and Environmental Design (LEED). Other developed countries have established their own certification system after LEED; Building Research Establishment Environmental Assessment Method (BREEAM) and Canada Green Building Council (LEED CaGBC) are most popular ones.

In addition to green building/product certification systems, there is another design approach called biomimicry that can improve and develop the green design in architecture. It is a science field that can be used to design ecological and sustainable products, cities and buildings by integrating and/or mimicking natural systems and their functions (Benyus, 1998).

Analytical research and comparison of green design examples in architecture

The methodology of this paper is based on analytical research and comparison of existing buildings and analysing conditions of the green design in architecture aiming to result with innovative approaches; such as developing new green design approaches based on natural solutions or integrating biomimetic design criteria into green building design. The method also aims to clarify the importance of green design and its consequences on climate change and construction industry. It is specially preferred to determine the possible ways to find out innovative solutions that can make remarkable changes in green design. The other way of clarifying the current situation of green design is to use comparative existing examples and suggest innovative proposals.

Common consequences of green design and their evaluation

The Earth is facing new challenges due to harsh and irresponsible behaviours of human kind; it cannot resist for a long time without any support from its demolisher as its rescuer. This help differs within all fields; in architecture it is green design. In fact, one of the biggest impacts on the environment comes from construction field. Designers can improve the positive effects on environment by carefully selecting their design choices (Noxon, 2012). As the major part of architecture, construction field is responsible for half of the overall carbon

footprint produced in the world (Biomasion Building with Nature). This is the reason why green design must be considered as an environmental concern rather than green aesthetics. Therefore, main green design attempts come from environmentally responsible architects, engineers, interior architects and city planners. However, green aesthetics cannot be considered just as green appearance of a building. It is designers' consideration that building must be eco-friendly and look aesthetic. Both can be achieved at the same time. As it is stated above, this consideration can be established either with biomimetic design which guides designers to use and emulate natural organisms and their functions or green certification system which can be applied to new constructions, neighbourhoods, major renovations, commercial interiors, etc.

There are some good designs that were designed with green design approaches stated above. This kind of designs help planet earth to resist and refresh itself. The first one, which was designed by using biomimicry as a green design approach, is East Gate Building in Harare, Zimbabwe (see Figure 1). Although this building has a certain amount of green façade, it functions just like termite mound. There is a system that creates a passive cooling inspired by cooling system of the termite mounds. This system is not a mechanical system. It is more likely a system that transfers cool and hot air via chimneys and air ducts with suction. This reduces the use of energy to a minimum and the green facades prevent solar radiation.

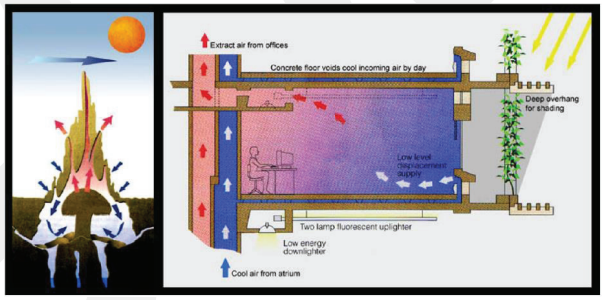


Figure 1. Termite mound and a section of an office in East Gate showing exact way of cooling system (Mick Pearce Architects).

Another example is designed based on green building certification system, LEED (see Figure 2). The main reason n selecting this example are; first, it is one of the LEED Platinum certificated buildings which uses natural materials efficiently and second, it is very effective in terms of natural light and landscape design. According to the architect of Crest

Apartments, built environment shapes the interactions and experiences of people, which also help them interact with nature (United States Green Building Council). This is why building's landscape design is successful in terms of green aesthetics and environmental concern. The project achieved LEED platinum certificate under the LEED BD+C (Building Design and Construction) Multifamily Midrise adaptation in 2017. Platinum is the highest rank in this certification system that enables building to reach the maximum credits provided on the score card. The main issue in this project are; natural lighting where windows are designed to receive plenty of natural light, energy efficiency where cross ventilation system is selected and healthy materials such as permeable pavers to provide changeable surface grounds (Michael Maltzan Architecture). The designer preferred to use natural materials, mainly to provide the requirements of green building certification and secondly had an aesthetics concern such as combination of green and white (see Figure 2).

Figure 2. Crest Apartments designed by MMA (Michael Maltzan Architecture) achieved a LEED Platinum Certificate in 2017 (United States Green Building Council).

Apart from energy saving, natural lighting and materials, this kind of green buildings also include an interaction with nature and the built environment. For example, transportation of materials to the construction site of these green certified buildings is very important; designer must select the most affordable, recyclable and regionally close materials to be transferred in a very short way to save energy and reduce carbon footprint.

Innovative Design Criteria

Examples stated above are unique in terms of their designs. Developing such examples and increasing the number of green buildings and the interest in green aesthetics depend on innovative design approaches. Some of these can be stated to enhance the

methodology of the study; integrating nature's innovation into design, eco-mimicry, socio-architectural interaction, ergonomic interaction between nature and sustainable structural performance (Karabetça, 2016). These approaches have been developed based on biomimicry.

Conclusion

Nowadays all designers are aware of the truth the profession is facing is to reconstruct the delicate interaction and balance between human kind and natural world (Krauel, J. 2013). Designers must create sustainable cities, buildings and materials by using green design and biomimetic design approaches. Since the beginning of these design phases, important advances have been made. Above examples are only two examples out of thousands of green buildings. If biomimicry would be integrated into green building certification system, prerequisites and credits on the scorecard could be incorporated with natural systems. These credits could implement natural aspects in to architectural designs during the design and construction phases.

Green design may end up with green aesthetics where green aesthetics may not end up with green design. Thus, a new ecology-based aesthetic for architecture can be developed and work of designers can be qualified not only for its aesthetics but also for its environmental performance (Yeang, 2006).

Climate change or global warming can be minimised if green design can be improved in accordance with the innovative design criteria stated above.

References

Krauel, J. (2013). *Architecture for a Green Future*. Barcelona, Spain. Linksbooks.

Noxon, S. (2012). *Sustainability in Interior Design*. London, UK, Laurence King Publishing.

Yeang, K. (2006). *Ecodesign, A Manual for Ecological Design*. Great Britan, UK. Wiely Academy.

Benyus, J. (1998). *Biomimicry. Innovation Inspired by Nature*. Harper Collins Publishers. U.S.A

Karabetça, A. R. (2016). *Biyomimikri Destekli Mekan Tasarımı Ölçütleri ve Bu Ölçütlerin Örnekler Üzerinde İncelenmesi.* Mimar Sinan Fine Arts University, Institute of Science. PhD Thesis. İstanbul, Turkey.

Mick Pearce Architects. *East Gate Development Section*. Retrieved from Mick Pearce website: www.mickepearce.com

United States Green Building Council. *Top Architects in Green Building*. Retrieved from USGBC website: https://www.usgbc.org/articles/top-architects-green-building

Biomasion Building with Nature. *Biomasion Technology*. Retrieved from Biomasion website: https://biomason.com/technology/

Michael Maltzan Architecture. *Crest apartments*. Retrieved from website: https://www.mmaltzan.com/projects/crest-apartments/

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Occupants' Behaviour for Sense of Security and Well Being Concerns in Their Residences: 100. Yıl Case

Özge Karaman[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, okaraman@cankaya.edu.tr*

Abstract: In residential areas, unsustainable occupant behaviour is one of the main reasons of energy waste. Analyzing occupant behaviour is essential to reduce energy consumption. The motivation, reason or drivers of unsustainable behaviour must be identified to come up with effective solutions. While there are solutions for excess energy use, such as timing for electric devices, sensors for lighting control; there is no solution for purposely leaving lights or electronic devices on. As can be observed by the researcher, occupants tend to have a behaviour of leaving the lights on, due to security and wellbeing concerns when they are not actively using them. An online questionnaire survey is conducted for the selected neighbourhood of 100. Yıl İşçi Blokları with 100 participants. While prevalence of the behaviour is measured, the underlying results are analysed and presented. This paper presents the preliminary results of the study.

Keywords: occupant behaviour; energy waste; unsustainable behaviour

Introduction

Improving building energy performance, thus reducing carbon footprint, is the primary purpose of sustainable architecture. To do so, the influencing factors on total energy use in buildings must be identified. These factors can be categorized as external, internal and human based factors (Hui, 2007). Occupant behaviour and activity, occupancy patterns and social/economic factors can be seen as human based factors that may cause energy waste (Yu et al., 2011). In residential buildings waste resulted by inhabitants' behaviours is a significant area of research. Occupants tend to leave lights and electric devices open when they are not actively used, by laziness, forgetfulness, lack of care etc. Several sensor-based smart control systems have been developed to overcome such problems. But, what if occupants leave lights open, on purpose?

According to Reppetto (1974), people tend to adopt barriers for burglary in their residences. These barriers can be physical as locks, grills and also psychological barriers that gives impression of occupancy. It is claimed that leaving the lights on is the most common strategy as a psychological barrier (Rosenbaum, 1988). It is followed by using timers on indoor lights and radios in the same study.

As it is observed and presented as a null hypothesis by the researcher, in residential areas, due to security and well-being concerns residents adopt several behaviours such as leaving the lights on, when they are not actively used or needed. That causes a lot of energy

waste. Habit of purposely leaving lights on in unoccupied or non-actively used hours is searched in this study to test the hypothesis and answer research questions. The overall study will be focusing on the relationship of this behaviour with building type, household size, age of the resident and existence of a security system in the future. Some of the research questions are remained unanswered due to random sampling strategy. This can be seen as a limitation in this study and further research must be done accordingly.

In this paper preliminary results will be presented with the following research questions: How prevail is that habit, why people do it, when they do it. The results will be analysed to see if this behaviour is related with past experiences of burglary.

Methods

An online questionnaire survey is prepared by Google Forms to be carried on with 100. Yıl residents. 100. Yıl İşçi Blokları Neighbourhood is chosen according to having high burglary rates, since it is occupied generally by university students. The participants are reached through a social media group named '100. Yıl Evleri' on Facebook and participated the study by their will. The questionnaire was developed in Turkish language in May 2018 and was made available between 3-8 May, 2018. There was no personal information wanted. The questionnaire consisted of 14 questions regarding the research questions and conducted with 100 participants. The results were analysed and the graphics were prepared on Google Sheets and MS Excel.

Findings and Discussion

The survey results will be analysed under 2 main headings: Behaviour of leaving the lights on in unoccupied hours, Behaviour of leaving the lights on in occupied hours.

Behaviour of leaving the lights on in unoccupied hours

When it is asked to participants if they are purposely leaving the lights on in terms of security when they are not at their homes or not, 48% of the participants (Figure 1) indicated that they are doing that.

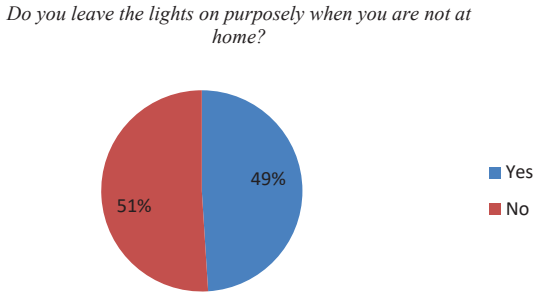


Figure 1. Graphic representing the occupants' behavior of purposely leaving the lights on when they are not in their homes.

Participants who have that behaviour are asked in what occasions they leave the lights open in case of security. It can be observed that, most of the participants (42%) are leaving their lights on when they are out at night time. 19% of them are leaving their lights on when they are on vacation. 11% of the participants stated they are leaving lights on also at daytime in case of security.

Participants were asked if they have witnessed a burglary themselves or by their neighbours. According to results shown in Figure 2, 64% of the participants had an experience of burglary by themselves (12 participants) or they witnessed a burglary through their neighbours (57 participants).

Since behaviour of leaving the lights on in unoccupied hours is a way of representing an occupied dwelling and precaution for burglary, the relation of these measures should be compared. As it can be observed in the Figure 2, more than half (53%) of the participants who had an experience of burglary, have a behaviour of leaving the lights on in unoccupied hours. 58% of the participants among who never witnessed a burglary (36 participants), do not have a behaviour of leaving the lights on in unoccupied hours. According to these results, it can be said that there is a relationship between these two concepts. People who have bad experiences tend to take psychological actions more to make their houses more secure.

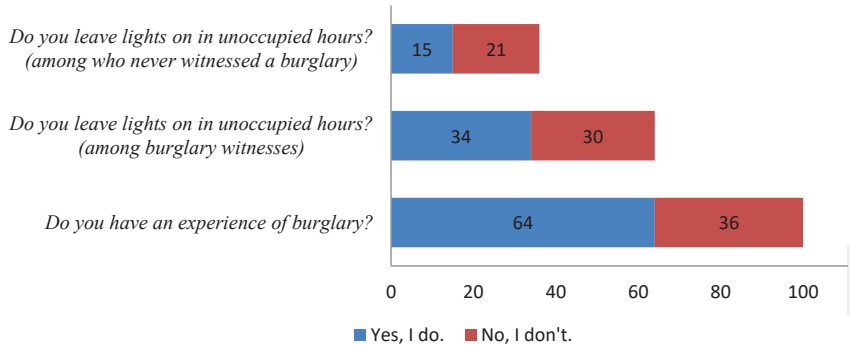


Figure 2. Graphic representing the relation between the experience of burglary and habit of leaving the lights on in unoccupied hours.

Behaviour of leaving the lights on when they are not actively used in occupied hours

According to survey results shown in Figure 3, 44% of the participants are leaving the lights on purposely when they are not actively using. While 56% of the participants stated that they never leave the lights purposely open when they are not actively used.

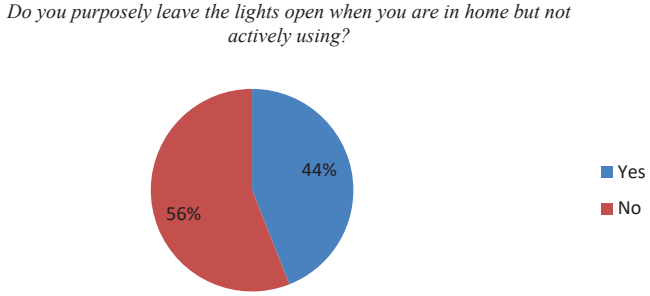


Figure 3. Graphic representing the occupants' behavior of leaving the lights on when they are not actively used.

To understand the underlying reasons of that behaviour, when and why they are doing this behaviour is asked. According to survey, among participants who have that behaviour (n: 44), the prevalent reason mentioned by 24 participants for leaving the lights on when they are

not actively used is to feel safe. 16% of the people think that, leaving the lights on even though they are not actively using, is a precaution for the threads outside. %8 of the participants have fear of darkness and they are leaving the lights on in terms of wellbeing concerns. %6 of the participants feel better when the circulation areas in the house is light. 13% of the participants answered as they are doing it for decorative reasons.

When it is asked to participant when they are doing this behaviour, 34% of the participants stated that they are leaving the lights on even they do not need or use them actively when they are alone. 14% of the participants leave the lights on when they are sleeping and 13% of the participants stated that they are leaving the lights open all the time. 1 participant stated that he/she is doing that behaviour when he/she feels anxious. As the reasons and timing compared, it is not surprising to see that having light in the house is linking with feeling safe and well.

Conclusion

According to online questionnaire survey carried on with 100 inhabitants of 100. Yıl İşçi Blokları Neighbourhood, almost 50% of the participants have the behaviour of leaving the lights on in unoccupied or not actively used hours. This percentage can be seen enough to support the hypothesis on the occupants' habit of leaving the lights on can cause a lot of energy waste. These preliminary results give insight on the occupant behaviour and underlying reasons. Findings promote that **user acceptance** and behaviour has a prevalence on energy efficient way of living. Sense of well-being and security should not be underestimated when the sustainable living is the issue, since the basic idea of constructing shelters for human beings is to provide them. This study Further study might focus on an energy efficient way to replace this behaviour.

References

Hui, S. C. M. (2007). Sustainable building technologies for hot and humid climates. In *Joint Hong Kong and Hangzhou Seminar for Sustainable Building, 21-23 September 2007, Hangzhou, China*. Retrieved from http://dx.doi.org/

Reppetto, T. A. (1974). *Residential crime*. Ballinger Publishing Company Cambridge, MA.

Rosenbaum, D. P. (1988). Community crime prevention: A review and synthesis of the literature. *Justice Quarterly: JQ / Academy of Criminal Justice Sciences*, *5*(3), 323–395.

Yun, Geun Young, Hyoin Kim, and Jeong Tai Kim. (2012). "Effects of Occupancy and Lighting Use Patterns on Lighting Energy Consumption." *Energy and Buildings* 46: 152–58. doi:10.1016/j.enbuild.2011.10.034.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Using Spolia in Ottoman Architecture: Searching for Continuity on an Architectural Symbol of Power through Re-use of Materials

Ceren Katipoğlu Özmen[1]

[1] *Department of Architecture, Çankaya University, Ankara, Turkey, cerenk@cankaya.edu.tr*

Abstract: The main objective of this study is to examine the use of spolia, especially spolia of stone columns, in the Ottoman monumental architecture during the sixteenth century. The meaning of the word of 'spolia' in the art and architectural history is discussed. Then, the use of spolia in the Anatolia before Ottoman Empire is considered. The shape and the material of the spolia using in the Ottoman buildings and the reason of this choice are the focal point of this research.

Keywords: spolia; Ottoman architecture; sixteenth century; Ottoman complexes

Introduction

The origin of the Latin word '*spolia*' comes from the term '*spoils*', particularly the word indicates the spoils of war. The translation of this word to art history was used firstly as a name of the ancient marble ornaments in the sixteenth century Roman architecture. Spolia, Italian *spoglie,* alluded to a violent removal of an object (Kinney, 2001). The tradition of using spolia was a common attitude since the ancient times. Stone, also stone column, was the most popular material to use as spolia in the architectural history. Certainly, the economy was the main reason of this trend. From Roman times, the spoil of the stone had a significant importance. For the construction of the Venezia, Barberini and Capitol palaces which were the buildings of medieval Roman age, 100.000 m^3 travertine stone were pulled out from Coliseum. (Barkan, Ö. L., 1979).

The Use of Spolia in Anatolia before the Ottoman Empire

Starting from the twelfth century, together with the development of stone architecture in Anatolia with Emirates and Seljuk periods, obtaining stone as a construction material was important. They needed to investigate new quarries or they revitalized old quarries for getting stone. However, when they were not any quarry in their near surrounding, they had to used antique materials. Without no doubt that this material choice provided an advantage in terms of time, effort and economy. The use of spolia in Caravanserai of Saadeddin (Zazadin), Caravanserai of Kuruçeşme, the façade of the İsa Bey Mosque and İlyas Bey Mosque is a direct consequence of those factors behind. On the other hand, the decorative quality of these antique materials (spolias) was one of the effective factors in re-using these materials. The existence of

two sarcophagi on the lower part of the portal of Sahip Ata Mosque in Konya and decorated lintels of Atabey Madrassa can be evaluated as a search for aesthetic quality (Bakırer, 1990).

This is a critical point that, in Seljuk architecture, the re-used materials can be easily differentiated and also visually recognized by means of their size and material. This situation may signify that there was not any institutional structure related with use of spolia. In other words, Seljuks did not develop any widely implemented policy on spolia. The exterior wall of the Caravanserai of Saadeddin may be one of the best examples of it.

The use of Spolia in the Ottoman Architecture during Sixteenth Century

Contrary to the spolia tradition in Seljuk, there was relatively more organized spolia system in Ottoman Empire. We can trace this kind of a system from the construction notebooks of Süleymaniye Mosque and Complex, Tezkiret'ül Bünyan and the travel notes of Evliya Çelebi. There were two kind of spolia used in Ottoman Empire; one of them was used as rubble stone and the other was used as wrought stone (Tanyeli, U., Tanyeli, G., 1989). While we can explain the reason for using of the spolia as rubble stone in order to reduce the construction costs, the used of spolia as wrought stone was different. With the conquest of İstanbul, the spolia was used for the first time in Fatih Complex. As it is known from the Hayrullah Efendi's notes, during the construction of Fatih Complex which was built over the ruins of Havariler Church, the stones of the old church had been used as the construction material of the basement of the complex.[1] At the construction of the İstanbul Beyazıt Mosque, the stones of the Forum of Theodosios and the stones of the surrounding buildings were used as the stock of the stone.[2] Such a construction techniques of the spolia are the samples of the rubble stone using. Functionally, the use of spolia was a result of the material need for the construction of a new monumental building. Yet, this would not be a complete argumentation on the use of spolia at that time. Because after the conquest of İstanbul, the use of spolia had a symbolic connotation. This point should not be disregarded that the Havariler Church and the forum of Theodosios themselves were accepted as the spoils of Byzantine by the Ottoman. In this sense, the use of spolia was emphasizing the symbolic meaning of newly constructed Ottoman buildings as well

[1] Hayrullah Efendi, Hayrullah Efendi Tarihi, VIII, İstanbul, unknown date, p. 85 cited in Tanyeli, U., Tanyeli, G. (1989). Osmanlı Mimarlığında Devşirme Malzeme Kullanımı (16.-18. yüzyıl), *Sanat Tarihi Araştırmaları Dergisi*, vol:2, No: 4, pp. 23-31.

[2] W. Muller-Wiener, Bıldlexikon zur Topographie İstanbuls, Verlag E. Wasmuth, Tübingen, 1977, p. 385, cited in Tanyeli, U., Tanyeli, G. (1989). Osmanlı Mimarlığında Devşirme Malzeme Kullanımı (16.-18. yüzyıl), *Sanat Tarihi Araştırmaları Dergisi*, vol:2, No: 4, pp. 23-31.

as their monumentality. The stone also signified the transfer of the political power from Byzantine to Ottoman. While the institutional process of the Ottoman Empire developed, the corps of the royal architects as the unique institute on the architectural production was becoming the most powerful establishment on all kind of architectural edifices. Particularly in the sixteenth century, with the head architect of Sinan, Ottoman created a unique language and harmony in the monumental architecture in the İstanbul. The unique design process created selectivity and refinement on the use of spolia. Different form the previous Seljuk spolia tradition, during the sixteenth century, Ottoman changed the shape and the size of the spolias. On the contrary to the Seljuk architectural style, Ottomans spolias could not be recognized with in the all structure. Furthermore, the selectivity can be traced from the qualities of the materials. In monumental architecture, using the best stone was a sign of the political power.

Ottoman Policy on Using of the Spolia

As we learn from the construction notebooks of Süleymaniye Mosque and Complex, for the construction of Süleymaniye Complex (Barkan, Ö. L., 1979), a complicated research was conducted with in the control of the court of royal architects. Those researches covered the most valuable stones on the lands under the rule of Ottoman Empire. After the mailing process with the man who was responsible on this area where the stones locate, an architect was appointed as the controller to evaluate the convenience of the stones with reference to its size and quality. This process occurred with a long period of time with lots of correspondence for the columns from Egypt and Ba'albek. [3] What interesting thing is that while there were two Egyptian columns and two Ba'albek columns according to the correspondences, there are one Egyptian column and one Ba'albek column in the mosque. There are some claims that other columns had been broken on the way to İstanbul. However, Uğur and Gülsüm Tanyeli assert that Ottoman State acquired all valuable columns of that area to create a stone spolia stock in İstanbul (Tanyeli, U., Tanyeli, G., 1989, p27). Furthermore they claim that this stock was at one of the parts of Topkapı Palace (Tanyeli, U., Tanyeli, G., 1989, p27). The construction notebook of Süleymaniye mentions a man who sold stones. This can be evaluated as a proof that spolia was an economic sector in the Ottoman Empire. According to another claim of Tanyeli, Ottomans prominently preferred the lands where both spolia material and quarry exist

[3] There are thirty-one letters in the construction notebook of Süleymaniye Mosque and Complex related with two granite columns which were transferred from Egypt and three letters for the columns which were transferred from Ba'albek.

at the same time (Tanyeli, U., Tanyeli, G., 1989, p27). The spolias from İzmit and Yalova are the examples to such situation. The origin of the Marmara marble used in Süleymaniye Mosque also verifies this condition.

Conclusion

When the symbolic meaning of sixteenth century Ottoman Architecture is concerned, the symbolic value of the stone as a basic and strong construction material can be well-understood. To gathering the most beautiful columns from the furthest point of the empire to İstanbul, the capital, would be evaluated signifier message to the rest of the world. This message which came from the most magnificent and wealthy sultan of the Ottomans underlines who hands the whole political and economic authority of the era. The originality of Ottoman spolia system which is different from that of Seljuk State is that the spolias are evaluated as the reference to the previous authority collapsed by the Ottomans. The columns and iron materials, which Piyale Pasha collected from newly conquered lands for his mosque, are the examples of the use of spolia at the lower-level of the hierarchy.

References

Barkan, Ö. L. (1979). *Süleymaniye Cami ve İmareti İnşaatı* (1550-1557), vol I, II, T.T.K., Ankara.

Bakırer, Ö. (1990). Materials of Construction in Ottoman Architecture, *Seventh International Congress of Turkish Art*, Ed. by Tadeusz MAJDA, Polish Scientific Publishers, Warsaw, pp. 29-36.

Evliya Çelebi. (2003) *Günümüz Türkçesiyle Evliya Çelebi Seyahatnamesi*, İstanbul, YKY, 2003, vol I, II.

Goodwin, G. (1971). *A History of Ottoman Architecture*, Baltimore: Johns Hopkins Press.

Kinney, D. (2001). Roman Architectural Spolia, *Proceedings of the American Philosophy Society*, Vol. 145, No. 2.

Necipoğlu Kafadar, G. (2005) *The Age of Sinan: Architectural Culture in the Ottoman Empire*, Princeton and Oxford: Princeton University Press.

Sai Mustafa Çelebi. (2003). *Yapılar Kitabı: Tezkiretü'l-Bünyan ve Tezkiretü'l-Ebniye : Mimar Sinan'ın Anıları*, translation: Hayati Develi, Samih Rifat, İstanbul: Koçbank Yay.

Tanyeli, U., Tanyeli, G. (1989). Osmanlı Mimarlığında Devşirme Malzeme Kullanımı (16.-18. yüzyıl), *Sanat Tarihi Araştırmaları Dergisi*, vol:2, No: 4, pp. 23-31.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Analysis of Building Stock and Development of Building Typologies in Turkey

Dr. N. Cihan Kayaçetin[1*], Assoc. Prof. Gülsu Ulukavak Harputlugil[2], Dr. A. M. Husaunndee[3], M.Sc. M. S. Dizdaroğlu[4]

[1]Building Science, Middle East Technical University, Ankara, Turkey, nckayacetin@gmail.com
[2]Architecture, Çankaya University, Ankara, Turkey, gharputlugil@cankaya.edu.tr

Abstract: The building stock in Turkey consists of over 9 million of buildings which are diverse in terms of use, size, structure and several other parameters. Developing building typologies is a means of representing the overall building stock in Turkey for further analysis. This study focuses on the development of typologies for residential and non-residential buildings and their variations in different climatic zones in Turkey. For this purpose, existing building regulations in EU, which are similar to what is suggested by EUROSTAT, were investigated. Two main data sources in Turkey were used: a national survey and the Turkish Statistics (TUIK) database. Depending on these sources, building typologies for 10 different functions and 4 climate zones are defined. Characteristics of the building typologies are presented in a tabular form as building sheet which includes detailed information about envelope and technical systems.

Keywords: building stock, building typologies

Introduction

Energy efficiency in buildings is a point of interest in both academia and construction industry in Turkey. One of the major components in any study that was conducted on energy efficiency in buildings was the building stock. As seen in Figure 1, the building stock in Turkey consists of over 9 million of buildings which are very diverse (TÜİK, 2014). Furthermore, as Turkey is divided into four different climatic zones (TS825) for energy analysis, there is significant variation on the materials and equipment used in buildings. This makes the building stock more complex for analysis. In order to facilitate thorough analysis and energy calculations, the building stock needs to be characterized by building typologies.

This study focused on the development of typologies for residential and non-residential buildings and their variations in different climatic zones in Turkey. For this purpose, existing building regulations in EU, which are similar to what is suggested by EUROSTAT (2014), were investigated. A country-wide questionnaire in 81 provinces was conducted. The questionnaire includes questions regarding general information, building definition and technical systems. Besides existing data in TUİK database regarding number of buildings, useful area and building envelope were analysed.

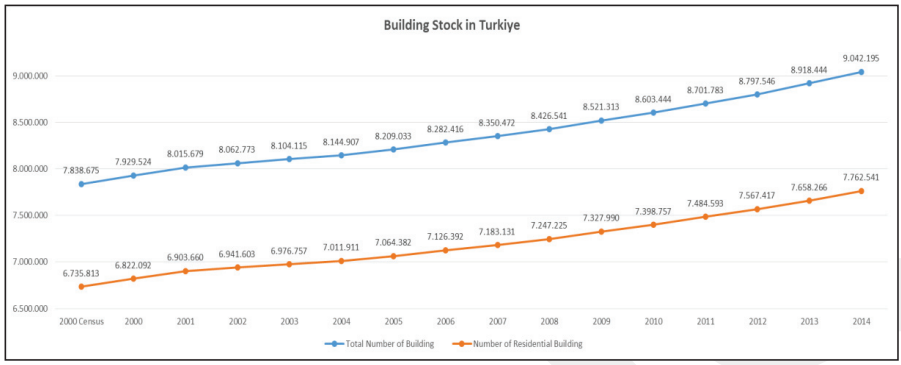


Figure 1. Evaluation of building stock between 2000 and 2014 (TÜİK, 2014)

Depending on these sources, building typologies for 10 different functions in four climate zones are defined. Characteristics of the building typologies are presented in a tabular form as building sheet which includes detailed information about envelope and technical systems. The main objective of this study was to provide;

- An analysis of the survey carried out on building typologies in 81 provinces.
- a description of typical buildings for some building categories according to the four climate zones (Figure 2)

The building typologies introduced in this study are also utilised for in-depth analysis of building stock and energy calculations to evaluate the energy savings potential of different building sectors at national level (İslami, 2017).

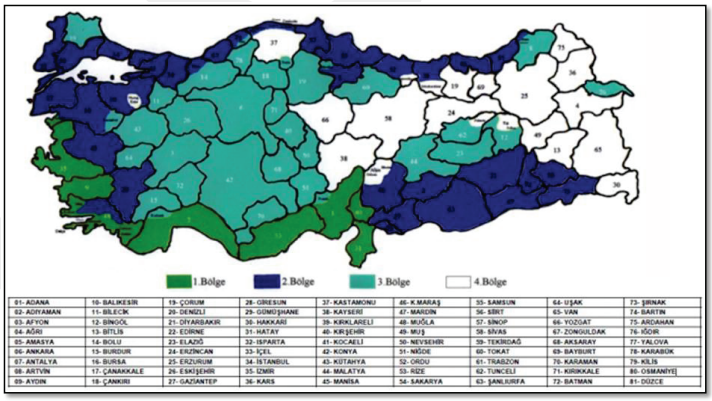


Figure 2. Climate zones of Turkey (TS825)

Methodology

In order to investigate the building stock in Turkey, it was planned to conduct a survey at national level. This action was carried out as the review of available sources of data (TUIK, GIS, architectural research documents) was insufficient. The survey was conducted for collection of information about buildings through a questionnaire that was developed during the project and is distributed to the provincial offices of the MoEU in 81 cities. Technical personnel of MoEU were requested to collect and provide data of two buildings per build type in their cities. Results of the survey provided useful inputs to develop the basis for describing typical buildings categories according to the four climate zones defined in Turkey (TS825).

In most countries, in existing or drafted building regulations, the building categorisation is similar to what the one proposed by EUROSTAT. The recommendation for categorisation and sub-categorisation of buildings is based on Annex I of the EPBD (2010) and EUROSTAT. The main purpose of the building stock inventory is to collect and provide key information about the existing building stock:

- Information needed to develop/adjust national reference buildings;
- Input needed for evaluation/calculation of cost optimal levels for energy performance requirements;
- Input needed for evaluation/calculation of national economic energy savings potential;
- Information about continued development of the energy consumption (incl. effects of new laws and regulations).

When proposing approach/methodology for the new building stock inventory (BSI), there are several challenges to consider:

- Definitions and terms - common definition would facilitate comparison of data; including floor area, dimensions name of energy carriers, etc.
- Collection of energy data can normally only be done at the level of delivered energy (by energy carrier), and not directly as energy performance (energy use) for heating, cooling, ventilation, domestic hot water preparation, lighting etc. (expert recalculations will be needed).
- Most probably some sub categories of buildings will have negligible influence to the final energy consumption, and this will normally be clear after at least the initial input of information has been entered into the building stock inventory.

Survey on Building Stock

To learn about building typologies in 81 cities, it was planned to perform a survey. It was for collection of information through the questionnaire distributed to the provincial offices of the MoEU.

The questionnaire consisted of 42 questions including general information, building envelope and technical systems etc. as given in Figure 3:

	General information on building		**Heat supply and energy carriers**
	Building category		**Ventilation and cooling**
	Building description and dimensions		**Electricity**
	Facades and windows		**Indoor conditions of the building**
	Building usage		**Annual energy consumption**

Figure 3. Sections of the questionnaire

To fill in the Questionnaire, the participants were asked to select specific stand-alone existing buildings in their city (constructed between 1950 and 2000), which would fit into the following buildings types and interval of floor area (2 buildings per each sub-type, in total 20 buildings per city). Building categories and sub-categories are given in Table 1.

Findings and Discussion

This section introduced typical buildings in the categories listed in table 1 and for the 4 climatic zones. In addition to the recommended building categorization, new sub-categories were included in order to cover the large building stock of Turkey. Explanations for these additions are made in the respective sections. Building categories and climate zones are given in the Table 1:

Table 1. List of building typologies and climate zones

	Building Typologies
B1	Family house (160 m²)
B2	Apartment buildings (1.680 m²) up to 6 storeys
B3	Residence (mixed format) (5.400 m²) 12 storeys
B4	Offices w/ Traditional Construction
B4a	Offices w/ Contemporary Construction
B5	Educational building - School (Small: 2.400 m²)
B6	Educational building - School (Large: 5.700 m²)
B7	Health care facilities - Polyclinic (2.400 m²)
B8	Health care facilities - 30 beds Hospital (4.000 m²)
B8a	Health care facilities - 75 beds Hospital (12.600 m^2)
	Climate Zones
Z1	Climate Zone 1
Z2	Climate Zone 2
Z3	Climate Zone 3
Z4	Climate Zone 4

The building typologies list in Table 1, are defined in tabular format which includes characteristics of each building under two main sections: (i) building definition and (ii) technical systems. In the building definition section; size of the building with relevant floor area and storey number and height, and material preferences regarding walls, roof, floor and windows are presented. For technical systems; type of heating, domestic hot water (DHW), cooling, lighting and ventilation systems are provided.

In the context of this study, descriptive building sheets are prepared for each building typology and each climate zone as seen in Figure 4. For each building category, 4 sheets are generated to display different characteristics of buildings in each climate zone. In these descriptive sheets, building definition and technical systems are determined according to the conducted questionnaire work, expert opinion and respective standards.

For some buildings, a single parameter option may not be sufficient. Hence, it is necessary to introduce the possibility of variations of parameters. In the full paper, the descriptive sheets are going to be presented with additional tables in which variations for technical systems (VT) and building definition (VB).

Building Type B1-Family house (160 m²)		Details	Climate Zone Z1-Climate Zone 1		Details
Building Definition Parameters		**Values**	**Technical Systems Parameters**		**Values**
Size			**Installations**		
Floor area (m²) (heated/cooled)		**160 m²**	Heat Generation	Type	**Split+Direct**
Storeys		**2**		Fuel Type	**Electricity/Wood/Coal**
Storey Height (m)		**2,8 m**		Size (kW)	**24 / n/a**
Dimensions (m) (Width)		**8 m**		COP / Efficiency, nominal	**2,5 (split individual**
Dimensions (m) (Length)		**10 m**		Control:	**Manual**
Envelope			Heat Emmission	Type	**Split+Direct Electricity/Stove**
Walls	Type	**Brickwork**		Control	**Manual**
	Insulation	**No**	Heat Distribution	Piping (length)	**n/a**
	UD (W/m²K)	**0,7**		Pump/Fan	**n/a**
	Area (m²)	**171,36**		Control	**n/a**
Thermal Bridges	delta U (W/m²K)	**0,05**	DHW	Type	**Solar Collector/Direct Electricity**
Roof	Type	**Sloped roof/Flat roof**		Storage	**Yes / Yes**
	Insulation	**Yes**		Size (lt/h / kW)	**100 lt/h (Solar) / 1,8 kW + 60 lt**
	UT (W/m²K)	**0,45**		Efficiency, nominal (%)	**60 (solar) / n/a**
Floor	Type	**Slab on ground, concrete / Unheated basement**	Cooling	Type	**Split Individual System**
	Insulation	**No**		Size (kW)	**10 for partial cooling**
	Ut (W/m²K)	**0,7**		EER	**3/3,5**
Windows	Type	**Plastic**	Lighting	Type	**Efficient Energy Bulbs**
	Glazing	**Single glazed/Double glazed**		Installed capacity (W/m²)	**n/a**
	Window/Facade Ratio (%)	**0,15**		Control	**Manual**
	Area (m²)	**30,24**	Ventilation	Type	**Natural ventilation**
	UP (W/m²K)	**2,4**		Heat Recovery (Yes/No)	**No**
	gn	**0,85/0,75**		Control	**Opening of windows**
	Frame ratio (%)	**20**		Air exhange rate (n/h)	**0,8**

Figure 4. Sample building sheet for B1-Family House / Z1-Climate Zone 1 (EuropeAid/134786/IH/SER/TR., 2016)

Conclusion

In the end of the study, some general conclusions regarding the building stock are provided as such:

- Building stock is getting homogenous, the ratio of buildings which differentiates according to climatic, geographic and cultural regions is very small. Regarding the impact of climatic conditions, the requirements as set by regulations on energy efficiency in Buildings may need to be re-visited and adjusted.
- Building facade systems which are easy to implement, cheap and widespread are preferred for building envelope.

- Differentiation on building envelope insulation and external solar protections have not been given sufficient importance. In climate zone 1, no special precautions have been taken for the cooling demand.
- Renewable energy systems are mostly used in climate zone 1 and are used for domestic hot water.

Analysis of building stock and characterization of building typologies in Turkey holds a great potential for future use. The impact of the building stock study may include:

- Initiating the infrastructure with the definition of typical buildings for preparing a building stock inventory.
- Defining future strategies through the forecasts which are available with the new understanding on the building stock.
- Calculating energy saving potential by using the typical buildings.
- Sets up an example for the future research on building stock of Turkey.

Acknowledgments: The study has been produced with the financial assistance of the European Union and the Government of Turkey through the IPA Project "Technical Assistance for Improving Energy Efficiency in Buildings" (EuropeAid/134786/IH/SER/TR).

References

Energy Performance of Buildings Directive (EPBD). (2010/31/EC).
EuropeAid/134786/IH/SER/TR. (2016). Technical Assistance for Improving Energy Efficiency in Buildings, Activity A7: Developing typical buildings and proposal of structure for Building inventory in Turkey.
EUROSTAT (2014). Buildings Database [Datafile]. Retrieved from: https://ec.europa.eu/energy/en/eu-buildings-database
İslami, B. (2017). Energy Saving Potential in Turkey. Proceedings of International Symposium on EE in Buildings, Ankara, Turkey.
TS825 (2008). Thermal insulation requirements for buildings (Binalarda Isı Yalıtım Kuralları). Turkish Standards Institute.
TÜİK (2014). Building Permit Statistics. Turkish Statistical Institute.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

From Design to construction in Architecture

A critical phase that redefines the role of the architect in the profession

Karen Boujaoudeh Khoury[1]

[1]*Architecture Notre Dame University, Zouk Mosbeh, Lebanon,*
kaboujaoudeh@ndu.edu.lb

Abstract: The changes that affected the construction industry in the last decade, revealed new organization structure in the practice with new means of communication. The objective of this research is to grant architects with basic facilitating elements that can maximize communication between participants in the design and construction phases in architecture projects. The cases also summarize the relationship between the architect and the different project delivery systems and his/her job according to other participants. The factors and mechanisms that lead to successful communication and enhance productivity in architecture project management in Lebanon are examined in this research through 7 case studies in the Lebanese construction industry. As a result the role of architects is redefined in a framework that embodies seamless integration among participants in both design and construction processes and the principles of successful communication that can be useful to the real working environment are delivered.

Keywords: project management; communication; the role of the architect; construction industry

Introduction

Construction projects and their outcomes seriously influence the contemporary culture; therefore, the significance of a well-functioning construction industry is an essential element. In various, several countries; the construction industry has, nevertheless, concerned analysis for unsuccessful outcomes such as time and cost overruns, low productivity, poor quality, and insufficient customer satisfaction. Practitioners, researchers, and the social order at large have, consequently, called for a change in interrelations, behaviour, and dealings in order to boost the probability for project success and improve results. The customer is proposed to act as a change mediator in such a transformation.

Project management in architecture is the organization of activities performed in construction organizations that mainly deal with “planning, executing, coordinating, and controlling projects,” resulting in building new structures (Blyth *et al.*, 2004). Unluckily, due to poor value of management practices, several construction projects do not meet their targets (Brown *et al.*, 2001; World Bank, 1996; LO Oyede Nle, 2012). Consequently, the incentive for this research is the call for project success improvement in the construction region.

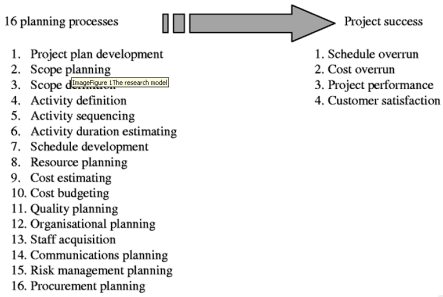


Figure. 1 The planning phases and process in project management from Blyth el al ((Zwikael, 2009)

The main product of the planning phase is the project plan as achieved by the project team. Originally, design and construction have been separated by the earliest builders who did not distinguish between both phases, until the industrial revolution placed new manufacturing and profit-making structures.(The AIA handbook 14th ed.)

Moreover, a contradiction between the architect's intentions and achievements arise when the architects give the major of attention to the client's needs rather than the social and economic conditions that form design restrictions in most of the cases (Blau, 1942) .

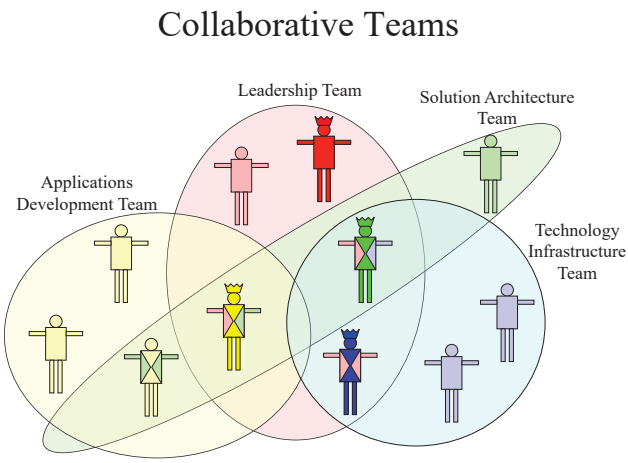


Figure. 2 Collaborative teams (Emmitt and Otter, 2007)

The figure extracted from a study on collaborative teams reveals a diagonal selection of members belonging to a variety of positions which enriches the communication process and makes it more successful.

Therefore, the architecture deny of its involvement with other non-design members ignores the social context within which the construction takes place and creates a loss for all parties involved especially the architects (Cuff, 1953: 56; Stevens, G. 2002).

Methods

The article refers to a study of 7 different case studies chosen from the top 10 architecture firms in Lebanon. They encounter 85% of the Lebanese construction market. They follow different organization models and cover a variety of business construction projects.

The qualitative study covers the real observation of cases in architecture firms in Lebanon with open ended questions addressed to the project managers and participants involved in the process to test the participants' behavior and formulate the existing models of communication.

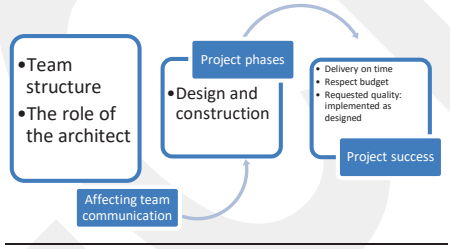


Figure 3. The research model used in the study of this paper

The study examines the factors that facilitate communication for a successful project delivery.

Information was composed in a series of personal interviews conducted with various groups, including managers and employees, within the project group. Interviews collect field data for empirical modeling in order to select appropriate, related knowledge artifacts from the list of possible ones. Collecting data for experimental modeling requires creating a sample of projects that symbolize the reality in the field of the study.

Questionnairs were handed and addressed to project managers who are considered the ones responsible for the clarity of messages exchanged and the right delivery of these messages

The triangulation method in this qualitative research was done to increase the credibility and validity of the results.

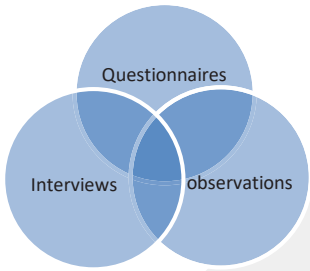


Fig 4 The triangulation method used in this study based on Foster and Jonker, 2005

Findings

In the case studies, the description of communication facilitators is done in relation with the project delivery system:

Building the team: The impact of **team structure** on communication links determined the participant's role in successful communication only if duties, rights and responsibilities were properly organized.

Share common language: The impact of **cultural differences** on communication links in firms with international connections had a high impact on the success of the project. Participants are to be educated to communicate easily and more effectively.

Team goals: The impact of **project delivery system** on communication links was delivered by all firms according to the organization of tasks related to each project; thus revealing the importance of team work.

Innovation: The impact of **Information technology** on communication links was found to be essential for a successful communication but was unvalued in local projects which had no international links. It highlighted the importance of IT skills, learning curve and innovation that were considered new variables to be included in the study.

Identifying roles and responsibilities: The impact of **information management** on communication links is revealed in the assignment and organization of tasks to participants to deliver the project on time. This smooth communication structure between members is considered basic in a successful communication system.

Nature of communication: The impact of the **nature of communication** on communication links, categorized under common language, highlighted the importance of internet connection which highly affects the communication links in reaching the success of the project even if the project is locally designed and constructed.

Risk assessment: The impact of **risk assessment** on communication links, categorized under the geographical boundaries affected greatly the firms with international connections which were found to be a risk. Once high risk issues are quantified the team must extend plans and action items for the improvement or decrease of these risks.

And therefore, architects need to have better skills in design and get more involved in technological innovation needed for the construction phase to accomplish the duties from design to delivery within a certain budget and a limited time frame (Mayo, 1984).

Conclusion and Future Recommendations

The architect as a project manager

Nowadays, the importance of acquiring management skills is vital for project managers in the construction field. In most of the case studies, project managers appeared to have a lack of some major elements essential for the coordination of tasks in architecture projects. Architects in those cases were separated from the construction phase and had no contact with the contractors that were responsible for the implementation of the designed plans.

Architects in all case studies had a significant impact on the project's success and delivery if they were allowed to interfere in the construction phase of the project process. The architect who was once responsible for the whole process was found to be the most appropriate member able to organize tasks and identify roles.

"The Challenge is to find ways to unify the design-construction process so that dramatic improvements can be made in project delivery, reduced costs, constructability and quality, client/user acceptability and return on investment." (Collin, 1984).

Architects should no longer design buildings but rather design solutions in materials and technology that is implemented in the construction phase, thus combining creativity and construction for a better outcome in architecture (Foster 1964; Farahmand, N. F. H. 2013).

References

Blau J.R.1942. Architects and Firms: A Sociological perspective on Architectural Practice. Cambridge Mass,MIT Press, c1984.

Blyth, K., Lewis, J., Kaka, A. 2004, "Developing a framework for a standardized works programme for building projects", Construction Innovation, Vol. 4 No.4, pp.193.

Brown et al. 2001, "The facilities management role in new building procurement", Facilities, Vol. 9 No.3/4, pp.119.

Cuff, D. 1992. Design- Production Practices in Architecture. Journal of Architecture Education, vol45, No.4 (Jul 1992):204-212.

Davis, Colin.1986; Building the Bank. Architectural Review April 1986.

Emmitt, S. and Otter, A. 2007, Exploring effectiveness of team communication, Engineering co Foster, C. Competition and Organization in Building, The Journal of Industrial Economics, Vol. 12 No. 3(Jul 1964):163-174.

E Rahimianzarif, M Moradi ,2018 - Designing Integrated Management Criteria of Creative Ideation Based on Fuzzy Delphi Analytical Hierarchy Proces, International Journal of Fuzzy Systems,– Springer

Farahmand, N. F. H. ,2013; Value Cohesiveness Comprehension as Forward Thinking Organization Formulation. Management, 3(7), 388-401.

Foster, C. Competition and Organization in Building, 1964, The Journal of Industrial Economics, Vol. 12 No. 3(Jul 1964):163-174.

Mayo, J.1984. Reasoning for an enlightened architectural practice. Journal of Architectural Education Vol. 41, No. 4 (Summer 1988):46-57

MM Singh, A Sawhney, A Borrmann; 2015 Modular coordination and BIM: development of rule based smart building components- Procedia Engineering-Elsevier

Stevens, G. 2002; The favored circle: The social foundations of architectural distinction. Mit Press

The American Institute of Professional Practice. The Architect's handbook of Professional Practice. 14th edition

World Bank 1996, World Bank Survey of International Construction Projects, World Bank, London, .

Zwikael, O., Shimizu, K., Globerson, S. 2005, "Cultural differences in project management processes: a field study", International Journal of Project Management, Vol. 23 No.6, pp.454-62.

Z Jin, F Deng, H Li, M Skitmore, 2013 Practical framework for measuring performance of international construction firms - Journal of Construction

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The room acoustic analysis of TED high school main lecture hall

Kivanc Kitapci[1]

[1]*Department of Interior Architecture, Cankaya University, Ankara, Turkey, kivanckitapci@cankaya.edu.tr*

Abstract: This paper analyses and discusses the acoustic design of the main multi-purpose lecture hall of TED High School (Kocaeli, Turkey) through the outcomes of computer simulations. CATT Acoustics Software (version: 8.0b) was utilised to run the ray-tracing simulations. Analysis of the lecture hall was based on four acoustical parameters' distribution graphs: Sound Pressure Level (SPL), Speech Transmission Index (STI), clarity (C_{80}), and reverberation time (T_{30}). It is observed that the average T_{30} values are within the targeted range throughout the space. Additionally, the speech transmission index is suitable for speech related activities. The simulated C80 values are marginally higher than anticipated C80 value intervals. The lack of early surface reflections increases the ratio of early-to-late sound energy, eventually increasing clarity of the perceived sound. Additional suggestions of improvement on material selections in terms of acoustics sustainability will be presented in the second phase of the study.

Keywords: acoustic sustainability; acoustic simulation; architectural acoustics; education

Introduction

Quality of an indoor acoustic environment is one of the major environmental factors affecting student learning performance. Poorly designed teaching environments resulting in sub-optimal physical conditions negatively affect students learning capabilities, cognitive processes, and mental health; where temperature, lighting, and acoustics are considers as the "physical basics" of a given environment (Marchand, Nardi, Reynolds, & Pamoukov, 2014). Architectural design of a school that considers thermal comfort, lighting, natural ventilation, air quality, and acoustics improve engagement with learning activities (Tucker & Izadpanahi, 2017). Indoor acoustic conditions are considered as one of the main factors to develop a sustainable environment. Sustainable acoustic environments should combine the three aspects: human well-being, controlling and managing acoustic performance, and the use of renewable energy sources (Yu & Kang, 2011, 2014). Therefore, to create ideal spaces dedicated to education, optimum acoustical needs must be considered in a holistic design mind-set, especially during the initial architectural and/or interior architectural design process.

Buildings of education contain a large variety of sub-spaces that undertake different purposes (i.e. study rooms, libraries, laboratories, multi-purpose halls, sports halls, meeting rooms, dining rooms, and administrative spaces). In the literature, the recommended values for room acoustic parameters for each of the spaces previously mentioned are well-established (Department for Education, 2015) (Long, 2014). The most common suggestions to improve

the indoor acoustic quality of any given space of education are low background noise levels and reverberation time (Gómez Escobar & Barrigón Morillas, 2015). Additionally, the choice of materials among a wide range of acoustically similar options should be based on their sustainability performances (Yu & Kang, 2011). Natural materials, recycled materials, or mixed and composited materials should be preferred in order to achieve a sustainable acoustic design (Asdrubali, Schiavoni, & Horoshenkov, 2012).

Several studies investigated the effects of background noise levels and reverberation time on student performance, through subjective evaluation (Beckers, van der Voordt, & Dewulf, 2016; Silva, Oliveira, & Silva, 2016; Yang, Becerik-Gerber, & Mino, 2013). The relationship between indoor air quality, one of the dominant environmental factors, and background noise levels was also investigated; however, it was revealed that most physical environmental parameters were not correlated with acoustic parameters (Mydlarz et al., 2013). Studies on the acoustic performance of spaces of education from the perspective of acoustic sustainability is quite limited or non-existent.

The present study is divided into two phases. In the first phase, the current acoustic design of TED (Türk Eğitim Derneği) High School (Kocaeli, Turkey) main multi-purpose lecture hall is investigated. In the second phase, methods of possible improvements in terms of material choices and acoustic sustainability will be suggested. In this paper, the results of the first phase of the study are presented.

Methods

This paper analyses and discusses the acoustic design of the main multi-purpose lecture hall of TED High School (Kocaeli, Turkey) through the outcomes of computer simulations. CATT Acoustics Software (version: 8.0b) was utilised to run the ray-tracing simulations. Initial three-dimensional (3D) model of the architectural design was created in AutoCAD 2016 software. The final 3D model included all the furnishings and consisted 775 polygonal surfaces.

The generic shoe-box shaped hall was designed to simultaneously occupy approximately 340 people. The seating units are planned to be fixed on an inclined carpet floor. The finishing materials that were used in the computer simulations and the relevant absorption coefficients (α) are presented in Table 1.

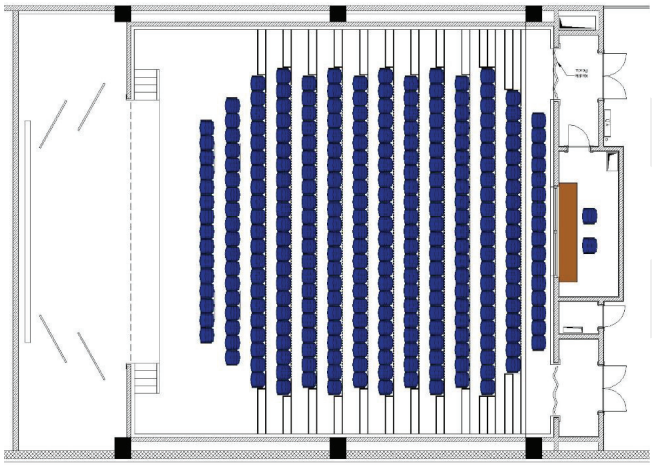


Figure 1. The schematic floor plan of TED high school multi-purpose lecture hall.

The analysis of the lecture hall was based on four acoustical parameters' distribution graphs: Sound Pressure Level (SPL), Speech Transmission Index (STI), clarity (C_{80}), and reverberation time (T_{30}). These parameters were reported and analysed at 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz octave band frequencies. The recommended values of indoor ambient noise levels ($L_{Aeq,30mins}$), reverberation times (T_{mf}), and speech transmission index values for multi-purpose lecture halls are presented in Table 1.

Table 1. The absorption coefficients (α) of the finishing materials.

Surface	Material	Frequency (Hz)					
		125	250	500	1000	2000	4000
Floor (hall)	Carpet over wood floor	0.20	0.25	0.30	0.30	0.30	0.30
Floor (stage)	Parquet on counter floor	0.20	0.15	0.10	0.10	0.05	0.10
Side walls (50%)	20mm MDF panels (perforated) over 200mm airgap with glass wool	0.60	0.90	0.95	0.85	0.75	0.65
Side walls (50%)	20mm MDF panels over 200mm airgap	0.06	0.10	0.08	0.09	0.07	0.04
Back wall	20mm MDF panels over 200mm airgap	0.06	0.10	0.08	0.09	0.07	0.04
Front wall (stage)	Plasterboard on frame, 100mm airgap with glass wool	0.08	0.11	0.05	0.03	0.02	0.03
Ceiling	12mm plasterboard (suspended)	0.15	0.11	0.04	0.04	0.07	0.08

Table 2. The recommended values of indoor ambient noise level, reverberation time, and speech transmission index for multi-purpose lecture halls (Department for Education, 2015).

Acoustic parameter	New build	Refurbishment
Ambient noise level ($L_{Aeq,30mins}$ dB)	35	40
Reverberation time (T_{mf} seconds)	0.8 – 1.2	0.8 – 1.5
Speech transmission index	> 0.6	> 0.6

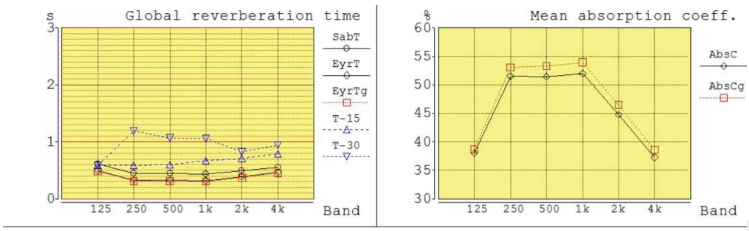
The suggested T_{30} interval for new build multi-purpose lecture halls is between 0.8 and 1.2 seconds (Table 2). Additionally, according to the Turkish acoustic regulations, the recommended reverberation time for spaces of education (i.e. classrooms) is 0.8 seconds. For larger halls, such as conference rooms, an accredited acoustic consultant's suggestions should be followed (Binaların Gürültüye Karşı Korunması Hakkında Yönetmelik, 2017). Lower reverberation times might cause significant loss of sound energy throughout the lecture hall and higher reverberation times would result in lower speech intelligibility. It is crucial to balance the even distribution of sound energy through surface reflections, while maintaining optimum speech intelligibility.

The sound pressure level of the virtual sound source implemented in the ray-tracing simulation at 1 meter was 90 dB(A). The target sound pressure level at the back rows of the multi-purpose lecture hall was 70 dB(A), if the distribution of the sound energy throughout the hall was even.

The C80 parameter is the logarithmic ratio of the sound energy that arrives to the listener in the first 80 milliseconds (early sound energy), to the sound energy that arrives after the first 80 milliseconds (late sound energy). Higher early sound energy increases speech intelligibility; however, this results in uneven distribution of the sound throughout the space (Long, 2014). Therefore, to achieve an optimum speech intelligibility while maintaining even distribution of the sound energy, the C_{80} interval should be between +2 dB and +4dB.

Findings and Discussion

In this section, results of the computer ray-tracing simulations are presented and analysed. The room acoustic parameters (reverberation time, speech transmission index, sound pressure level, and clarity) are investigated in relation to the suggested optimum values provided in the previous section.



	125	250	500	1k	2k	4k	
EyrT	0,49	0,33	0,33	0,32	0,39	0,47	s
EyrTg	0,48	0,31	0,31	0,30	0,37	0,45	s
SabT	0,61	0,44	0,44	0,43	0,49	0,55	s
T-15	0,59	0,59	0,60	0,67	0,71	0,79	s
T-30	0,58	1,19	1,07	1,06	0,82	0,94	s
AbsC	38,02	51,51	51,45	51,99	44,77	37,26	%
AbsCg	38,67	53,06	53,30	53,94	46,47	38,59	%
MFP	5,89	5,88	5,87	5,87	5,88	5,88	m
Diffs	10,18	10,16	10,22	10,15	10,16	10,21	%

Trunc	888,3	ms
Rays	22182	(used/oct)
	286	(lost/oct)
	0	(absorbed/oct)
Angle	1,36	degrees

Figure 2. Global reverberation times.

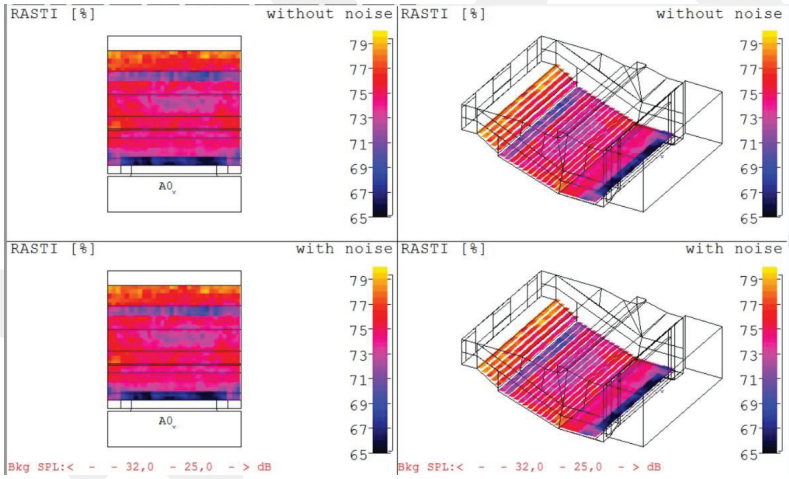


Figure 3. Distribution graph for the rapid speech transmission index (RASTI).

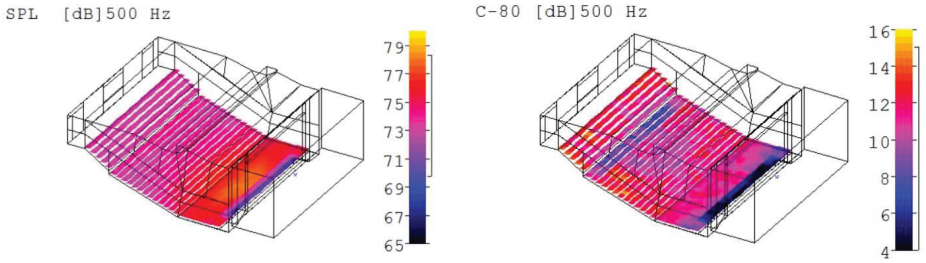


Figure 4. Distribution graph for SPL and C_{80} values at 500 Hz octave band frequency.

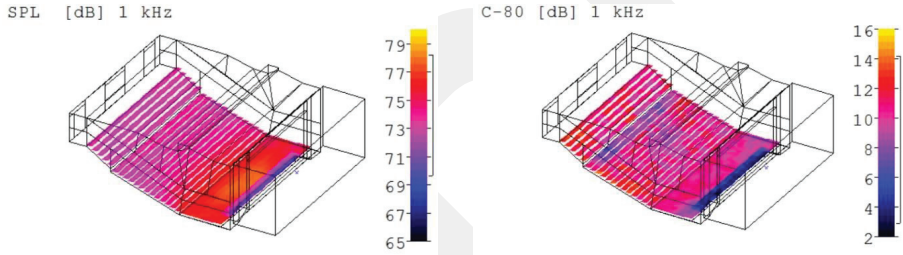


Figure 5. Distribution graph for SPL and C_{80} values at 1000 Hz octave band frequency.

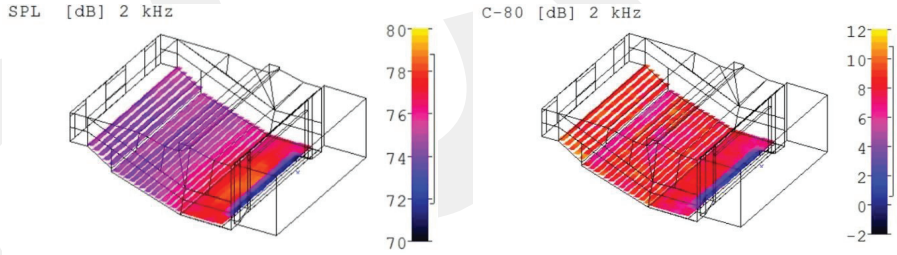


Figure 6. Distribution graph for SPL and C_{80} values at 2000 Hz octave band frequency.

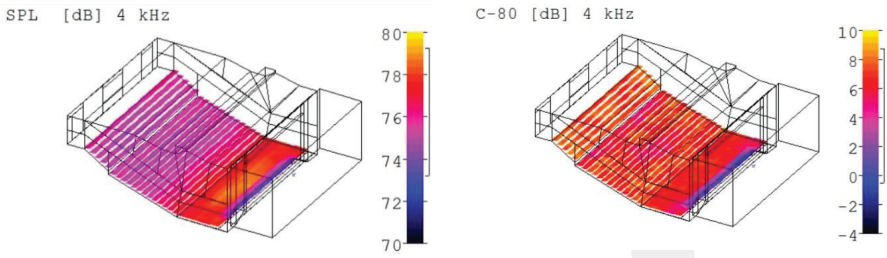


Figure 7. Distribution graph for SPL and C_{80} values at 4000 Hz octave band frequency.

The computer simulation results of the reverberation times are presented in Figure 2. It is observed that the average T_{30} values, which are between 1.0 seconds and 1.2 seconds, is within the targeted range throughout the space. The speech transmission index distribution graphs are presented in Figure 3. When the results are compared to the suggested STI values given in Table 2, it is seen that the acoustic design is suitable for speech related activities.

Figure 4, Figure 5, Figure 6, and Figure 7 shows that the sound pressure levels across the multi-purpose lecture hall varies between 73 dB and 80 dB, which are higher than the target value of 70 dB. The simulated C_{80} values vary between +6 dB and +10 dB, which are marginally higher than the anticipated C_{80} value intervals of +2dB and +4 dB. The lack of early surface reflections increases the early-to-late sound energy ratio, eventually increasing clarity of the perceived sound.

Conclusion

The results of the acoustic simulation of TED high school multi-purpose lecture hall shows that the current state of the design needs to be revised, focusing on the equal distribution of early reflected sound energy. Although the T_{30} values are within the targeted range, early-to-late sound energy ratio should be decreased by manipulating the geometry of the vertical reflective surfaces. Additional suggestions of improvement on the material selections in terms of acoustics sustainability will be presented in the second phase of the study.

References

Asdrubali, F., Schiavoni, S., & Horoshenkov, K. V. (2012). A Review of Sustainable Materials for Acoustic Applications. *Building Acoustics*, *19*(4), 283–311. https://doi.org/10.1260/1351-010X.19.4.283

Beckers, R., van der Voordt, T., & Dewulf, G. (2016). Learning space preferences of higher education students. *Building and Environment*, *104*, 243–252. https://doi.org/10.1016/J.BUILDENV.2016.05.013

Binaların Gürültüye Karşı Korunması Hakkında Yönetmelik (2017). Çevre ve Şehircilik Bakanlığı.

Department for Education. (2015). Acoustic design of schools - performance standards. *Building Bulletin*, (February), 1–43. https://doi.org/10.1016/j.jns.2003.09.014

Gómez Escobar, V., & Barrigón Morillas, J. M. (2015). Analysis of intelligibility and reverberation time recommendations in educational rooms. *Applied Acoustics*, *96*, 1–10. https://doi.org/10.1016/J.APACOUST.2015.03.001

Long, M. (2014). *Architectural Acoustics*. *Architectural Acoustics*. https://doi.org/10.1016/B978-0-12-398258-2.00022-2

Marchand, G. C., Nardi, N. M., Reynolds, D., & Pamoukov, S. (2014). The impact of the classroom built environment on student perceptions and learning. *Journal of Environmental Psychology*, *40*, 187–197. https://doi.org/10.1016/J.JENVP.2014.06.009

Mydlarz, C. A., Conetta, R., Connolly, D., Cox, T. J., Dockrell, J. E., & Shield, B. M. (2013). Comparison of environmental and acoustic factors in occupied school classrooms for 11–16 year old students. *Building and Environment*, *60*, 265–271. https://doi.org/10.1016/J.BUILDENV.2012.10.020

Silva, L. T., Oliveira, I. S., & Silva, J. F. (2016). The impact of urban noise on primary schools. Perceptive evaluation and objective assessment. *Applied Acoustics*, *106*, 2–9. https://doi.org/10.1016/J.APACOUST.2015.12.013

Tucker, R., & Izadpanahi, P. (2017). Live green, think green: Sustainable school architecture and children's environmental attitudes and behaviors. *Journal of Environmental Psychology*, *51*, 209–216. https://doi.org/10.1016/J.JENVP.2017.04.003

Yang, Z., Becerik-Gerber, B., & Mino, L. (2013). A study on student perceptions of higher education classrooms: Impact of classroom attributes on student satisfaction and performance. *Building and Environment*, *70*, 171–188. https://doi.org/10.1016/J.BUILDENV.2013.08.030

Yu, C.-J., & Kang, J. (2011). Acoustic Sustainability in Urban Residential Areas. *Procedia Environmental Sciences*, *10*, 471–477. https://doi.org/10.1016/J.PROENV.2011.09.077

Yu, C.-J., & Kang, J. (2014). Soundscape in the sustainable living environment: A cross-cultural comparison between the UK and Taiwan. *Science of The Total Environment*, *482–483*, 501–509. https://doi.org/10.1016/J.SCITOTENV.2013.10.107

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Application of a multiple regression model for estimating the performance of a prismatic panel in varying room and window sizes

Büşra Köse[1*], Tuğçe Kazanasmaz[2]

[1]*Department of Architecture, Izmir Institute of Technology, İzmir, Turkey, fatmakose@iyte.edu.tr, tugcekazanasmaz@iyte.edu.tr*

Abstract: The aim of this study is to test and predict the performance of prismatic panels in providing sufficient daylight as deeply as possible into the space and preventing negative impacts of natural light on occupants. A multiple lineer regression model is developed to analyse the relation between room depth, window-to-wall-ratio(WWR) and daylight illuminance. This is an approach to find a balance between window size and room geometry when prismatic panels are installed. Findings show that the multiple regression model estimates daylight illuminance in a room with prismatic panels with a 78% prediction rate. The minimum WWR is found to be 67% in room of 12m depth, satisfying required daylight illuminance at 52% floor area. This value is 43% in room of 9m depth, at 57% floor area; and 30% in room of 6m depth at 78% floor area.

Keywords: daylighting, window design, prismatic panel, regression

Introduction

Daylight has beneficial impacts on human health, performance and sustainable environment (Edwards & Torcellini, 2002). Interior daylight illuminance is based on various design parameters. Window size and room depth, for example, are crucial at the initial design phase. There are regulations varying from country to country, as well as studies conducted by numerous researchers to determine limitations of room parameters in terms of visual and energy aspects (Wong, 2017). They present an optimum room and window ratio depending on different climatic conditions. In a conventional side-lit room, light levels decrease rapidly as room gets deeper, resulting in excessive daylight exposure near the perimeter zones and need for artificial lighting at the back of the room. Innovative daylighting systems are developed to figure out this problem. Prismatic daylight-redirecting panels, for instance, improve daylight distribution through sun shading and redirection (Thanachareonkit, Lee, & McNeil, 2014).

This study focuses on evaluating the performance of prismatic panels attached in a side-lit room with different room depths and window-to-wall-ratios(WWR). The illuminance in different room and window configurations are obtained in Relux to use them as inputs in constructing a multiple regression model. The model is useful in evaluating performance of the prismatic panel and the relations between variables of room depth and WWR. It functions as a prediction model estimating illuminance and would be integrated during the initial design phase.

Procedure

The reference case is a 72m^2 south facing deep-plan classroom, modelled in Relux. It is located in IZTECH Campus (38°3'N; 26°6'E). Such a deep room (6m x 12m) was chosen on purpose to examine the prismatic panels' ability to deliver daylight beyond the typical effective daylight zone. Ceiling height is 3.8m. Window dimensions are 5.5m wide by 2.8m height; sill height is 1m. The transmittance is 80%. The prismatic panels are placed at 1.8m height to enhance entry of daylight and avoid redirecting light at the occupants' eye-level.

To determine different floor aspect ratios, limiting room depth of the reference case was found using following equation described in *The British Code BR 8206(Part 2)*:

$$L/W+L/H_w < 2/(1–R_b)$$

where W is the room width, H_w the window head height above floor level and R_b the average reflectance of surfaces in the rear half of the room. In accordance with this equation, limiting room depth of the reference case found as 9m, meaning that room will be gloomy and need an additional electric lighting beyond this value. Considering the limiting value, three different aspect ratios of depth to width were determined as follows:

A.R.= 1 (room depth is 6m)
A.R.= 1.5 (room depth is 9m)
A.R.= 2 (room depth is 12m)

Since large windows may cause excessive heat gain and discomfort glare, the window area of each determined aspect ratio was incrementally reduced. *The British Code BR 8206 (Part 2)* recommends a minimum WWR of 30% for rooms ranging from 11-14 meters in depth. Starting from the reference case with 67% of the WWR, the window width was reduced by 50 cm from both sides at each stage until minimum acceptable window WWR is obtained. All design alternatives are shown in Fig.1

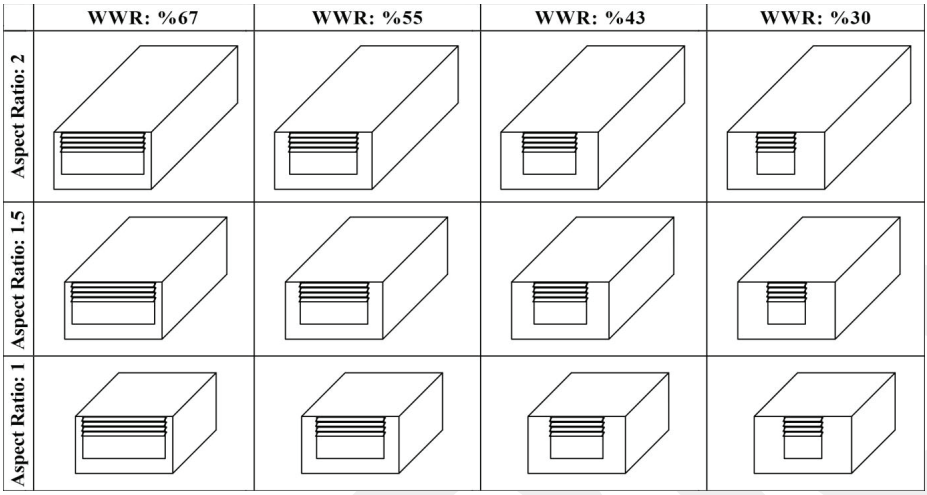


Figure.1.Design Alternatives

Design alternatives were performed using Relux. The measurement plane was 0.75m above the floor. The calculation points were set to be 0.6m away from the wall surfaces and 0.6m between each point, corresponding to the illuminance at this point, measured in lux. The reflectance of wall, ceiling and floor are 0.50, 0.85 and 0.20 respectively. Simulations were conducted for 21st March at 13:00 under clear sky condition. The 10% transparent sunshade was considered at the lower part of the window.

A multiple regression model (MRM) is constructed to determine the performance of a prismatic panel in room with varying room depth and WWR, estimating daylight illuminance on workplane, using data generated in Relux. The model aims to determine the relationship among variables calculating the performance of a dependent variable on independent variables, representing with an equation(1). MRM is a mathematical model to estimate values.

$$Y=\beta_0+\beta_1\times X_1+\beta_2\times X_2+\beta_3\times X_3+\cdots+\beta n\times Xn+\varepsilon \qquad (1)$$

where, Y is the dependent variable, β_0 is a constant, X_1,X_2,X_3 and X_n are independent variables, and β_1,β_2,β_3 and β_n are regression coefficients.

The regression coefficients were predicted using 1365 data sets obtained from Relux. Room depth, WWR, point-x and point-y are independent variables; daylight illuminance is the dependent variable.

Findings and Discussion

Performance evaluation of the prismatic system shows us minimum window areas specific to each aspect ratio in relation to room depth. When aspect ratio is 1, almost 78% of floor area satisfies the required min. illuminance of 300 lx with 30% WWR. When aspect ratio is 1.5, almost 57% of floor area gets adequate daylight with 43% WWR. When aspect ratio is 2, almost 52% of floor area is under full of daylight with 67.5% WWR.

The initial step for evaluating the outputs of multiple regression analysis is to specify the coefficient of inferential statistical R^2, to applicate F-test to the regression equation. R^2 is an accurate criterion for the prediction outputs in supplementary studies of the model in future. R^2 is a value between 0–1. Values closer to 1 indicate that predicted data fits the actual data very well. Here, R^2 is found as 0.78 meaning that 78 percent of the change in illuminance can be explained by variables, room depth, WWR, point-x and point-y.

Table 1. Summary outputs of multiple lineer regression analysis.

Regression Statistics	
Multiple R	0,884929603
R Square	0,783100403
Adjusted R Square	0,782462463
Standard Error	142,3744012
Observations	1365

Regarding ANOVA results, a very low value of significance F(0.00) indicating the relation between variables and the illuminance is statistically significant at the level of *p*-value <.05. There was a significant impact of room depth, WWR, point–x and point-y on illuminance value at the $p < .05$ level, *(F (4,1360)=1227.55; p <.05).*

Table 2. Coefficients of the estimated model

	Coefficients	*Standard Error*	*t Stat*	*p-value*
Intercept	406,5507784	22,20710807	18,30723645	4,26442E-67
room depth	-4,261033844	1,824677113	-2,335226224	0,019676415
wwr	8,376481959	0,28009153	29,90623081	1,9188E-151
point-x	-84,56381345	1,46971113	-57,53771045	0
point-y	15,20244599	2,441405343	6,22692419	6,32627E-10

As every *P*-value relating to each variable is below the significance level in Table 2, their significant effect on predicting illuminance is apparent. Minus indicator i.e. in room depth coefficient presents a negative relation that higher the room depth, lower the illuminance. Yet,

higher the WWR, higher the illuminance. The most dominating variable becomes point-x, the least effecting one is room depth. Overall model is suitable for illuminance predictions. Using coefficients in the table, expected value of illuminance can be formulated (2) as below.

Illuminance = 406,55 – 4.26 Room Depth + 8.38 WWR – 84.56 Point-x + 15.20 Point-y (2)

Conclusion

The decisions made during the initial design phase are crucial in terms of providing good visual comfort and managing energy consumption of the building. This study proposes an alternative approach to computer simulation programs to predict illuminance in different room and window configurations when prismatic panels are installed. It presents a high accuracy with the Relux outputs. It is considered that multiple regression model would be beneficial and practical in the initial design phase. Besides, daylighting standards in literature can be revised considering innovative systems such as prismatic panels.

References

Edwards, L., & Torcellini, P. (2002). *Literature review of the effects of natural light on building occupants* (No. NREL/TP-550-30769). National Renewable Energy Lab., Golden, CO.(US).

Reinhart, C. F., Jakubiec, J. A., & Ibarra, D. (2013). *Definition of a reference office for standardized evaluations of dynamic façade and lighting technologies.* Paper presented at the Proceedings of BS2013: 13th Conference of International Building Performance Simulation Association, Chambéry, France, August 26.

Standard, B. 8206-2: 1992 Lighting for buildings. *Code of practice for daylighting*.

Thanachareonkit, A., Lee, E. S., & McNeil, A. (2014). Empirical assessment of a prismatic daylight-redirecting window film in a full-scale office testbed. *Leukos, 10*(1), 19-45.

Wong, I. L. (2017). A review of daylighting design and implementation in buildings. *Renewable and Sustainable Energy Reviews, 74*, 959-968. doi:10.1016/j.rser.2017.03.061

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Hybrid biomimetic design for sustainable development through multiple perspectives

Carla Langella[1*], Valentina Perricone[2]

[1]*Department DADI, Università degli Studi della Campania "Luigi Vanvitelli", Aversa (CE), Italy, carla.langella@unicampania.it*
[2]*Department DISTABIF, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy, valentina.perricone@unicampania.it*

Abstract: In the bio-technological era the boundary between biological and synthetic world is increasingly blurred, as well as, the edge between different disciplines in a multidisciplinary perspective (Thiel et al., 2015) or, in a more extreme case, anti-disciplinary (Ito , 2016).
However, the overcoming of barriers is not to be considered a symptom of homogenization or loss of complexity, but rather, as a paradigm, in which new forms of connection and intersection between design and science are created developing hybrid products in which nature and artifice coexist and collaborate (Oxman, 2016); a change of paradigm that deeply revises the concept of environmental sustainability.

This paper aims to illustrate activities, methods and results of the *Hybrid Design Lab* for research, teaching and design experimentation sustained by the DADI Department of the Campania University "Luigi Vanvitelli"; specifically dedicated to different forms of collaboration and intersection between design and bio-sciences with particular insight on environmental sustainability.

Keywords: design; biomimetic; hybridism; bio-technology; sustainability

Introduction

Presently, bioscience and biotechnology evolution means that the frontier between the biological and synthetic world is increasingly dissolving providing new opportunities for nature and artifice to cooperate and hybridize together.

As a discipline, design is highly involved in decoding social conceptual transformation in new productive solutions. This conceptual mutation should be considered as a possible opportunity to materialize new forms of design inspired by nature and to create products and processes integrated with the environment. New bio-technological solutions for repairing human tissues and organs; repopulation systems for endangered species; post-humanism ; bio-sensing systems able to detect human and environmental disorders and diseases are all examples of cooperation between man and nature, able to realize new forms of propulsive sustainability; an advanced improvement of past protective and conservative sustainability concepts.

In this regard, the concept of environmental sustainability is not only considered as a reduction of the human activity impact on the ecosystem or an ability to conserve resources; but also as the capability of developing new forms of human cooperation with nature able to trigger virtuous processes improving ecosystem living conditions for present and future

generations. Thus, associated with the ability of science to "regenerate" and "enhance" nature (Mehaffy & Salingaros, 2017).

The *Hybrid Design Lab* has extensively experimented these new design frontiers through an innovative biomimetic approach. The HDL biomimetics projects are carried out in collaboration with different fields of science, particularly the biological sector, aiming to better understand the relationship between morphological, structural and behavioural characters of natural systems and all the "motivations" behind them in order to transfer functional elements to hybrid design products.

Methods

Since 2006, in the *Hybrid Design Lab* new forms of mutual collaboration between design and life sciences have been experimented. It is a cooperative relation in which biology supports project culture by providing inspirations and strategic principles drawn from nature resulting in a sustainable innovation regarding products and production processes (manufacturing innovation) providing new forms of adaptability, flexibility and resilience; whereas, design helps biology to approach society and its needs to better understand the functional aspects of nature, yielding new specific interpretative filter and tools .

Hence, biology contributes to the innovation processes carried out by design, and design helps biology to better understand and interpret what emerges from instrumental investigations, thus producing new knowledge, in a singular biomimetic approach.

In terms of sustainability, biomimetic design can contribute and support studies in biodiversity and on the endangered species preservation. In fact, all the interpretative and representative tools of these disciplines can provide useful contributions to morphological, structural or functional studies of biological systems aimed at understanding the effects of climate change, human intervention or pollution, as well as, self-adaptation and self-strategy organization implemented by biological entities. To elaborate these studies, biologists often use comparisons between different individuals of the same species living in different environments, or between different species with similar characteristics. In these cases, the designer can transfer to biological research the correlation tools gained in the design experience in which the characteristics of the object must be related to the different user needs and to different application contexts.

The approach and methodology used in HDL are continuously updated according to scientific literature and to specific standards *i.e*. ISO TC / 266 apropos biomimetics.

HDL methodology applied in biomimetic design projects foresees, in particular, two possible different approaches: *from Biology to Design* and *from Design to Biology*. The first proposes

natural models induced by biology to design that identify possible applications, which corresponds to the approach defined as *solution-based* (Badarnah & Kadri, 2015), *solution-driven* (Vattam et al., 2007), *biology push* (ISO / TC 266 2015), *biomimetics by induction* (Gebeshuber & Drack, 2008) or *biology to design* (Baumeister, 2014). On the other hand, the second approach begins from specific design problems and searches the most suitable solutions in nature corresponding to the approach defined as *problem-driven* (Fayemi et al., 2017), *problem-based* (Helms, et al., 2008), *challenge to biology* (Baumeister, 2014), *technology pull* (ISO / TC 266, 2015), *top down* (Speck, et al., 2008) or *biomimetics by analogy* (Gebeshuber, 2008).

In the *Hybrid Design Lab* the nature study and knowledge phase is dealt by biologists and designers through observation and subsequent interpretation of biological subjects using optical microscopes, scanning electron microscopes, photogrammetry and micro-tomography. The choice of points of view and details to be observed are strongly oriented by design according to the aim of the project. The interpretation of instrumental images is also conducted in cooperation and translated into nature models in function of application needs. These could be two-dimensional or three-dimensional, static or dynamic, virtual or physical models, obtained mainly using digital tools, that represent biological structures, their behaviour, dynamisms and functional elements that possibly could be transferred to the product project.

Findings and Discussion

The *Biomimicry DesignLens* proposed some life principles to be used in bioinspired design *e.g. use life-friendly chemistry*; *be locally attuned and responsive*; *adapt to changing conditions*; *evolve to survive*; *integrated development with growth*; *be resource efficient* and related strategies like *break down products into benign constituent; use feedback loops; embody resilience through variation, redundancy, and decentralization; cultivate cooperative relationship; self-organization*. These could be connected to specific products developed in the *Hybrid Design Lab*.

Some HDL products, characterized by reduced life cycles like orthopaedic supports used in a limited therapy time, are designed in a planned degradation releasing substances not only less harmful but also benign for the environment thanks to their fertilizing, balancing and regenerating properties.

Hybrid products are designed to adapt constantly themselves to external changes and feedback loops. This approach corresponds to HDL products that incorporate materials that react to environmental factors such as humidity, light or the presence of polluting factors, modifying their characteristics and performances.

In the lab nature is not conceived just as a source from which to take raw materials, but also as a "participating" component of the product and of its realization process.‒Biological and synthetic components coexist in hybrid products, triggering synergistic and cooperative relationships according to a co-evolutionary and mutualistic approach. This happens, for example, in a photovoltaic lamp that incorporates the natural sponge *Euclpetella* activating a cooperation between natural factors such as solar energy and the ability to focus the light of this "biological optical fiber" with artificial factors such as photovoltaic panel, resin and digital manufacture processes. It is the result of a synergy between nature and artifice also the lamp in which a recycled component, coming from the recovery of a disused appliance, a natural component, cultivated by the user (loofa), and a designed component, that guarantees the universal connection between the elements, are integrated in a hybrid lamp.

The generative bio-inspired approach applied to design process, assisted by parametric modelling and digital fabrication technologies, allows to develop a new generation of hybrid products that are customizable, *on request*, adhering to specific needs, optimized in terms of consumption of matter and energy, therefore more sustainable. The hierarchical structure of properties such as porosity, density; elasticity, makes designed products able to adapt more easily to changing conditions and to different types of stresses and stress distributions.

HDL products are not, however, always perfectly optimized because sometimes they embody resilience through variation, redundancy, and decentralization strategy as often happens in the skins and in the envelopes of living systems. An *auxetic* structure, inspired by the salamander skin, has been redesigned with variating, and sometimes redundant, modules to generate a collar for neck postural rehabilitation that adapts to different positions and different anatomies.

Finally, in nature, often a component is able to perform, if necessary, different functions and to address a variety of needs. This causes a designing of multifunctional products.

References

Badarnah, L.,& Kadri, U. (2015). A methodology for the generation of biomimetic design concepts. *Architectural Science Review*.

Baumeister, D. (2014). *Biomimicry resource handbook: A seed bank of best practices.* Biomimicry 3.8.

Aoussat, A., Fayemi, P. E., Maranzana, N., Wanieck, K., & Zollfrank, C. (2017). Biomimetics: process, tools and practice. *Bioinspiration & biomimetics*.

Drack, M., &Gebeshuber, I. C. (2008). An attempt to reveal synergies between biology and mechanical engineering.Proceedings of the Institution of Mechanical Engineers, Part C: *Journal of Mechanical Engineering Science*.

Goel, A. K., Helms, M. E., Vattam, S. S., Weissburg, M., & Yen J. (2008). *Problem-driven and solution-based design: twin processes of biologically inspired design*.

ISO/TC 266 (2015) *Biomimetics-Terminology, Concept and Methodology*.

Ito, J. (2016). Design and science. *Journal of Design and Science*.

Mehaffy, M., & Salingaros, N. A. (2017). *Design for a Living Planet: Settlement, Science, & the Human Future*. Sustasis Press.

Oxman, N. (2016). Age of entanglement. *Journal of Design and Science*.

Speck, T., Speck, O. Beheshti, N., McIntosh, A. C. (2008). Process sequences in biomimetic research. *Design and Nature* IV.

Fiedler, S., Loh, J., & Thiel, S. (2015). Multidisciplinary Design in the Age of Data. In *New Challenges for Data Design*. Springer, London.

Goel, A. K., Helms, M. E.,& Vattam, S. (2007). *Biologically-inspired innovation in engineering design: a cognitive study*. Georgia Institute of Technology.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Fashion eco design lab: capsule collections bio

Roberto Liberti[1*], Patrzia Ranzo[2]

[1]*DADI, University of Study of Campania, Luigi Vanvitelli, Aversa, Italy, roberto.liberti@unicampania.it*
[2] *DADI, University of Study of Campania, Luigi Vanvitelli, Aversa, Italy, patrizia.ranzo@unicampania.it*

Abstract: The purpose of the contribution is to describe the design method of listening design applied to national cases highlighting the importance of sharing strategies, methods and listening practices to be implemented in specific phases of the development of the project in the fashion industry. This approach has been applied in recent years, by a group of researchers from the Uni- versity of Campania Studies Luigi Vanvitelli, to several cases in the local area, demonstrating how such methods prove to be versatile and adaptable to territories not only Italian. The listening model open to the territory that the listening design method generates, demonstrates how it is able to create innovation in diversified sectors based on the needs deriving from a specific case. The main objective of the methodology is to define a shared path that can guide companies in defining the demand for innovation, in creating innovative concepts and experimenting with new products and products through co-design practices. Designers, researchers, companies and users are the resources that make up part of the creative ecosystem in which the method is developed, to be subsequently completed by means of local structural resources. As can be seen from the theoretical structure of the aforementioned process of analysis, Listening Design (LD) practices and tools include "collective" and "connective" intelligence. In particular, the case studies refer to cultural deposits in the fashion sector in the Campania region, with reference to the Fashion Eco Design sector.

Keywords: fashion eco design, capsule collection bio, eco sustainability.

Introduction

The analysis of the “giacimenti culturali” in the fashion industry in Campania, arises from the presence of multiple historical brands that the FA.RE. Vanvitelli is studying to promote new capsule collections through collaboration with companies such as Mario Valentine, Emilio Schubert, Livio De Simone, Tramontano, until arriving at the presentation of the bio capsule for Kiton. The research and teaching method we used for the analysis of these cultural deposits in the fashion industry called Listening Design derives from the analysis of the Design Thinking approach. Through phases of listening to the territories in which the companies are inserted, and meetings with the same business managers, the company's needs are analyzed first and then Fashion Eco Design projects are developed with the companies themselves. This experimentation is very interesting and represents an innovative design and teaching method applied to companies that wish to deepen the development of innovative collection projects with an important focus on the environmental sustainability of the process and of the industrial product analyzed.

Methods

The case studies presented for the understanding of the experimental method of listening design were basically Italian and analyzed with the aim of showing the transition from reading the graphs and concept maps developed for the method to real cases of small and medium Italian companies for which this method has been conducted so far by researchers from the University of Campania, Luigi Vanvitelli, the FA.RE. Laboratory and some companies of the Italian fashion system. This reading of the case studies presented has seen the application of the LD method to some of the most important Italian luxury companies in the fashion sector. These case studies have been analyzed to propose a system of listening to the territory in which the companies are located and for which the LD project was aimed at a proposal of innovation related to a capsule collection project carried out with a team of work - which in the method of LD we will call Dream Team - presented at international events during Milan Fashion Week. This request for innovation was applied from 2012 to 2018 with various companies of the Italian fashion system and in particular with the following brands: Mario Valentino, Emilio Schubert, Livio De Simone, Amina Rubinacci, Kiton. The dream teams structured for the four case studies presented were the classes of the first year of the Master Degree Course in Design for Innovation, curriculum Fashion Eco Design at the University Vanvitelli with teams composed of teachers and students, while the users were managers and other actors involved within the various companies analyzed. The request for innovation in the various case studies was differentiated according to company needs, and has moved from the needs of process innovation for Mario Valentino with the adoption of digital material experimentation in the leather sector, to those in the field of experimental knitwear for the capsules presented for Amina Rubinacci.

For the BIANCA collection for mario valentino we analyzed "zero class" low environmental impact skins, free from chemical dyes and treatments harmful to health, trying to promote an "eco" production in a particularly polluting environment such as the processing of tanning skins.

It has been useful in this first listening phase to show the results before and after the listening design project, and to show the expected results and the testing phase. The four projects presented were the capsules: Bianca for Mario Valentino, Neo for Emilio Schubert, LSD for Livio de Simone, Amina Rubinacci plus for Amina Rubinacci and Kiton.

Findings and Discussion

The present paragraph wants to underline the applicability of the design methodology in the field of design for innovation in the Fashion sector, underlining the importance of sharing strategies, methods and listening practices to be implemented in specific phases of the design process starting from a Design Thinking approach. The collaboration between the FA.RE. laboratory. Fashion Research Lab and the companies identified in recent years for experimenting with a way that leads from research to teaching to promote the conception of innovative capsule collections, has seen collaboration with several companies starting with the historic Neapolitan company Mario Valentino, the maison Livio De Simone until the latest collaboration with Amina Rubinacci and the historic leather brand Tramontano, to get to the organic capsules made for Kiton with natural materials, and presented at the fashion week man June 2018.

The design method of the LD has had a particular connection with the theme of environmental sustainability in the KIton NEM project. During the listening sessions with the kiton managers of marketing, the need to deepen eco-friendly materials in the capsule collection project emerged, leading to a research with leading Italian companies in the sector. This research led to the contact with the company MAEKO of production of natural and certified fiber materials that were then used to create the NEM capsule collection in Milan during the Men's Fashion Week in June 2018.

The listening design method applied to the development of new capsule collections for Italian fashion houses has proved to respond to the needs of innovation in the sector, respecting the cultural identity of the brands and their values. This design method is of particular interest, especially when applied to historic brands, whose identity complexity requires much more than the creativity of a single designer. In fact, it is not possible to think of entrusting the entire process of relocating an experimental capsule collection to a single stylist or creative as happened, for example, with Tom Ford for the Gucci brand, or with Karl Lagerfeld for Chanel; those were very special cases and those genius were absolutely unique in their kind, and the historical period was absolutely different from the current one. Today, in our opinion, it is necessary to entrust such a task to a team of creatives - the dream team - with interdisciplinary tasks, in order to face the project of a new capsule collection for historical brands still in existence.

The planning necessary for the creation of new capsule collections for the international contemporary fashion market requires complex and interdisciplinary methods that the

listening design approach possesses. The market to which this type of experimentation refers is that of luxury, and refers to companies operating in the local territory with an eye to the sale of the product of excellence on international markets. In this sense, the "glocal" characteristic of the project for products essentially linked to Made in Italy, opens up to a systemic vision for the development of new products for new markets or expanding markets. Almost all of the brands analyzed had their greatest success on national and international markets during the Italian economic boom between the '60s and '80s to suffer from the beginning of the '90s onwards a setback for the economic crisis of the sector. The maisons analyzed, despite the great difficulties of that historical period, have come down to us thanks to a characteristic managerial structure of a "family" character typical of the organization of many successful Italian fashion brands.

This management structure makes it easier to experiment with the method of listening to innovation, to propose a proptotype vision suitable for the customers of the brand analyzed. Another characteristic common to the maison considered for the experimentation conducted with the FA.RE. laboratory is the possibility of analyzing the clientele of the capsules thanks to the verification of the points of sale owned by the fashion houses themselves analyzed.

Conclusion

The method analyzed promotes the creation of projects that move from the world of university research to the company reality, and shows how eco-sustainable research in the fashion world is a priority for companies that today increasingly have to look at the sustainability of products and processes. Moreover, the LD method presents a real approach for the future designers involved in this experimental research and teaching methodology to understand the real needs of a company that is increasingly moving on the issues of environmental sustainability in the field of fashion, whose system of companies it is among the most polluting and less sustainable today. In this sense it is necessary that all the actors involved are sensitized on these issues and in particular the designers who are often fundamental in the selection of processes and innovative products for the company.

References

ALFANO MIGLIETTI F., (2005), Virus moda, chic and choc rivestimenti: moda, modelli a mutazioni, Skira ed., Ginevra – Milano.

BALESTRI A. - TOCCAFONDI D., (1994), Imprenditori e Distretti Industriali, Prato Fortuna ed., Prato.

BALDONE S. - SDOGATI F. - TAVOLI L., (2000), La posizione dell'Italia nelle nuove forme di divisione internazionale del lavoro, Mimeo ed.,

BECATTINI G., (1990), The Marshallian industrial district as a socio-economic notion, in: F. Pyke, G. Becattini, and D. Sengernberger, Industrial district and inter-firm cooperation in Italy, Geneva, ILO ed.,

BECATTINI G. - RULLANI E., (1993), Sistema locale e mercato globale, Economia e Politica Industriale n° 80,

BELFANTI C. M. - MACCARELLI T., (1998), (a cura di) Un paradigma per i distretti industriali, Grafo ed.

BELLONI V., (1996), Squilibri strutturali e nuovi assetti dell'industria italiana, Grafo ed.,

BETTAGLI N. - GIANNELLI L., (2001), Borsa materie rime e filati, notizienostre, N° 173, pp.45-47

BIRINDELLI L., (1999), (a cura di) Mobilità del lavoro nei distretti: elementi teorici, metodologie ed evidenze fattuali, Mediocredito Centrale, Osservatorio sulle piccole e medie imprese, Quaderni di Politica Industriale, n° 29.

BRECHER J. - COSTELLO T., (1997), Global Village or Global Pillage, 1995 - trad. it.: Contro il capitale globale, (Feltrinelli), Milano

DE MASI D., (2003), L'avvento del post-industriale, Franco Angeli ed., Milano, 2000.DELLI PAOLI G., Reverse, tesi di Laurea in Design per la Moda, Facoltà di Architettura SUN, a.a. 08-09, relatore R. Liberti.

FABRIS G., Il nuovo consumatore: verso il postmoderno, (Franco Angeli), Milano.

LIBERTI, R., (2000), Il distretto industriale sostenibile, Napoli, ed. Giannini.

LIBERTI, R., (2003), Design per la moda, tecnologie e scenari innovative, Firenze, Alinea ed.

LIBERTI R. (a cura di), (2010), HIGHWARE L'industria del lusso in Campania, Camera Nazionale della Moda Italiana, Napoli, Graus ed.

RANZO P, VENEZIANO R., (2013), Listening design: a new methodology for design and innovation processes, 2nd International Conference for Design Education Researchers, Oslo, DRS Cumulus.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Historical thermal baths in Europe: a research methodology for restoration and preservation

Elena Manzo[1*], Ilaria Pontillo[2]

[1]*Department of Architecture and Industrial Design, Università della Campania, Aversa, Italy, elena.manzo@unicampania.it*
[2]*Department of Architecture and Industrial Design, Università della Campania, Aversa, Italy, ilaria_pontillo@hotmail.it*

Abstract: Paper aims at presenting a focused research methodology examining the historical thermal baths, in order to design a network of cultural itineraries in European countries able to promote sustainable tourism. Cataloguing and documenting transformation of sites and landscapes, after the period thermal vacation has acquired a new social significance, could support government programs for preservation and restoration of environmentally, architecturally and artistically-valuable thermal areas and related services.

Keywords: thermal baths; research methodology; cultural itineraries.

Introduction (Elena Manzo)

Thermal baths, made popular in the Roman era and rediscovered between the 14th and the 15th century, were exclusive tourist destination for the aristocratic élites visiting Italy and Europe during the *Grand Tour*. Then, they became favorite holiday destinations for the bourgeoisie during the 19th century, when the Industrial City, organized in homogenous areas, gave rise to new building types, designed in order to manage urban land expansion and meet technological developments and evolving social needs. Finally, between the 19th and the 20th century, namely in relation to the international debate of the hygienist movement on the importance of therapeutic properties of water and physical well-being, following the devastating cholera epidemics all over Europe, thermal baths became a real mass phenomenon able to reshape and influence sites and landscapes in a meaningful way. Just like bridges, train stations, department stores and galleries, modern baths were built for the emerging middle-class, although their architectural model came from the ancient repertoire. Next to spaces traditionally based on the *caldarium-tepidarium-frigidarium* sequence for ablutions, new areas for social activities and entertainment, such as reading rooms, restaurants, dance halls and Casinos, were designed**.**

After a gradual and progressive decline of thermal baths since the first decades of the 20th century, European countries have launched important public-private programs to reassess historical thermal sites in the last twenty years. These programs, coming from a renewed

interest in physical care and anti-ageing medicine, are based on government investments in the spa industry able to get important results, on national and local level, in terms of economic return and increase in tourism and employment.

Methods (Ilaria Pontillo)

Since the end of the 19th century, the historical thermal baths have been topics of many contemporary studies. For example, in France baths were analyzed in a lot of manuals and, in particular, in the books by M. Durand-Fardel, J. François, P. Planat. In Italy, however, thermal buildings were topics in the "treaty" *Il Costruttore*, published between 1886 and 1907, or in the *Enciclopedia delle Arti e Industrie*, as well as in the volumes edited by Daniele Donghi and in some of the most important magazines, such as *L'Edilizia Moderna* and *Rivista di Ingegneria Sanitaria*.

The international renewed attention for historical thermal baths and the current UNESCO guidelines in the field of preservation of cultural heritage, increase of touristic movement and promotion of sustainable tourism throughout Europe have suggested to develop a research methodology based on a critical analysis of schemes, models and characteristics the most important European thermal sites, worthy of attention because of their dimensions or architectural type, have in common. The aim of the methodology is to get a comparative study able to provide the groundwork to map safeguarded sites and design a network of thematic itineraries.

In order to develop common methodologic and applicative tools to be used in different European countries, the historical and anthropological research has focused on exemplar case studies in Italy, located in healthy and panoramic areas. In particular, in Campania Region, the Castellammare di Stabia's and Neapolitan islands' nineteenth-century baths have been investigated by Elena Manzo, while the Telese's thermal complex has been analyzed by Ilaria Pontillo. These baths have been selected also because they have made historical thermal settlements important sources for economic growth.

Findings and Discussion (Ilaria Pontillo)

The philological, iconographical and documentary study on the historical baths has resulted in the planning of original common know-paths and soundscapes, aimed at a sustainable esteem and reuse of thermal sites. So, cataloguing and documenting the historically and artistically-value thermal centers in Campania Region, it has been possible to design a

network of thematic and artistic itineraries able to recall traditional habits of the cultural vacation between the 19th and the 20th century and suggest appropriate policies for the requalification of degraded sites in terms of sustainable development.

The recognition of historical identity of the thermal baths as cultural heritage to preserve has required, first of all, an archive and literature research phase in order to catalogue and document transformation of sites and landscapes in Campania Region, after the period thermal vacation has acquired a new social significance. This phase has been also supported by on-site inspections to study the worthy-of-attention baths in Castellammare di Stabia, Ischia and Telese.

The re-evaluation of thermal buildings has been linked to a second phase of analysis of common characteristics and services (construction period, plant size, architectural type, and so on). This second phase has provided the information needed to plan a georeferenced network of historical itineraries in Campania Region and suggest measures for long-term enhancement of thermal areas, such as infrastructural or service restoration measures.

Conclusion (Elena Manzo)

Today, thermal baths are one of the fastest growing and most productive sectors in economic balance of European countries. The historical identity of sites is considered as cultural heritage to be saved and promoted thanks to networks of protected areas, able to attract large numbers of tourists. Despite the interest in restoration of thermal areas shown by European countries in the last years, there is still no coherent project of thematic paths introducing visitors to the knowledge of European historical thermal areas. Given all of that, the research methodology's main scientific goals have been, on one hand, having emphasized the historical dimension of the touristic routes, so important for the cultural and economic enhancement, and, on the other hand, having offered a network of know-paths, selected for common architectural, historical and environmental values of the thermal areas. The focus has been planning "themed" routes in order to offer a model of sustainable tourism through Europe.

Precisely, methodological protocols used for the baths in Campania Region could be adopted also in thermal areas with similar conditions. In particular, according to the UNESCO guidelines, which promote the safeguard of the cultural and environmental heritage in member States, the network of thermal itineraries in Italy and between Italy and other nations could be tool of knowledge of the European historical identity, preservation of the memory of thermal sites and urban economic revival.

References

Becheri, E., Quirino, N. (2012). *Rapporto sul sistema termale in Italia*. Milano: Franco Angeli.

Commissiò Europea (1996). *Il turismo termale europeo: quattro regioni a confronto*. Pacte Programme European Commission.

Pansera, A. (1989). L'architettura delle terme tra salute e mondanità. *L'arca: la rivista internazionale di architettura, design e comunicazione visiva*, 23, 4-8.

Peris-Ortiz, M., Álvarez-García, J. (2014). *Health and wellness tourism: emergence of a new market segment*. Heidelberg: Springer.

Rocca, G. (2013). *Dal prototurismo al turismo globale. Momenti, percorsi di ricerca, casi di studio*. Torino: Giappichelli Editore.

Sexton, K. (2017). *Architecture and the body, science and culture*. New York: Routledge.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The design from autarky to the circular economy

Angela Pecorario Martucci[1]

[1]*Department of Engineering, University of Campania Luigi Vanvitelli, Aversa, Italy, angela.pecorariomartucci@unicampania.it*

Abstract: The purpose of this contribution is to offer an updated interpretation of autarky by identifying recycling, recovery, re-use and re-introduction of materials, which is rooted in the mid of '30s in the independent economic programme. It was prefigured by Mussolini in response to the economic sanctions imposed on Italy due to the Ethiopian war. "*Italy will do itself*" is the strict imperative.
We will try, therefore, a new reading of the independent policy adopted as a laboratory of ideas, innovations and experimentations, as the result of a particular contingency, in which it is possible to grasp points in common and affinities with the most current models of sustainability, anticipating somehow the most recent developments of the circular economy.

Keywords: Autarchy; experimentation; reuse; circular economy.

Introduction

In 2015 was introduced the so-called Eco-design directive which introduces in the design criteria of durability, recyclability and reparability of products, contributing to outline the transition to an increasingly more focused economy for material and energy recovery. Thus, the guidelines and models of the circular economy are taken into consideration so that, according to the latest definition created by the Ellen MacArthur Foundation, we can talk about "an economy designed to regenerate itself" (Bompan, Brambilla, 2016). We can find the prelude of this new concept in the second mid of '70s in the report written in 1976 by Walter R. Stahel and Geneviève Reday-Mulvey titled *Potential for Substitution Manpower for energy*, revised in 1982, which introduces for the first time a model of "cyclic economy" (Bompan, Brambilla, 2016). A further step forward is found in 2002 with the publication of the cult text by William McDonought and Michael Braungart *Cradle to Cradle Remaking the Way We Make Things* that reverses at all the setting of the old economy by opposing a continuous persistence of material in the production cycle through "a cradle-to-cradle approach" (Lacy, Rutqvist, Lamonica). In other words, it is a conversion of the linear production model from the cradle to the grave - based on production, use, disposal – to a real circular system, from the cradle to the cradle in "which the negative output, the waste [...] becomes the starting point for a new [...] world of production and economic growth" (Bompan, Brambilla, 2016).

Methods

However, we can wonder if such research lines should be considered absolutely new or can boast previous examples. Actually, many current productions that use waste as reusable raw material propose again precisely the experiments carried out during the Italian autarkic experience.

In fact, if we compare some today's practices eco-friendly with the directed research, starting from the 30s', in response to the program of economic independence prefigured by Mussolini, it is possible to identify significant similarities so important that we could speak about proto-circularity.

The lack of national resources which comes from Italy's desire to become independent from foreign imports does not lead to a design impoverishment, but encourages the culture of the project towards the experimentation of new languages and materials that are more and more native and circular. By-products become raw materials of other processes towards an increasingly cradle-to-cradle production system, in a sort of upcycle ahead of its time.

So, even if we do not deny the ambiguity and the contradictions experienced by Italian design in this particular context, it is interesting to interpret the self-governing conditioning as an "involuntary green-economy laboratory" (Ruzzenenti, 2011).

Findings and Discussion

Pursuing the more central aim of sustainability, contemporary design is more and more characterized by "a circular approach, or cradle to cradle one" (Bompan, 2015), through experiments focused on materials, their production and final destination, in a continuous recycling of material. This change of perspective implies, as a more immediate consequence, the second life of the object from the beginning, supporting the recycle, re-use and regeneration of raw materials. This promotes easily removable materials that allow repair and replacement only for worn out or outdated elements. Through the correct planning of efficient supply chains, the materials themselves, in fact, acquire the quality of circularity in a re-upcycling which corresponds to an increase of their values. That's how, for example, that fabrics with excellent features are obtained from PET bottles or other plastic waste; many biomaterials are used to produce glasses and packaging. Thanks to technological innovation, natural materials take on their own extraneous properties: it is the case of wood that is used as

a substitute for leather. Fruits, vegetables and cereals are used to make furnishing accessories. From food scraps such as tea leaves, egg shells, rice waste and sugar we can obtain shoes and brushes. Fish skin has found wide use in the fashion industry to make shoes, bags and clothing. Textile fibres are obtained from the processing waste of oranges. There are *clothes in milk*, made by casein biopolymers that cannot be used for food purposes, or from bagasse, which is the waste from the production of sugar cane; or the *cocolok* shoes, made by coconut fibres.

Many of these practices about the promotion of waste, combined with the promotion of native materials, are anticipated in the experimentation of reuse and recovery of the started products, just in the autarkic phase, according to the slogan "*everything can be used*". So, in the mid-30s', in the furniture we use woody native cores instead of imported precious ones. Cellulose is obtained from local plants. Local raw cane and straw as well as raffia are used as a weaving material. Glass, aluminium and its alloys are independent of imports, so they become the undisputed protagonists in architecture, fashion and design. Alongside the materials available on site, the new surrogate and substitute materials determine the autarkic style adopting circular patterns through the start-up of industrial symbiosis systems. In this way the scraps of one sector become resources for another one. This is the case of Buxus, a substitute for briar root that is created as a recovery product in processing waste and which is used in many applications such as in leather industries, furniture veneers and covering. The processing of the broom creates as final product the substitute self-sufficient fibres of cotton and jute, but the scraps of this process are treated to obtain cellulosic straw for the paper industry and also soap resin. According to a circular and multi-directional approach the used material feeds not only the textile industry, but also new supply chains. The proto-circular supply chain of excellence is Lanital's, repurposed with a different technology and now commercialized by the names of Milkofil and 2diLatte. From this artificial protein fibres, obtained thanks to the dairy industry waste, it is also possible to obtain products with extraordinary glue and sticky qualities that are used to make buttons, handbags and combs (Zoolite, Galakerite, Keroide etc.).

Then, in the sanctioning period, especially agricultural by-products become new raw materials. Rice and wheat straw, shives, corn stalks, sorghum, esparto and shavings are processed to return into a dynamic industrial transformation for the production of cellulose. From the leaches of the cellulose factories it is possible to obtain a further thermosetting plastic material; in addition, from cellulose waste we obtain also artificial tannins useful for

the tanning industry. Sawdust, waste, twigs, scraps, depleted olive pomace, husk of wheat, oats, rice, corn stalks, almond shells and hazelnuts are processed to produce ethyl alcohol, glycerine, acetic acid, paint resins and furfural aimed at the production of plastic materials and lignin. From the tomato peels we obtain the Italicum, a rubber-resin. The shortage of leather brings the Cuoital, Coriacel, and Sapsa to the market. On the other hand, the Visderma, obtained from the skin underneath the skins of animals, converts a tannery waste into the material used for shoe uppers and soles. Experimentation focuses on shark skins, snapper, salmon, croaker and groupers to replace the uppers made by sheepskin and goatskin. Alongside the materials and the whole exploitation of resources we can find behavioural rules which express a sort of aware culture of reparation and reuse. We can see embryonic remanufacturing practices through product regeneration; shoes are repaired, old sweaters are unravelled and are stitched. The product's end of life is increasingly postponed.

Conclusion

Durability, regeneration, upgrade and repair are all practices that find their precursors in the culture of the '30s, even if we must take note the obvious differences. Autarky directs design towards a design research that implements a series of actions to reduce waste and optimize resources but, on the other hand, they do not have any environmental focus. The only exception is the purpose of sheer and simple economic independence, founded only on the resources available on the spot: it leads unconsciously towards a forced experiment of green-economy.

We can see the preludes of that "metabolism of the product" that looks at the matter "as biological and technical nourishing" (Mcdonough, Braungart, 2016) of the processes, but as adaptive change to the new plan of independent economics and not as an expression of an "industrial ecology" (Bompan, Brambilla, 2016) with an environmental awareness. The structural transformation imposed by the autarky, of course, defines an "autotrophic economy" (Ivoi, 2016), similar to the most recent developments in the circular economy, but with a closed view towards the free market. The system is completely introverted and rejects the foreign import; it leaves the liberal model to fall back only on the national economy, while the perspective of the current circular system can be summarised in the expression: "source local, act global" (Pellizzari, Genovesi, 2017). Obviously, it is not a matter of looking at the past, but of "redirecting the purposes of the tangible and intangible assets production"

(Guatteri, 1991), proposing alternative settings as "*glocal*" as possible, so that it can protect territoriality in a framework of global interrelation.

References

Pellizzari, A., & Genovesi, E. (2017). *Neomateriali nell'economia circolare*. Milano: Edizioni Ambiente.

Ricchetti, M. (2017). *Neomateriali nell'economia circolare*. Moda. Edizioni Ambiente.

Bompan, E., & Brambilla, I. (2016). *Che cos'è l'economia circolare*. Milano: Edizioni Ambiente.

Ivoi, I. (2016). Il design della non Materia. Tra futuro immateriale e rimateria da in-formare. *Materia Rinnovabile,* (12), 24–27.

Lacy, P., Rutqvist, J., & Lamonica, B. (2015). *Circular economy dallo spreco al valore*. Milano: Egea.

Bompan, E. (2015). Circular design: la materia esce dal purgatorio. *Materia Rinnovabile*, (3), 74–77.

Cappellini, M., & Farias, J. (2015). *Made in food Waste. Food waste as sustenable resources.* Matrec.

Cappellini, M. (2015). Made in food Waste. *Materia Rinnovabile*, (4), 70–73.

Mcdonough, W., & Braungart, M. (2013). *Dalla culla alla culla. Come conciliare tutela dell'ambiente, equità sociale e sviluppo*. Novara: Blu edizioni.

Ruzzenenti, M. (2011). *L'autarchia verde. Un involontario laboratorio della green economy*. Perugia: Jaca Book.

Guatteri, F. (1991). *Le tre ecologie*. Torino: Edizioni Sonda.

Giani, P. (1942). *Autarchia e guerra. Lineamenti, realizzazioni e sviluppi dell'autarchia*. Torino: Editrice libraria italiana.

Lojacono, L. (1937). *L'indipendenza economica italiana.* Milano: Hoepli.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Medical retrofitting design

Sabina Martusciello[1] , Massimiliano Masullo[1] , Geremia Nappo[1],
Alessandro Tessitore[2], Rosa De Micco[2], Antonio De Mase[2]
Antonio Garofalo[3] Antonio Cennamo[3]
[1]Department of Architecture and Industrial Design,
[2]Department of medical, surgical, neurologic, metabolic and aging sciences
University of Campania "Luigi Vanvitelli", Aversa Italy,
[3]Department of Economic and Legal studies,
University of Naples Parthenope
sabina.martusciello@unicampania.it; massimiliano.masullo@unicampania.it;
geremia.nappo@studenti.unicampania.it; alessandro.tessitore@unicampania.it;
rosita.demicco@gmail.com; demaseantonio@gmail.com;
antonio.garofalo@uniparthenope.it; antonio.cennamo@uniparthenope.it

Abstract: Design of wearable aids for patients suffering from Parkinson's disease with freezing of the march (FOG). This symptom may be resistant to pharmacological therapies. The primary device collaborates with other physiotherapy solutions to walking, stimulating and monitoring the patient's movement. From the primary device we want to develop a series of aids both for other symptoms related to the disease, and for other neurological diseases. Design, re-design, co-design of products and services for autonomy is the focus of research structured on 4 skills: design, neurology, engineering and economics.

Keywords: design for autonomy, parkinson's disease, medical design, neurologic sciences

Introduction

Anxiety, insecurity, fear of falling, feeling glued to the floor are just some of the feelings experienced by a Parkinsonian patient when the symptom of Freezing manifests itself.

Among the many symptoms of Parkinson's Freezing appears to be the most disabling both physically and emotionally. Freezing of the march or FOG creates a condition for which the patient can not ambulate, as if the lower limbs are freezing.

SynCrono is an aid for parkinsonian patients who have the symptom of Freezing. The wearable device helps to counter Freezing through a series of tactile and visual stimuli.

The aid can be worn in four different ways: the ankle, the wrist, the nape and the neck. Both the tactile and the visual stimulation are used on the ankle and wrist; while at the back of the neck there is only the tactile one. Use at the neck is reserved exclusively for data transport.

The design of the device takes into account the patient's discretion and emotionality, basic elements that in the aids are generally not covered. The patient in daily life must feel at ease and not invalidated by the aid itself.

That's why SynCrono is born, to give back autonomy to those who lost it.

Methods

Like all the products resulting from the LANDesign[1] method, it meets 6 requirements, 3F + 3E: the Vitruvian canons – form, function, technique/feasibility – and three more requirements: ecology, economy and feeling. Form considered as an exterior feature, the result of a clear, conscious design evolution; function, the appropriate use of the product in the man/environment relationship; feasibility, analysis of the structure necessary and sufficient to shape the product;economy, from oikonomia, i.e., the right distribution of the living areas vis-à-vis cost/benefits; ecology, provided by the benevolent man/environment relationships created by the use of the product; feelings, considered as the intense emotional reaction that can generate new, healthy ways to live on earth. «Design is a technology humanizer and designers have the role of keeping the person at the center of the evolution of technology. It is important, in the digital revolution that we live, to transmit our heritage to future generations and to help create a better world for all »[2].

Findings and Discussion

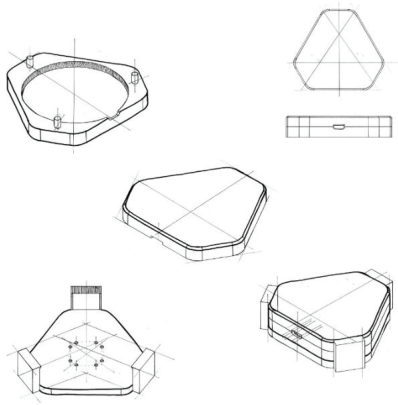


Figure 1. Sketches of the product: top shell, bottom shell and hook

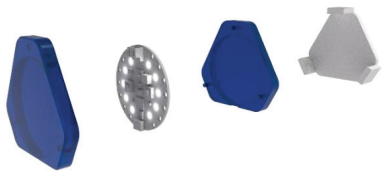


Figure 2. Exploded view with the hardware at the center

Conclusion

Being the project in a first experimental phase, different anatomical parts to work on were taken into consideration.

The ankle is certainly the most favorable anatomical region from the point of view of detecting. In fact, during Freezing the lower limbs are the only ones to be involved, and in this case the detecting is certainly as precise as possible. Even if the ankle is not the anatomic part most sensitive to stimuli, it is still an excellent entry point. The stimuli can be used both, with the visual stimulus being projected downwards providing a sort of guidance to the patient.

The wrist definitely has a deficit in detecting since during the Freezing the upper limbs are not blocked, but from the point of view of cuing the situation is better. Tactile and visual stimulation are easy to perceive and control.

The nape is the anatomical part most sensitive to stimuli and therefore excellent for a tactile stimulus. On the other hand, visual stimulation is lacking and detecting is not the best.

The neck was chosen as an alternative for the transport of the aid, which can be worn when you go to the doctor for routine checks.

As we can see in this first experimental phase, detecting and cuing are physically united, because the electronic components used are inserted into a single hardware card. In view of future improvements it would be better to separate the detecting from the stimulus to optimize

it to the maximum. As a result you can have two separate devices, one at the ankle for a precise detecting and another exclusive for the stimuli, positioned in the anatomical parts described above.

Acknowledgments: The LANDesign Applied Research Project, scientific directors Sabina Martusciello, M. Dolores Morelli, Dept. of Architecture and Industrial Design, Università degli Studi della Campania together with Benecon Regional Centre responsible for Cultural Ecological Economic Heritage, offices of the UNESCOchair on Landscape, Cultural Heritage and Territorial Governance, Dept. of Pharmacy, Università degli Studi di Salerno and General Directorate MIUR Campania has got:

SELEZIONE E MENZIONE “COMPASSO D'ORO INTERNATIONAL AWARD” Design for Food and Nutrition_Concorso Internazionale di Design promosso da ADI (Triennale di Milano, dicembre 2015);
TESTIMONIAL "Le Universita' per EXPO 2015" e "Progetto Scuola EXPO 2015" (2015);
PREMIO SPECIALE "Progettazione partecipata" X Concorso IQU Innovazione e Qualità Urbana, promosso dal Gruppo Maggioli (2015);
I PREMIO on line “Sezione opere realizzate" X Concorso IQU Innovazione e Qualità Urbana, promosso dal Gruppo Maggioli (2015);
II PREMIO Concorso Internazionale di Design promosso da POLI.Design del Politecnico di Milano "Le 5 stagioni" (2015);
III PREMIO Concorso "Ars. Arte che realizza occupazione sociale" promosso da Fondazione Accenture e Menzione speciale del MIBACT Ministero dei Beni e Attività Culturali e del Turismo (2013);
PREMIO "OSCAR GREEN" promosso da Coldiretti (2011)

References

Sabina Martusciello (2017), *LANDesign*, in *Dwelling on Earth* n°4, Gangemi, Rome.
Luisa Bocchietto (2017), *30a Assemblea Generale World Design Organization*, Torino.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Wayfinding as an Aspect of Social Sustainability

İpek Memikoğlu[1*], Hetham F. Layas[2]

[1]*Interior Architecture, Çankaya University, Ankara, Turkey, ipekmemikoglu@cankaya.edu.tr*
[2]*Derna, Libya, hl_adam@yahoo.com*

Abstract: Wayfinding can be considered an important aspect of social sustainability. The ease of wayfinding in a complex environment can be understood by the dynamic communication between the environmental cues and the users of the environment. Environmental cues that consist of architectural and graphical cues can support individuals and provide accessibility. The aim of the study is to understand if a university based tertiary care hospital in Ankara, Turkey is socially sustainable in terms of wayfinding with respect to architectural and graphical cues. A questionnaire was administered to the users of the hospital for the assessment of architectural and graphical cues. The results of the study indicated that the majority of the users found the graphical cues and architectural cues visible, legible and accessible, except for one architectural cue that was not easily accessible. It can be suggested that both the architectural cues and graphical cues in the built environment should be planned in the initial phase during design process, complement each other for social sustainability and be accessible to all.

Keywords: wayfinding; social sustainability; accessibility; architectural cues; graphical cues

Introduction

Sustainable development, after the Brundtland Report in 1987, has been considered as the combination of three aspects: environmental, economic and social (Lehtonen, 2004; Dhahri & Omri, 2018; Strange & Bayley, 2008). However, emphasis has been given to environmental and economic sustainability rather than to social sustainability (Borowczyk, 2018; Dempsey, Bramley, Power & Brown, 2011; Woodcraft, 2012; Woodcraft, Hackett & Caistor-Arendar, 2011). Although, various authors indicated that the concept of social sustainability was difficult to analyze and define (Lehtonen, 2004; Litting & Griessler, 2005), social sustainability is referred to as the influence of the built environment on the quality of people's life (Borowczyk, 2018; Dixon & Woodcraft, 2013). Social sustainability describes the extent to which the built environment supports the individuals and provides social equity (Dixon & Woodcraft, 2013; Dempsy et al., 2011). Social equity in the built environment is generally measured in terms of accessibility. The built environment can have an impact on the nature of accessibility (Dempsy et al., 2011) and wayfinding can be an important dimension of accessibility for all.

Wayfinding can be considered an important aspect of social sustainability. Wayfinding, as a problem solving activity, requires individuals to identify their location and reach their destinations whether in familiar or unfamiliar environments (Arthur & Passini, 1992). The ease of wayfinding in a complex environment can be understood by the dynamic communication

between the environmental cues and the users of the environment. Wayfinding in complex built environments, such as hospitals, transportation centers, governmental facilities, shopping malls or university buildings can be challenging and frustrating for people when they have little or no prior knowledge about the environment resulting in a feeling of disorientation. For people to feel secure and safe, they need to know where they are in complex unfamiliar environments. Unfamiliarity with the building, unclarity of decision points and routes with missing or incomplete cues can put the users into stressful situations. In order to successfully reach a specified destination, orientation in an unknown environment is an important factor and requires usually environmental cues. These cues are comprised of all kinds of information that is available in the environment, such as 'graphic' and 'architectural' cues (Sun & de Vries, 2009).

Graphical cues are signs and maps that represent the built environment, and architectural cues are configured by the architects in the initial phase during design process (Sun & de Vries, 2009). Architectural cues, which are essential in the built environment, shape the behavior pattern of the user of the built environment and are not easy to rebuild. (Sun, 2009). They can be stated as the circulation system, the exterior form of the building, spatial layout, atrium, stairs, corridors, entrances and exits (Sun, 2009). A socially sustainable built environment should satisfy human needs in terms of wayfinding and spatial orientation with the aid of environmental cues. The aim of the study is to understand if a university based tertiary care hospital in Ankara, Turkey is socially sustainable in terms of wayfinding with respect to architectural and graphical cues. In other words, do the architectural and graphical cues support the users and provide social equity.

Methods

A questionnaire consisting of 15 questions was administered to randomly chosen 181 patients and visitors in a university based tertiary care hospital during the months of July and August 2016 (Layas, 2017). Signage and maps were referred to as the graphical cues; the entrance, exit, elevators, stairs, corridors, information desk, doctor's office, departments, and academic campus were referred to as the architectural cues. Questions related to the availability, sufficiency, legibility of the graphical cues and architectural cues and the accessibility to various locations inside the hospital were asked to the participants.

Findings and Discussion

According to the results of the questionnaire there were 181 participants whose age range was from 18 to 102 (Layas, 2017). The university based tertiary care hospital consists of four entrances, 88 participants indicated that they used the main entrance followed by 44 participants who indicated that they used the polyclinic entrance. Although the main entrance of the hospital is not enhanced by an architectural element, it is differentiated by a signage, which is legible to the users from different angles, indicating that it is the main entrance.

In most cases, the entrances of a hospital are also the exits of a hospital. Visitors who are unfamiliar with the hospital should firstly find the entrance. One hundred and forty-five participants left the hospital from the same door that they entered from and were able to find the main entrance easily, whereas 36 participants were not able to exit from the same door that they entered and had difficulty in finding the main entrance.

According to Malkin (1992) and Passini (1984), the corridors, elevators, stairs and information desks should be visible and legible from the entrance point for the users who are unfamiliar and familiar with the setting. Likewise, the departments, the doctor's room and the academic campus should be accessible to its users. One hundred and fifty-seven participants found the elevators easily. Likewise, 150 participants found the stairs easily. One hundred and thirty-nine participants found the departments easily and 152 participants found the information desks easily. One hundred and ten participants found the doctors' rooms easily; however, only 35 participants found the academic campus easily. Thirty-one participants could not find the desired places within the hospital (Layas, 2017).

Signage is commonly used in hospitals to ease wayfinding and simulate the environmental information because it informs the patient or visitor about the place, their location and the possibility of occurrence of an event and even how it occurs (O' Neill, 1991; Passini, 1984). With respect to the graphical cues, 134 participants indicated that there were signs and you-are-here maps in the hospital; however, 66 participants indicated that they were not sufficient. In order to find their way inside the hospital, 67 participants used the signs and maps inside the hospital. One hundred and thirty-four participants indicated that they did not have difficulty in reading the signs and maps in the hospital, whereas 47 participants indicated that they had difficulty. They stated their difficulties as being not literate, not being able to understand the hospital layout and the informative signs either being too small or too complicated or having no color.

It can be stated that the architectural cues consisting of elevators, stairs, main entrance, departments, information desks, doctors' rooms are visible, legible and accessible to the participants since they were able to find them easily; however, finding the academic campus was difficult and caused problems for the participants. Since the academic campus was planned as a separate block and was not considered as part of the hospital spatial layout, the path that led to the academic campus was not legible and accessible from the entrance point, as a result the graphical cues that indicated the academic campus were not sufficient. In addition, the graphical cues need to be accessible by people who may come from different cultures, backgrounds, education levels and who may speak different languages. By reconsidering the graphical cues the hospital can be a socially sustainable built environment in terms of wayfinding.

Conclusion

Wayfinding in the built environment is an important aspect of social sustainability that can be assessed by the environmental cues. People have to depend on the external information that exists in the environment and is communicated through architectural and graphical cues. However, when there is a lack of sufficient environmental cues, the needs of the people are not fulfilled during wayfinding. When there is inaccessibility to an architectural cue, a graphical cue needs to complement the architectural cue. Architectural cues and graphical cues within the built environment should be accessible to and usable by people with the widest range of abilities language, social and cultural background.

References

Arthur, P., & Passini, R. (1992). *Wayfinding: People, Signs, and Architecture*. New York: McGraw-Hill Book Co.

Borowczyk, J. (2018). Sustainable urban development: Spatial analyses as novel tools for planning a universally designed city. *Sustainability, 10* (5), 1-16. Retrieved from www.mdpi.com/2071-1050/10/5/1407/pdf

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, 19, 289-300.

Dhahri, S., & Omri, A. (2018). Entrepreneurship contribution to the three pillars of sustainable development: What does the evidence really say? *World Development*, 106, 64-77.

Dixon, T., & Woodcraft, S. (2013). Creating strong communities: Measuring social sustainability in new housing development. *Town and Country Planning Journal*, 82, 473-480.

Layas, H.F. (2017). *Analysis of the Wayfinding System in a University Based Tertiary Care Hospital.* Unpublished Master's Thesis. Ankara: Çankaya University.

Lehtonen, M. (2004). The environmental-social interface of sustainale development: Capabilities, social capital, institutions. *Ecological Economics*, 49, 199-214.

Litting, B., & Griessler, E. (2005). Social sustainability: A catchword between political pragmatism and social theory. *International Journal of Sustainable Development*, 8, 65-79.

Malkin, J. (1992). *Hospital interior architecture: Creating healing environment for special patient populations*. New York: Van Nostrand Reinhold.

O'Neill, M. (1991). Evaluation of a conceptual model of architectural legibility. *Environment and Behavior*, 23(3), 553-574.

Passini, R. (1984). *Wayfinding in Architecture*. New York: Van Nostrand Reinhold.

Strange, T., & Bayley, A. (2008). Sustainable development. Linking economy, society, environment. *Paris, France: Organisation for Economic Co-operation and Development* (OECD).

Sun, C. (2009). *Architectural Cue in Evacuation Simulation for Underground Space Design*. Unpublished doctoral dissertation. Eindhoven: Eindhoven University of Technology. Retrieved from http://alexandria.tue.nl/extra2/200910173.pdf.

Sun, C., & de Vries, B. (2009). Automated human choice extraction for evacuation route prediction. *Automation in Construction*, 18, 751-761.

Woodcraft, S. (2012). Social sustainability and new communities: Moving from concept to practice in the UK. *Procedia - Social and Behavioral Sciences*, 68, 29 – 42. doi: 10.1016/j.sbspro.2012.12.204

Woodcraft, S., Hackett, T., & Caistor-Arendar, L. (2011). *Design for Social Sustainability: A Framework for Creating Thriving New Communities*. Future Communities

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Achieving Socially Sustainable Environments through Empathic Modelling

İpek Memikoğlu[1]

[1]*Interior Architecture, Çankaya University, Ankara, Turkey, ipekmemikoglu@cankaya.edu.tr*

Abstract: Designers need to ensure the built environment is designed inclusively to satisfy the diverse requirements of the population, which is an integral part of sustainability issues. For built environments to be socially sustainable it is important that designers develop empathy towards users with diverse abilities and needs. Role-playing as a strategy of empathic modelling allows designers to experience the built environment from the perspective of the users. The aim of the study is to understand if role-playing can contribute to social sustainability and help to understand if an environment is accessible. In the study, three graduate students simulated a disabled user in a wheelchair and experienced their familiar campus environment. During role-playing, the students encountered various problems in the campus environment. It is suggested that an inclusively, socially sustainable built environment can be achieved through role-playing, and that it can help to assess the built environment in terms of social sustainability.

Keywords: inclusive design; empathic modelling; role-playing; social sustainability; built environment

Introduction

Satisfying human needs is an integral part of sustainability issues. The Brundtland Report defines sustainable development as a development "which meets the needs of the present generation without compromising the ability of future generations to meet their needs" (WCED, 1987, p.43). Social sustainability, as one of the pillars of sustainable development, focuses on how the built environment influences the quality of people's life (Borowczyk, 2018; Dixon & Woodcraft, 2013). The Young Foundation defines social sustainability as "a process for creating sustainable, successful places that promote well-being, by understanding what people need from the places they live and work" (Woodcraft, Hackett & Caistor-Arendar, 2011, p.16). Some of the criteria for social sustainability can be stated as well-being, safety, access to facilities and amenities, participation and social interaction (Dave, 2011; Dempsey, Bramley, Power & Brown, 2011; Weingaertner & Moberg, 2011). These criteria for sustainable life can be achieved through inclusively designed built environments.

The design of the built environment is very crucial since it can have an impact on the participation and engagement of people in their everyday activities. Designers need to ensure the built environment enables all people to participate, interact and access equally within society. When the users of the built environment are different from the designer with diverse abilities and needs, there is often a mismatch between the users and the built environment that causes barriers to access and use (Altay et al., 2016). A socially sustainable built environment

accommodates the needs of diverse user groups in different situations and under various circumstances.

Inclusive design, also known as Design for All (in Europe) and Universal Design (in USA) is a design approach that focuses on the principle of inclusion of all, acknowledging diversity and equality and intends to allow environments to be inclusive of all people (Altay & Demirkan, 2014; Mulligan, Calder & Mulligan, 2018). The concept provides a means for understanding accessibility and considering diversity within user groups; in other words, it intends to reflect a design philosophy that recognizes, respects and attempts to accommodate the wide range of human abilities, needs and preferences in the design of environments (Altay & Demirkan, 2014; Altay et al., 2016). Designers of the built environment are considered to be advocates for inclusive design. They need to ensure the built environment is designed inclusively to meet the requirements of the diverse population and enhance social equality (Mulligan et al., 2018).

Inclusively designed environment that is accessible is needed to sustain one's life quality. In order to understand whether the built environment is socially sustainable or not in terms of accessibility empathic modelling can be utilized. Empathic understanding refers to stepping out of the designer role and stepping into the user role who experiences the built environment (Kouprie & Visser, 2009). Empathic design enables designers to get closer to the lives and experiences of diverse users in order to understand whether their design satisfies the user's needs. Simulating the user's situation by role-playing or adoptation of a certain disability by the designer is one of the strategies of empathic design (Altay & Demirkan, 2014; Kouprie & Visser, 2009). This strategy provides a first-hand experience of what life might be like with a disability. With empathic modelling designers can simulate a disabled person and this will give them an insight to the built environment. The study proposes role-playing as a method for assessing a built environment. The aim of the study is to understand if role-playing can contribute to social sustainability in terms of accessibility and help to understand if an environment is socially sustainable or not.

Methods

The qualitative study consisted of three graduate students' experiences during a simulated disability. The students, who were enrolled in an inclusive design course in the Interior Architecture department at Çankaya University in Ankara, Turkey, had to experience their campus environment by simulating a user in a wheelchair. Mobility impairment was

preferred to explore accessibility in the built environment. The students were asked to perform their regular everyday activities of a weekday in their familiar campus environment located in Balgat district and indicate the problems they encountered. Mulligan and colleagues (2018) claimed that "experiencing a familiar environment with a simulated disability allowed the participants to identity aspects of the environment that were disabling as they could compare their customary experience of the environment to one that they would not normally experience" (p.238). The activities that were performed by the students were: crossing the road, entering and exiting the building and classrooms, using the restroom and cafeteria facilities.

Findings and Discussion

Simulating a disabled person allows students to experience a situation that could be dangerous, expensive and impossible (Altay & Demirkan, 2014). Role-playing as a simulation method helps to build an understanding of how life is experienced by diverse users (Altay & Demirkan, 2014). In addition, it provides an understanding of the in/accessibility of the built environment. Simulating a disabled person in a wheelchair gave the students a firsthand experience of what life would be like with a disability.

According to the experiences of the students, getting around the campus was impossible in a wheelchair. Although they were familiar with the campus environment, they indicated that being in a wheelchair restricted their interaction and encountered various problems of access and safety. After entering the campus environment, they could not use the sidewalks since there were no curb ramps, as a result they had to use the road and their lives were in danger by the passing cars. Building entrances were inaccessible since it consisted of steps and ramps were not provided. The students commented on other problematic areas on the campus, such as obstacles being too close to sidewalks, inaccessibility of the circulation system inside the building, inaccessibility of the classroom, restroom and cafeteria facilities and amenities. The buildings in the campus consisted of four floors and were connected to other at different levels; however, there was no elevator and a ramp inside the buildings. As a result the students had request help from their friends to reach the various levels inside the building. With empathic modelling the students were able to assess and experience the campus environment from the perspective of a disabled person. They noted that the activities they performed in their normal daily lives were restricted causing frustration and annoyance. The campus environment did not ensure safety, accessibility, inclusivity and sustainability. It can be stated that empathic

modelling as role-playing can be element of social sustainability and help to understand if a built environment is socially sustainable.

Conclusion

The built environment has a direct impact on the experience of all the people. Inclusive design, as a design approach, aims to create sustainable environments where every person can participate, interact, access and satisfy their needs without difficulty. Designers of the built environment are considered to be advocates for inclusive design. They need to ensure the built environment is sustainable and designed inclusively to meet the needs of the diverse population. For built environments to be socially sustainable it is important to establish empathy between designers and users. When designers understand the built environment from user's perspective, they will ensure well-being, participation, social interaction, safety and access to facilities and amenities. This study suggests that role-playing of a disabled person as a strategy of empathic modelling can help to assess the built environment in terms of social sustainability.

References

Altay, B., Ballice, G., Bengisu, E., Alkan-Korkmaz, S., & Paykoç, E. (2016). Embracing student experience in inclusive design education through learner-centred instruction. *International Journal of Inclusive Education*, 20(11), 1123-1141.

Altay, B., & Demirkan, H. (2014). Inclusive design: Developing students' knowledge and attitude through empathic modelling. *International Journal of Inclusive Education*, 18(2), 196-217.

Borowczyk, J. (2018). Sustainable urban development: Spatial analyses as novel tools for planning a universally designed city. *Sustainability, 10* (5), 1-16. Retrieved from www.mdpi.com/2071-1050/10/5/1407/pdf

Dave, S. (2011). Neighbourhood density and social sustainability in cities of developing countries. *Sustainable Development*, 19, 189-205.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, 19, 289-300.

Dixon, T., & Woodcraft, S. (2013). Creating strong communities: Measuring social sustainability in new housing development. *Town and Country Planning Journal*, 82, 473-480.

Kouprie, M., & Visser, F.S. (2009). A framework for empathy in design: Stepping into and out of the user's life. *Journal of Engineering Design*, 20(5), 437-448.

Mulligan, K., Calder, A., & Mulligan, H. (2018). Inclusive design in architectural practice: Experiential learning of disability in architectural education. *Disability and Health Journal*, 11, 237-242.

Weingaertner, C., & Moberg, A. (2011). Exploring social sustainability: Learning from perspectives on urban development and companies and products. *Sustainable Development*, 19, 289-300.

Woodcraft, S., Hackett, T., & Caistor-Arendar, L. (2011). *Design for Social Sustainability: A Framework for Creating Thriving New Communities*. Future Communities

World Commission on Environment and Development (WCED) (1987). *The Brundtland Report: Our Common Future*. Oxford: Oxford University Press.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

How can we make sustainable design?

Maria Dolores Morelli[1]

[1]*Departmet of Architecture and Industrial Design, University of Study of Campania "Luigi Vanvitelli" , mariadolores.morelli@unicampania.it*

Abstract: This paper wants to provide a new approach for design project and is an operational guide for designers who want to achieve sustainable products. Those designing in the field of architecture have an endless series of treatises, manuals, stories, magazines, to deduce rules (Vitruvian Triade). This does not happen in the field of design where even if there is "history" (De Fusco, Storia del Design), there is no essay, only some manuals, few scientific journals from which it is possible to understand solutions produced for use and consumption, but not the rules of the design project, especially for sustainable design. Actually, the principles stated in some of the most important architecture treaties can be used to make sustainable design, such as the *oixonomia* that is the use of limited resources to meet the individual and collective needs reducing the costs, through a system of essential parts linking the form to the function.

Keywords: design, manual, sustainability, requirements, criteria

Introduction

Most of the literature on design is historical, theoretical, sociological, advertising, or didactic-conceptual, we can rarely read operational guides on how to make industrial design products. It seems to embody the old aphorism "who knows how to do it is the doer and who does not know how to do it is the teacher" **(**D'Auria, A., R , De Fusco, R.,1992).

"There are four stages which make the design experience a unitary process: the project, the production, the sale, the consumption ... . A corpus formed by all four aforementioned parameters, like a sort of four-leaf clover, an only process constituted by four parts" (De Fusco, 1985). This essay aims at analysing this structure focussing on the "project" component in its specific objective to produce objects of "sustainable design".

The adjective "sustainable" comes from the Latin *sustinere*, since 1980s, the term sustainability has been used with the meaning of "human sustainability on the Earth", giving rise to the most famous definition of sustainability that is the "balance between the satisfaction of present needs and the possibility for future generations to cope with their own"[1].

[1] Brundtland Report (1987)

The above definition highlights the difference between the meaning of "design sustainability", and the large-scale design and architecture design sustainability.

Urban or territorial planning takes a long time and certainly must be aimed at the transmission and preservation of the present assets to future generations; we can use the phrase “sustainable future generations”; on the other hand it is very difficult to speak of "sustainable design" because if the artifacts are responding to the needs for which they have been realized, for the most part, they are not sustainable because they won’t be available in future, as they are aimed at the satisfaction of present needs.

It is therefore necessary to widen the definition of "sustainability" in the field of design, not only as "design of new products, resulting from a compromise between environmental and technical-economic parameters, the evaluation of impacts and the choice of materials, forms and structures ...or product design through the application of rules and indications orienting the production of new objects, taking into consideration also the needs of the ecosystem. The sustainable design is consequently no longer exclusively charged with the environmental impact of the product: the latter becomes one of the essential requirements of the project"[2], not even the development of ecodesign based on reduction, reuse and recycling, assembly/dismantling/self-construction, use of clean and renewable energies, reduction of harmful emissions, choice of materials, analysis, certification and de-materialization of the product-service is sufficient; it is necessary to say again that the more the object of design is used, the more sustainable it is, and it is sustainable as it originates from an accurate design process.

Methods

So "How can we make sustainable design?":

It is advisable to keep in mind the following steps: observing people and things in order to recognise the (material and intangible) necessities as well as the latent needs; determining a morphological and technical reduction of the functional idea; decomposing and reordering the parts of the designed model; selecting materials for the product; communicating the plus of the product in the "formal sequence" of belonging; combining "pre-existing elements in new useful and smart combinations "(Poincaré, H., 1906). This

[2] http://www.treccani.it/enciclopedia/sostenibilita/

method starts from the contraction of the meaning of "sustainable" referring to design as a series of parameters to which, the object considered as such (sustainable artifact) must respond; parameters coming from the statements on the architecture contained in the famous text of Vitruvius and in the subsequent treatises, which can be widened to design.

"The achievements ... are to be carried out in a way that takes into account the solidity, the usefulness and the beauty. The principle of solidity will be respected if pillars sink to the compact ground and material is selected in an accurate way, without any saving in relation to tools and quantities; the principle of usefulness will be satisfied in presence of a proper organisation of spaces so that they are adequately distributed according to the required exposure with no obstacle to their use; the principle of beauty requires some pleasant and smart work and an accurate modular relationship between the different elements and their proportions" (Vitruvio, I sec. d.c.). In the 17th century, Perrault, C., (1673), defined the incisive Vitruvian Triad: firmitas (solidity); utilitas (use); venustas (beauty).

Coming back to the well-known triad sub species design we could say that the firmitas (solidity) can corresponds to the feasibility, analysis of the structure necessary and sufficient to the conformation of the product, the utilitas (use) the function, appropriate use of the product in the human/environment relationship; the venustas (beauty) the form, thought as an outward connotation, the result of a clear and conscious design evolution.

Vitruvius states "the system (in Greek taxis), the arrangement, in Greek *diáthesin*, the *eurythmy*, the *symmetry*, the *decor*, the *convenience* and the *distribution* (*oixonomía*). The system consists in adapting to the right measure the elements of a work taken individually and setting the proportions for the purpose of symmetry. It is based on the "quantity", *posótēs*. "Quantity" means the adoption of the modules on the basis of the elements of the work itself and, in relation to the individual parts of its elements". Referring to design, we could say that the relationship between the parts composing an object, considered both individually and in their relationship, is based on the quantity through the unit of measure.

Among the six Vitruviane categories, the most important one for design is symmetry, which is not only the richest of aesthetically critical meaning but includes other components.

Using the classic four-principle scheme for the processing of design objects, projects, production, sales and consumption, we can state that while the system is necessary to determine the size of the object, the arrangement is used for a concrete dimensional and representative restitution of the same, as the *eurythmy* serves to modulate proportionally the parts of the object, the *symmetry* establishes the correspondence between its parts, the convenience (the *Decor*) allows formal communicative adequacy, *distribution* (economy) is

necessary in the compositional and conformal processes of the design product characterized by elements and parts appropriate to its function (almost a "Tailor-made" model) and its cost-benefit.

Given that the 6 categories should regulate the 4 phases of the design processes in accordance to their multiple meanings, it is also true that the *ordinatio*, the *eurythmy*, the *symmetry*, the *dispositio*, the *decor*, the *economy* characterize all the "project" stages; The *dispositio*, the decor and the economy are necessary to the phase of "production", the decoration and the economy to the phase of "sale", the economy to the stage of consumption. All the categories as defined relate basically to the relationship between the function and the shape of the design object and the distribution of its components in relation to its use, it seems significant to consider, with respect to the definition of the aesthetic effect of its products a multiple randomness, a concert, an agreement of factors or the *concinnitas*. This concept goes back to L.A. Alberti's idea of beauty..

In order to design and produce sustainable artifacts it is also necessary to re-read the treatise of Francesco di Giorgio Martini, who first spread the Vitruvian opera making it really understandable and usable, with practical spirit through texts and drawings that he distinguishes as meaning and sign of the speech and a whole series of precepts set down into the constructive practice, entirely aimed at the constitution of a system. He neglects the connection of the elements, does not embody the principle of vitruviana symmetry (given for obvious and discounted) to focus on the principle of "sol radice" (a single root) that was the key of the whole system.

Conclusion

We can state that the *decor* is the refined form of the object, resulting from a suitable choice of each of its parts, corresponds to the convenience, the custom, the nature and can be defined with the contemporary term of ecology; whereas for the *oixonomia* that is the use of limited resources to meet the individual and collective needs reducing the costs, through a system of essential parts linking the form to the function, the *dispositio*, the order and the symmetry define the object in a weighted, proportional and harmonic way. All these parts together *concinnitas* showing us the usefulness and the value of an object through their communicative ability, are such to promote the empathic role of the object "the architecture is to move us" (Le Corbusieur,1921), as "a good sustainable design".

References

D'Auria, A., De Fusco, R. (1992). *Il progetto del design, per una didattica del disegno industriale*. Milan: Etas books.

De Fusco, R., (1968). *Il codice dell'architettura, antologia di trattatisti*. Naples: E. S. I..

De Fusco, R., (1985). *Storia del design*. Rome-Bari: Laterza.

Perrault, C., (1673). *Les Dix Livres d'Architecture de Vitruve Corrigez et traduitz nouvellement en françois avec des notes et des figures*.(1.ed.) Paris: Jean Baptiste Coignard.

Vitruvio, (I sec.d.c.) *De Architectura* (vol.I, edited by Pierre Gros, trad.e com. of Corso, A., and Romano, E.,) Turin: Giulio Einaudi publisher,

http://www.treccani.it/enciclopedia/sostenibilita/ (consulted the 01/07/2018)

https://www.are.admin.ch/are/it/home/sviluppo-sostenibile/cooperazione-internazionale/l_agenda-2030-per-uno-sviluppo-sostenibile/onu-_-le-pietre-miliari-dello-sviluppo-sostenibile/1987--rapporto-brundtland.html (consulted the 01/07/2018)

GCRIS

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Design Strategies for Natural Ventilation

Francesca Muzzillo[1*]

[1]*Dipartimento di Architettura e Disegno Industriale, Università della Campania Luigi Vanvitelli, Italia, francesca.muzzillo@unicampania.it*

Abstract: The paper is focused on an interpretation of ventilation as a fundamental aspect of designing a building, both into traditional architecture and sustainable contemporary architecture. Through a series of case studies and a personal research conducted on the theme, the author finds a strictly bound relationship between the shape of a building and its ventilation behaviours. In conclusion through this results convincement a return to a Total Design is suggested.

Keywords: Ventilation; Innovation/Tradition; Shape-Requirements Coherence

Introduction

A fundamental step in a sustainable design process consists in taking advantage of natural ventilation, in order to reduce carbon footprint into building life. Air, considered just as a real construction "material", becomes part of a sustainable architecture.

Benefitting of the intuitions of Susan Roaf's pioneering studies, many contemporary architectures compound innovative technologies with the basic Asian traditional ventilation strategies. A particular example of Breathing Building was some years ago based on researched originally conducted at the BP Institute in Cambridge to develop understanding of ventilation flows, and their interface behaviours with thermal mass.

The consideration of ventilation has been in many studies valued not just as an isolated factor, because it is important checking not only the bioclimatic performance of the building, but it is also relevant considering habitants sense of wellness, which is a question of culture. A convincing study has been made by Nicol Fergus focusing in fact on maximizing bioclimatic previewed comfort in building design by adapting it to the heterogeneous needs and habits that people have across different groups and areas. In particular, the research benefited from the Nicol Graph, which is a "tool for understanding how much heating or cooling is required to provide comfort in a building in a particular place, for local populations". (N.Fergus, M. Humphreys, S. Roaf, 2012).

Methods

In the research we have considered detailed accounts of selected architectures, which are emblematic of the coherence between the whole design data and the promotion of ventilation. This approach has been extended considering it as a starting point for a wider coherence between bioclimatic solutions and architectonic shape. The method has been deducted by the fragmentation of the singles buildings in elementary environmental units and in the subsequent unification in a complex series of system portions. However, in this extended abstract, because of the restricted dimensions of the text, only one case of traditional architecture, one case of Modern Movement and two cases of contemporary innovative buildings have been selected. Each case has been chosen for the design choices that correlate shape of the building with the preventive quantitative relation between air movement and the conduction medium, carrying out results on natural ventilation. Starting from some relevant design points (section height, depth of cavity for vertical ventilation, type of finishing and geometrical model), the architectural process is often structured in relation to three relevant design conceptual areas for a building section: joints, borders, and connections, as capable to encourage vertical air movement.

We know that the relationship between architecture and air movement is not new. In South Italy the so-called Zisa in Palermo is to be considered emblematic with respect to this approach. It has a natural ventilation system which even today after many centuries is surprising for its strategic intuitions: the building consists into a parallelepiped and two towers. On the ground floor there is a fountain which ends in a tub in the front of the building contributing to the cooling and the towers behaviour like ventilation chimneys.

Another image that comes to mind when thinking of air movement in architecture is the project for Villa Baizeau, in a suburb of Tunis, by Le Corbusier (see fig. 1). The realized project is different, with terraces encompassing the house in order to enjoy the view of the sea, as Lucien Baizeau desired. Also in this second solution, the way in which natural movement of air is caused by pressure differences reminds Villa Shodhan which Le Corbusier designed years late. Already looking at the sketches, it appears that the very architectural idea for Villa Baizeau was founded on air ventilation.

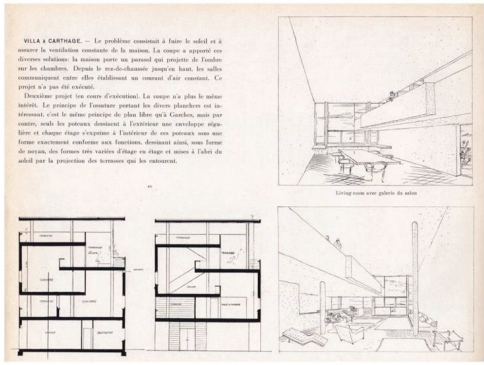


Figure 1. Page from *Le Corbusier, Oeuvre Complète*

Nowadays the need for natural ventilation technologies is progressively emerging in almost every context, as mechanical ventilation systems use too much energy to control temperature and the recourse to natural ventilation is a mean for significantly reducing energy consumption. So, just when architects conceive their ideas for a project, the variation in air pressure features among the primary concerns for buildings design.

There are very interesting examples in which the form of the entire building may be considered to be working with the goal of a good ventilation and in some case they behaviour entirely "as a chimney". In these examples the shape of the building is strictly related to the way in which vertical air movements behaver. The Hive by Feilden Clegg Bradley Studios, which features a chimney-like roof that induces air flow. Also some small houses in Kildare, Ireland, by Dot Architecture have a particular profile which induces air movements (fig.2).

Figure 2. Houses in Kildare, Ireland, by Dot Architecture (ph courtesy Dot Architecture)

Findings and Discussion

In the research a series of buildings have been analysed, in which the architectural idea seems to be founded on air ventilation. It would be too long here to refer to each analysis, which have been reported in a wider space into a publication (Muzzillo 2016).

But we can say, summarizing them, that the examples are used as a starting point for a wider reflection on the adaptability of the bioclimatic solution to the architectonic shape, on the correspondence between a performance of an innovative building system and the consequent choice of trying to give visibility to this technological performance into the outside aspect of architecture itself. In this perspective, a strategic design process could emphasize the behaviour of a technological design choice, while highlighting interactions among design and technologies in a way that let them become relevant to perception.

We could consequently wonder now whether or not there is a relationship between an adopted technology, on one hand, and a particular spatial organization, on the other one. And the answer is obviously: yes, there is often a strict connection, but It would be desirable that such a connection would always exist.

"Innovation" and "sustainability" are the distinctive, present-day signs of architecture. But, even if we cannot deny here the relevance of these two terms, nowadays, such as in ancient buildings where aesthetic appearance had got a relevant considerable importance, spatial aesthetic shouldn't have less significance, even if compared with these two relevant aspects. Like in the past also today, in order to work for a more sustainable built environment, an appropriate architectural design is necessary and, in order to underline the formal appearance of technological choices, it may result in a good mean of a technologically-informed approach. This approach could in fact be a potent instrument of communication raising awareness over the relevance of new needs.

Conclusion

In this work I have substantially worked on the idea of "technology appearance", as referred to the focus of ventilation, but it could otherwise have been related to any other focal point. In fact technological performances are the results of the "technological integration" into the architectural conformation of a building.

Looking at the case studies, it is possible to recognise how innovation into architecture technology has a successful reply when it is coherent with the design aesthetic research. It is

also most important that the technological behaviour could be well visible and understandable so that technological systems provide a visible framework of the building performances and the system remains comprehensible to people.

At the same time building maintenance and components replacing become easier when technological components are not hidden inside the building envelope. In fact, thanks to the accessibility, it is possible to periodically check performances so the whole "architectonical endurance" would improve.

This approach could be referred to an old intuition of Walter Gropius when he understood that the "great total work of art, this cathedral of the future, will then shine with its abundance of light into the smallest objects of everyday life". This experimentation would lead back to the central problem of different conceptions attributed to "art" and "technique". Art and technique remains in a one to one relationship in the "Gropius' Total Design", which we need again. (M. Wigley 1999). Wigley's theoretical position looks back to the focusing of design on a strategy of controlling every element in a systematic mental structure, and could so be synthetized: a vision "about architecture as control", a control which is modulated in a structural system. The ventilation building behaviour is in this approach only a part of the Total Design, with the ventilation response as element of the entire system designed to increase the chances for hypnotised outcomes.

References

Argan, G.C. (1951), *Walter Gropius e la Bauhaus*, Einaudi, Torino.

Fergus, N.,Humphreys M., Roaf, S., (2012), *Adaptive Thermal Comfort. Principles and Practice*, Routledge, London and New York.

Muzzillo, F. edited by, (2016), *Tall and Narrow. Chimneys for Bioclimatic Architecture between Tradition and Innovation*, La Scuola di Pitagora, Napoli.

Sobin H. (2007), *From l'Air Exact to I'Aérateur: Ventilation and its Evolution the Architectural Work of Le Corbusier*, in The Green Braid, Routledge, London 2007, pp. 140–52.

Wigley, M. (1998),*Whatever Happened to Total Design?*, «Harvard design magazine» n. 5, Summer, pp. 18-25.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Blockchain technology: opportunities for sustainability of construction sector

Nadia Netti[1*], Monica Cannaviello[2]

[1]DEMI, University of Naples "Federico II", Naples, Italy, nadia.netti@unina.it
[2]DADI, University of Campania "L. Vanvitelli", Aversa (CE), Italy, monica.cannaviello@virgilio.it

Abstract: The main innovations related to Blockchain technology and explores the possible benefits that can arise for architecture and construction sector. This technology could be useful especially in managing the construction process which can be controlled digitally, storing information on the network in a secure way, reducing risk and making the transformation more resilient. The contribution it can make to the building sector in managing the consumption of non-renewable energy resources can be potentially significant. Blockchain technology, in fact, which shows its most critical point precisely in the enormous energy consumption associated with its operation, could, in some ways, revolutionize the energy sector, changing the way we produce, and especially how we exchange energy. The different applications of Blockchain technology could promote the use of renewable energy sources in the building sector through more efficient energy management.

Keywords: Blockchain technology; building sector; energy sustainability.

Introduction

A blockchain is a decentralized database or distributed digital ledger able to store all the transactions, events, information relevant between parties. It is the technology underlying cryptocurrencies such as bitcoin. blockchain and smart contracts help reducing transaction costs and increasing liquidity disintermediating much of the service sector in different fields:

- in the traditional banking sector
- in financial sector (from market –makers on)
- in logistic and transportation industry
- in healthcare
- in the utility sector
- in real estate
- in the government and military sectors.

Blockchain technology in the construction sector

This technology could be useful in the construction sector, especially in managing the construction process which can be controlled digitally, storing information on the network in a secure way, reducing risk and making the transformation more resilient. In fact, the blockchain can be a useful infrastructure in the management of information during all phases of the life

cycle of buildings (Turka&Klincb, 2017), not least that of the construction site. Blockchain manages information about who did what and when and it reduces the possibility of misunderstandings and, therefore, legal disputes.

Although the project is managed with Building Information Modeling (BIM), Blockchain can help to:

- Rationalisation of internal resources: organisation and planning of activities to improve environmental management and avoid unnecessary bureaucracy;
- Better working environment: involvement and participation of all workers in the management of environmental issues, to promote a more attentive and aware mentality, also outside the working environment;
- Control and reduction of negative impacts on the environment: improvement of the management of the activities and services provided by the construction company;
- Energy and raw material savings: Identification of potential reductions in the energy sector and in the use of raw materials through centralisation of information on energy consumers and producers;
- Constant control of compliance with the law: constant verification of compliance with regulatory requirements and constant collaboration with the surrounding communities and the authorities in charge of controls;
- Competitive advantage also in the field of public procurement for companies with a centralized and secure management system.

Reliability is the keyword both in the construction phase (construction records, work performed and quantity of materials expected and then used.), and in the maintenance phase of the building once built (secure storage of data sensitive to privacy).

By smart contracts it is possible to minimize the need for intermediaries between parties engaged in each transaction ensuring trust by independent automatic executions of contractual terms on the nodes of the decentralized network of the blockchain technology by self-executing codes triggered by automatic mechanisms

Nach and Ghilal (2017) list four types of blockhcain:

1) The public blockchain is without restrictions on reading data and submitting transactions.

2) The private blockchain gives direct access to data and transactions to limited predetermined unknown entities.

3) The permission-less blockchain is without restrictions on users able to create blocks of transactions.

4) The permissioned blockchain has a predifined list of subjects with known identities.

By smart contract, it is possible to minimize the need for paper documents (bills, letters of credits, sales contracts, rent contracts, charter contracts, …) by scripts stored on the blockchain that ensure each part of transaction against unauthorized operations by an incorruptible digital resource (e.g. digital ownership certificates impossible to be replicated.

Blockchain and energy sustainability for buildings

Currently, one of the most critical aspects related to the use, in any sector, of Blockchain technology, is its consumption of non-renewable primary energy connected to the "mining" process on which the Bitcoin cryptocurrency is based. This process requires, in fact, a very high amount of electricity to solve the complex mathematical problems necessary for each transaction: "The power currently used for Bitcoin mining is comparable to Ireland's electricity consumption" (O'Dwyer et Malone, 2014).

From an initial assessment, it therefore appears that, at present, the Blockchain is, from the environmental point of view, anything but sustainable.

However, despite this criticality, Blockchain could play a decisive role in the energy sector. In fact, the many applications based on blockchains are able to revolutionize the way of producing, consuming and exchanging energy, through the creation of a decentralized system capable of managing the flow of energy distribution in a totally new way.

Through the Peer to Peer system, end users in the energy market will be able to exchange self-produced energy with each other and receive payments in real time, without passing through retailers.

Recent studies have investigated "the concept of a blockchain-based microgrid energy market without the need for central intermediaries", and it demonstrates, through the analysis of the Brooklyn Microgrid project, that "blockchains are an eligible technology to operate decentralized microgrid energy markets" (Mengelkamp et al, 2018).

This could represent a turnaround in the sector of renewable energy sources applied to the building sector. In recent years, generation from distributed renewable energy sources has undergone a series of ups and downs, but in order to promote widespread use at building level, without jeopardising the current energy system, it is necessary to ensure a reliable balance between generation and consumption of energy different from that traditionally used, through

new market approaches and, in particular, through the creation of new local energy markets. And it is precisely from this point of view that new technologies, and in particular Blockchain, can make the greatest contribution, transforming the traditional electric system, strongly centralized, into an enormous distributed network.

Consequently, the market for renewable energy sources applied to buildings could be driven and supported by the applications of the Blockchain technology through:

- Construction of open-source networks and infrastructures to accelerate the spread of renewable energy sources (as is happening, for example, thanks to the non-profit Energy WEB Foundation);
- Application of smart meters to measure the amount of energy produced and consumed;
- Simplifications relating to Certificates of Origin (which would lead to decentralised management of Green Certificates);
- Invoicing simplifications.

The creation of independent and isolated micro-networks makes it possible for the "prosumer" not only to consume energy but also to become producer and seller at the same time. The aim is to bring the final consumer to a greater control over the entire supply chain, and to the autonomous management of its energy supply contracts, encouraging him, in fact, to invest in renewable energy sources. This would make buildings and neighbourhoods not only more energy efficient, but also more resilient to the problems of power peaks and power outages, as they are independent of the core network.

Conclusions

What role does Blockchain technology play in the fight against climate change?

A controversial role that offers interesting insights and perspectives. It can be a turning point in the energy market and, above all, in the decarbonisation of the building sector.

According to the IEA, investment in energy efficiency in buildings still has an untapped potential (of around 80%), which is due to the high risk perception of energy efficiency projects. The Blockchain model, which is based on the trust generated by its main register, applied to the energy market and in particular to renewable sources, can help to reduce the perception of risk in the end user, leading to a significant increase in investments, with enormous benefits for the energy sustainability of the construction sector.

Aknowledgments

The paper is the result of a research work conducting by the Research Group "Nearly Zero Energy Building-NZEB" of DADI - University of Campania "L. Vanvitelli", in collaboration with the Economics Group of the University of Naples "Federico II". In particular: N. Netti is the author of: Introduction; Blockchain technology in the construction sector. M. Cannaviello is the author of: Blockchain and energy sustainability for buildings; Conclusions.

References

Mengelkamp E., Gärttner K., Rock J., Kessler S., Orsini L., Weinhardta C., (2018) Designing microgrid energy markets: A case study: The Brooklyn Microgrid. Applied Energy, Volume 210, 15 January 2018, pp 870-880.

Mengelkamp E., Notheisen B., Beer C., Dauer D., Weinhardt C., (2018) A blockchain-based smart grid: towards sustainable local energy markets, Computer Science - Research and Development, February 2018, Volume 33, Issue 1–2, pp 207–214.

Nach and Ghilal, 2017, Blockchain and Smart Contracts in the Logistic and Transportation Industry: the Demurrage and Maritime Trade Use Case

Turka, Ž., Klincb, R., Potentials of Blockchain Technology for Construction Management. Procedia Engineering, Vol. 196, 2017, 638-645. doi.org/10.1016/j.proeng.2017.08.052

O'Dwyer K.J., Malone D., (2014) Bitcoin Mining and its Energy Footprint. 25th IET Irish Signals & Systems Conference 2014 and 2014 China-Ireland International Conference on Information and Communications Technologies (ISSC 2014/CIICT 2014), 2014 p. 280 – 285

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The actuality of *MAT-Building* or the *deployed hub* in the suburban contemporary territory

Gaspare Oliva[1]

[1]*Department of Architecture and Industrial Design, Università della Campania Luigi Vanvitelli, Aversa, Italy, gaspareoliva@tiscali.it*

Abstract: The research proposes an operational strategy for the transport interchange nodes within the contemporary suburban area, with reference to the small towns and the interurban scale of intermodal transportation. This hypothesis wants to overcome the current *capsular* condition of the interchange nodes that is characterized by the separation from the surrounding context, the tendency to the formation of an autonomous and self-sufficient internal environment, the banalization of external characters with formalistic drifts. The *deployed hub* concept here proposed is based on the possibility of opening the capsule and it looks at the interchange as a system of architectures, extending the function of the transport interconnection to parts of the city and portions of territory. It starts from the operational paradigm of the *MAT-Building* and therefore assumes the connective spaces as structuring elements of the composition.

Keywords: train station; mat building; mobility; interchange node.

Introduction

With reference to the settlement condition of the contemporary suburban territory, this contribution proposes an alternative operational strategy for the interchange node project. This one, that can be considered the most recent moment of the train station type's evolution, puts together the function of the access to the mobility web, that is the foundational reason of the station as equipment, and the function of the interconnection between the various means of transport, that is the foundational reason of the integrated mobility web in the frame of intermodal transportation.

This research has a double aim regarding the architectural and territorial scales. On the one hand, we propose the overcoming of the *capsular* condition of the interchange node (a condition that will be more widely explained and clarified below) in order to change these introverted, self-referential and disconnected spaces with respect to their surroundings into collective places, introducing this way the collective dimension into a spatial entity which proves to be endemically deprived and which tends systematically to its reduction or expulsion. On the other hand, within a general hypothesis of construction of a polycentric

order for the contemporary suburban territory referring to the urban model of the *open city*[1] , nodes, conceived as open and collective places, can represent territorial benchmarks, defining recognizable urban parts in the generic sea of suburbanization. They can stand as coagulation points of a new urbanity, they realize by virtue of their intrinsic ability to attract centralizing and collective uses determined by their status of points of maximum accessibility of the territory and maximum concentration of people's flows.

Methods

The research starts from the recognition of main critical issues of the current and widespread conception of interchange nodes, expressed in the enucleation of some peculiar characteristics of the capsular condition.

The second step regards the definition of an alternative strategy based on the suggestion proposed by Marcel Smets in the paper *Open Up the Capsule!* through a pharmacological metaphor: *"You have to open the capsule, spread its contents on the table and see what is really inside"* (Smets, 2007). The capsule containing medicine corresponds obviously to the interchange node, with respect to which he proposes the opening towards the city and the territory: the collective uses absorbed by nodes must be turned outwards and the nodes themselves must be made freely passable through the implementation of accessibility. They can be thus elevated from the status of non-places to the status of collective spaces through the elimination exclusive accessibility forms.

The model here proposed, which I define as *deployed hub*, starts from this reflection and considers the node as a system of architectures: all the component parts, previously contained within a unifying envelope, become concluded and recognizable architectural parts. They are suitably interconnected and they extend the function of the transport interconnection (and all the minor uses connected to it and dependent on it) to entire portions of the territory creating this way the so called *area-node*.

The objective of this work is not the elaboration of a specific and singular project, but rather is the definition of an operative strategy, that is a compositional solution characterized

[1] *Open city* is an idea of a progressive city compared to the shape of the current cities, complementary to the closed city. This hypothesis was developed in the Twentieth Century by the authors of the Modern Movement who have taken presuppositions from the urban theories of the Enlightenment.

by a great level of generality permitting its use in similar cases with the guarantee of different outcomes. In this frame, the *MAT-Building*, as conceived by the Cadilis-Josic-Woods group in the Sixties and assumed here as a compositional procedure and not as a type, is identified as the reference for the deployed hub.

The conclusion is represented by a design application using the Mat-Building for the project of an interchange node in Santa Maria Capua Vetere, a small town near Caserta, in Southern Italy.

Findings and Discussion

Most of the recent interchange nodes, especially nodes with a high rank and big dimensions, are characterized by a notable internal wealth and variety, which comes from the large quantity and heterogeneity of hosted uses and from the technical necessities due to the technological and management evolution of transport webs, which corresponds to a banalization and simplification of characters and morphology of the node-station, that presents itself more and more as a homogeneous and unifying envelope, often affected by the contemporary tic of formalistic spectacularization.

As mentioned previously, Smets spoke about capsules, that are environments or self-sufficient systems interconnected one with another, through the same infrastructural network, yet separate and indifferent to their surroundings:

> The capsule is a device which creates an artificial environment and minimizes communication with the outside through the formation of its own space-time context, a sealed environment.

The capsular condition, with reference to the interchange node, is expressed through a peculiar phenomenology that we can summarize in several points, which are listed below:

- The fagocitation, by the equipment, of some properly urban activities, such as commercial ones, which can affect its transport functionality and can impoverish the surrounding context by subtracting elements of urban liveliness and social control devices. This is the case of the numerous renovations of old stations that are colonized by commercial chains becoming real *shopping centres for travellers* (See Figure 1.).

Figure 1. ECE GmbH, Station Central Leipzig renovation (Germany, 1994-1997).

- The phenomenon of closure with respect to the surroundings, that corresponds to the separation and isolation of the equipment, which manifests itself in two distinct ways. On the one hand there is the limitation of accessibility to the equipment, determined by safety reasons and addressed to the optimization of transport functionality, which becomes concrete in the privatization of mobility spaces and in the consequent limitation of social interaction forms that are the basis of the formation of public spaces (See Figure 2.). On the other hand, there is the formal indifference to the surroundings manifesting itself in a spectacular expression flatted on the external image, as happens for example in World Trade Centre Transportation Hub in New York City completed by Calatrava in 2015 (See Figure 3.).

Figure 2. Queues for security controls at Tiantongyuan North Metro station in Beijing (China) after the terroristic attacks of autumn 2015 in France.

Figure 3. Calatrava S., World Trade Center Transportation Hub, New York, 2015.

- The complexification of internal spatiality aimed at simulation of the wealth and variety of urban space, so that the *capsule* could show itself as an alternative to the city.
- The issue of large dimension that can be found in many interchange nodes and which maximizes the anti-urban ambition of the node as a capsule by connecting the same concept of *capsule* to the Koolhaasian concept of *bigness*.

In this scenario, we use the *Mat-Building* as a strategy for the conformation of the *deployed hub*. Leaving aside the many examples of this type of artefacts proposed by Alison Smithson in 1974, here we can define the *Mat-Building* starting from the theory developed by Shadrach Woods[2] and from the two projects developed by the team Candilis-Josic-Woods for the reconstruction of a central area in Frankfurt, bombed during the Second World War (1962), and the Berlin Frei Universitat (1964) (See Figure 4.).

[2] We are referring to Stem and Web theories (Woods, S. (1962). Web. Le carré bleu, 3).

Figure 4. Candilis G., Josic A., Woods S., Berlin Frei Universitat, the realized building.

These are grid-like buildings with a prevalent horizontal development (plates), with one or more levels, in which structuring elements with a linear development and with a connective function determine meshes accommodating spatial modules hosting served uses. We are facing an entity that is both architectural and urban, an *edificiudad* (Muro, 2011), an articulated artefact referred to the scale of the city, that reproduces in its interior spaces the complexity, the articulation, the density and the spatial richness of the city. It is a world-building, an entity capable of dialoguing with the landscape and geography, which starts from the centrality of the action of connecting and which considers the places of connection as public spaces dedicated to relations between people (See Figure 5.).

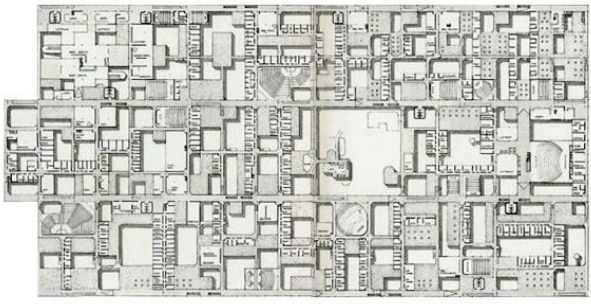


Figure 5. Candilis G., Josic A., Woods S., Berlin Frei Universitat, plan of the first floor.

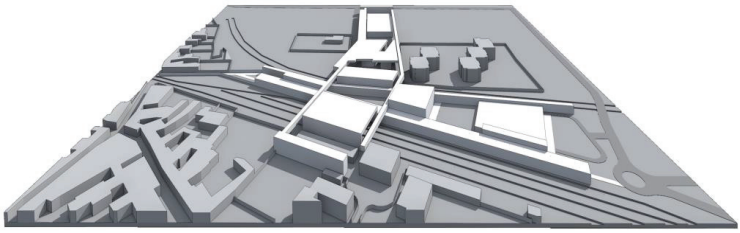


Figure 6. The *deployed hub* in Santa Maria Capua Vetere. The digital model.

The design application developed for the interchange node between the railway line, the regional subway line, which follows the route of a disused railway line, and public and private road transport has four connectors: two of them act in an east-west direction wedging between the two parallel railway lines, they are articulated on two levels and host commercial spaces; the other two stands as hanging decks and connect the old station square with the urbanized countryside climbing over the tracks. Between the different structuring paths there are all the served spaces that are interspersed by open spaces, gardens and courtyards that open onto the city and the surrounding urbanized countryside (See Figure 6. And Figure 7.).

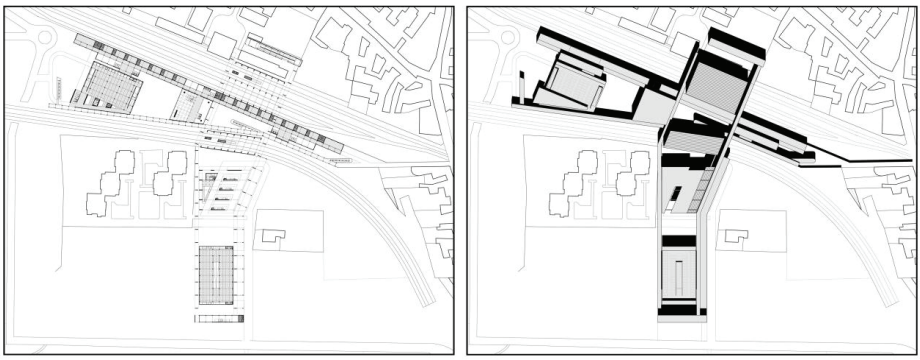


Figure 7. The deployed hub in Santa Maria Capua Vetere. Plan of the first floor (left), mass plan (right).

Conclusion

In the sustainable transformation of the mobility network, the most advanced theories overcome the traditional approach characterized by the flattening on technological innovation *strictu sensu*: it is now clear that research about construction of more efficient engines and

clean fuels cannot alone lead to the ambitious goals imposed by the serious current environmental situation. In this context we must consider that intermodality is a structural feature of the network and therefore it certainly has a fundamental role for its efficiency, for the reduction of congestion and for the optimization of transfers.

European policies about sustainable mobility seem to have incorporated this condition as demonstrated by the 2011 White Paper *"Roadmap to a single European transport area - For a competitive and sustainable transport policy"*[3]. Although intermodality has been presented as a lever of sustainable mobility since 2001[4], with the aforementioned document it started to be related to the scale of interurban transfers (ie those regarding areas and territories this contribution is about). Previously the interest of the European legislator had mainly concerned the scale of urban and interregional transfers and therefore now for the interurban scale the new technologies are less mature and the modal choices are smaller.

The construction of an intermodal network essentially concerns the realization of multi-modal platforms, ie the conversion of existing transport terminals into complex equipment. The research here presented works on the construction of this equipment at the scale of minor urban centres and interurban transport and tries to build an operational strategy that, by pursuing transport sustainability, can overcome the endemic critical aspects that this equipment shows and which, in my opinion, can render them little sustainable from the social point of view. Given that one of the objectives of this research stands in conceiving these spaces as collective places overcoming their statutory condition of non-places, we want to demonstrate, through the projects presented, that it is possible to conjugate sustainability goals and more general objectives concerning aspects of urban functionality, city construction and architecture.

[3] European Commission, White Paper. *Roadmap to a single European transport area. For a competitive and sustainable transport policy*, COM (2011) 144 final, Brussels (BEL), 2011

[4] The reference is to the European Commission, White Paper. *European transport policy for 2010: time to decide*, Office for Official Publications of the European Community, Luxembourg City (LUX), 2001.

References

XXIIIth World Road Congress (2007). The urban form of mobility. Paris.
De Cauter, L. (2004). The Capsular Civilization. On the city in the age of fear. Rotterdam: NAI Publisher.
DPA. Documents de projectes d' Arquitectura (2011), Mat-Building, 27-28.
Architectural Design (1974), 9.
Le Carré Bleu (1962), Web, 3.
Architectural Design (1974), 9
European Commission, White Paper. (2011) Roadmap to a single European transport area. For a competitive and sustainable transport policy, COM (2011) 144 final, Brussels (BEL),
European Commission, White Paper. (2001) European transport policy for 2010: time to decide, Office for Official Publications of the European Community, Luxembourg City (LUX),
Smets M.(2007). Open Up The Capsule!. In XXIIIth World Road Congress, The urban form of mobility. Paris.
Smithson, A. (1974). How to recognise and read mat-building. Architectural Design, 9, 573-590.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Business continuity of lodging industry in the face of disasters: A case study from Turkey

Ezgi Orhan[1]

[1]*Department of City and Regional Planning, Cankaya University, Ankara, Turkey, ezgiorhan@cankaya.edu.tr*

Abstract: The aim of the study is to highlight the importance of risk management for hotel industry. Since hazards affect the business continuity and the chance of their survival, taking precautions and developing mitigation policies constitute the base of risk management for firms. Hotels as temporary accommodation for visitors are vulnerable to disasters; however there is a few numbers of studies addressing the hazard-prone characteristics of hotels. Departing from the limitedness of theoretical and practical knowledge, this paper aims to put forward the risk management of lodging industry in Turkish case which is vulnerable to a variety of natural hazards in addition to human-induced hazards. In doing so, an empirical study is carried out using data from 75 hotels operating in Ankara city. The analysis provide a basis for policy-makers, entrepreneurs in lodging industry, and insurance companies in developing a framework for risk management strategies for business continuity.

Keywords: business continuity; hotel industry; disaster preparedness; disaster risk management

Introduction

Providing a temporary shelter to visitors, urban hotels have been a significant component of tourism sector. Despite numerous studies analysing the sector in multi-dimensional aspects, little attention has given to the relation between disasters and businesses in tourism industry (Lamanna et al, 2012; Drabek, 2000). Hotels are vulnerable to disasters not only in structural terms, but also in physical, economic and social terms. Tsai et al explain the vulnerability of them against challenges as "tourist-related organisations and destinations are placed in a particularly difficult position, faced with twin challenges of declining number of visitors and falling revenues" (2011; 325). Even, the safety factor determines the hotel destination choices of tourists, and additionally, creates and alters the image of the particular area or hotel dramatically (Machado, 2011). Their highly vulnerable characteristics make hotels as the subject of this study which aims to highlight the importance of risk management for hotel industry through an empirical study in Ankara, Turkey.

This study develops its context in Turkey which is prone to a variety of natural hazards, particularly earthquakes and floods as the major sources of destruction, and additionally man-made hazards such as fire. Being the capital city of Turkey, Ankara experienced a rapid urbanization process since 1920s, and the process contributed the constructions of several urban risks (Orhan, 2018). Additionally, as an administrative centre of the new state embracing the national sovereignty with the proclamation of Republic in 1923, the city has attracted visitors

all around world so that lodging industry gradually developed in the city. Consistent with neoliberal economy and its urban environment, urban tourism activities gave rise causing an increase in the hospitality functions. Today, with its local population of approximately 5.4 million, Ankara is hosting a total of 1.6 million incoming tourists (Ministry of Culture and Tourism, 2015). According to the official records in 2015, 58.6 per cent of the arriving tourists preferred to stay in Cankaya municipality holding the highest share among the municipalities of Ankara. Cankaya was followed by Altındag with 21.5 per cent, Yenimahalle wit 6.6 per cent, and Kızılcahamam with 3.4 per cent. Thus, it can be said that the accommodation services are concentrated in central municipalities of the metropolitan city and also tourists demanded the central district of the city for accommodation. In the same year, tourism statistics showed that Ankara held 189 establishments with tourism licence of investment and tourism licence of management, and their bed capacity reached to 30,231.Based on the trend of intensification of tourism sector in Ankara, the present study considers the disaster management in the lodging industry.

Methods

This research is based on an empirical case study including the urban hotels that operate in Ankara city. The subjects of the research are the privately owned hotels that locate in the urban area and constitute the central district of the city. This study depended on the data collected from 75 hotels operating in central municipalities of Ankara. The survey instrument was applied to the hotel owners and managers in March 2018. Data were collected through structured questionnaire including two parts; first part is devoted to identify the hotel profile, and second part deals with the disaster management of the hotel. Hotel profile part focused on the hotel location, star rating, year of establishment, occupancy status on property in which they operate, ownership type, number of staff, average room and bed capacity. At the final part, the survey instrument includes the questions about identification of major risks that Ankara urban hotels have, previous disasters they faced, types of preventive measures, and potential problem areas in case of disasters. Data obtained by questionnaire were analysed through the SPSS (Statistical Packages for the Social Sciences) program. Frequency analysis was used to examine the responses derived from questionnaire.

Findings and Discussion

In this research, Ankara hotels were examined to access their disaster management. Table 1 shows the distribution of respondent hotels in accordance with their location and scale.

Table 1. Location and scale of respondent hotels.

Districts	Total number of rooms	Average number of rooms	Total number of beds	Average number of beds	Total number of hotels	Distribution of floor numbers according to districts		
						1-5	6-10	11+
1	1494	67,9	3174	144,3	22	7	13	2
2	1634	60,5	3318	122,9	27	8	17	2
3	1440	80,0	2725	151,4	18	9	7	2
4	953	119,1	1807	225,9	8	1	3	4
Total	5521	73,6	11024	147,0	75	25	40	10

Notes. Districts were determined in line with the central development of Ankara. District (1) denotes the old town, Ulus; (2) indicates the commercial and administrative centre of the city, namely Kızılay; (3) shows the southern part of the central business district includes recreational and cultural arteries; and (4) reveals the western corridor as the new development zone of the city.

Results showed that hotel establishments were aware of the range of risks whether they are originated from natural or man-made hazards. Among the respondent hotels, 81 per cent found fire as the most probable source of the destruction, whereas 50.7 per cent mentioned earthquakes. Also, this survey revealed the hotel management's commitment in undertaking measures. All hotels in the sample accept that safety is a significant issue for both the continuity of their businesses and their guests. 90.7 per cent of the respondent hotels reported to take preparedness measures for disasters. The most frequently applied precaution among hotels was insurance for the property in which they operate (88%). This was followed by the insurance of equipment, furniture and machinery of the business (73.3%), preparation of emergency plan (66,7%), hiring an occupational safety specialist (60%), and kitchen fire protection (60%). Although they invested in pre-disaster activities, hotels in the sample were reluctant in developing systematic and effective tools for disaster management. The sample reported the main reasons of problems they may face in case of an emergency as the densely built environment (53.3%), evacuation of tourists from the hotels (41.3%), inadequacy of open space serving as a gathering place (40%), and cost of reinforcing hotel (38.7%).

Conclusion

This study examining the relation between disasters and hotel establishments asserts that tourism disaster management is a multi-dimensional topic requiring the knowledge from economy, emergency management, tourism, and sociology (Ritchie, 2008). Departing from the findings of this study, it is possible to develop a framework for urban hotels to manage crisis. In doing so, a comprehensive framework should be adopted at all levels of governments. In order to promote disaster management in tourism sector, central authorities, particularly Ministry of Culture and Tourism should force hotels to understand their vulnerabilities and potential damage factors, and develop strategies such as tax reduction, enforcing insurance. In addition, local governments should make regulations in spatial, physical and infrastructural terms to enhance the coping capacity of hotels at neighbourhood level against challenges.

References

Drabek, T. (2000). Disaster evacuations. *Cornell Hotel and Restaurant Administration Quarterly*, 41: 48–57.

Lamanna, Z., Williams, K. H., & Childers, C. (2012). An assessment of resilience: Disaster management and recovery for greater New Orleans' hotels. *Journal of Human Resources in Hospitality & Tourism*, 11(3), 210-224.

Machado, L. P. (2012). The consequences of natural disasters in touristic destinations: The case of Madeira Island–Portugal. *Tourism and Hospitality Research*, 12(1), 50-56.

Ministry of Culture and Tourism (2015). *Tourism Statistics 2015*. Ankara.

Orhan, E. (2018) Tarihi Kent Merkezlerinin Kırılganlığı ve Afet Yönetimi Üzerine Bir Değerlendirme: Ankara Saraçlar Sokağı Yangını Örneği. *Idealkent*, 9(23), 189-215.

Ritchie, B. (2008). Tourism disaster planning and management: From response and recovery to reduction and readiness. *Current Issues in Tourism*, 11(4), 315-348.

Tsai, C. H., & Chen, C. W. (2011). Development of a mechanism for typhoon-and flood-risk assessment and disaster management in the hotel industry–A case study of the Hualien area. *Scandinavian Journal of Hospitality and Tourism*, 11(3), 324-341.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainability of Heritage Conservation Council System in Turkey

Mustafa ÖNGE[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, onge@cankaya.edu.tr*

Abstract: Conservation council is a common system which was preferred by many nations for decision making in heritage conservation issues. This study discusses the question of sustainability of heritage conservation councils in Turkey. The background of conservation council system in Turkey is presented and the structural problems of the system are discussed with respect to the texts of law and academic works, to figure out the current problems. In the conclusion section the question of sustainability is evaluated from the governments and the conservation experts' points of view.

Keywords: heritage conservation; conservation council; conservation management; Turkey

Introduction

Heritage conservation is a significant issue of present day modern society. The nations are establishing councils of experts for taking decisions concerning their precious heritage as a rational attitude to the problem. Turkey is also following the same method since the early 20th century. The state has an efficient conservation council system as a body of its Ministry of Culture and Tourism. However, in many cases, these councils are badly criticized for taking faulty decisions and causing the loss and destruction of heritage.

This study, which is a shorter version of a more detailed one, comprises a research on the background of the conservation council system in Turkey for making an evaluation of changes occurred in the historical process, with respect to significant cultural and political events. The major sources of this study comprise; the texts of law, academic studies on the history of heritage conservation in Turkey and the personal experiences of the author as a council member. Several regional council decisions are also examined in the research process. As this is a limited study, which focuses on the case of Turkey, the conservation councils in foreign countries and their features are not discussed.

Conservation Council System in Turkey's Heritage Conservation Processes

Mainly from the 18th century onwards the lands of Ottoman Empire were suffering from the loss of its heritage. On the Ottoman side it was not a fundamental problem due to the apathy of society, which was directly related to the education system. In the 19th century, the administrational reforms led to the appearance of a new stately order and a new generation of

Ottoman statesmen. The state began to take precautions for protecting the cultural heritage, considering it as state property and began to develop related legislation. In this context, the term *âsâr-ı atika* (old works of art), which mostly comprise the archaeological heritage from pre-Islamic periods emerged. In the early 20th century, *âsâr-ı atika* concept began to have a better cultural context, comprising Islamic heritage.

Ottoman government had efforts for the conservation of movable heritage in the context of *âsâr-ı atika* and *Müze-i Humayun* (the Royal Museum), was established as a significant organization with branches outside Istanbul. Monuments of Islamic origin were being repaired periodically thanks to the *Vaqf* system or governmental funds. The deserted monuments were being used to provide material for new buildings, without considering its period. The empire needed experts, who would give decisions, make the rules, conduct and perform the repairs, for significant monuments.

The first example of conservation council system was founded in Istanbul in 1917. "*Muhafaza-ı Asar-ı Atika Encümeni Daimisi"* (Permanent Commission for Conservation of Old Works of Art), was a body of the Ministry of Education and it was responsible of locating the historical edifices in Istanbul; making inventory and conducting research (Madran, 2002, 75).

After the fall of Ottoman Empire, Turkish Republic rapidly began to form its own state institutions and legislation, alongside those of Ottoman inheritance, which included the first Turkish legislation for heritage conservation and the first conservation council. *Muhafaza-ı Asar-ı Atika Encümeni Daimisi* maintained its duty and renamed *"Eski Eserleri Koruma Encümeni"* (Commission for Conservation of Old Works of Art). It was consisted of a chairman and four members, who are required to be experts on history, art, architecture and historical edifices. The commission was taking decisions with respect to the legal provisions and it was also authorized to make new rules to be followed (Madran, 2002, 98).

In 1930's several significant state organizations concerning culture, education and public consciousness were established, including an additional conservation council *"Anıtları Koruma Komisyonu"* (Commission for the Conservation of Monuments), which was responsible for the conservation of built heritage in the whole country (Madran, 2002, 109). It was consisted of six members including two architects and two foreign experts (Madran, 2002, 169).

In 1950 "*Cumhuriyet Halk Partisi*" (Republican People's Party), the first political party of Turkish Republic, lost the general elections and "*Demokrat Parti"* (Democrat Party) became the new governing force. Democrat Party (a.k.a D.P.) began to apply its own policies destroying

the public education projects of 1930's. A new conservation council concept was introduced in 1951 and in accordance to the code no 5805, *"Gayrimenkul Eski Eserler ve Anıtlar Yüksek Kurulu"* (High Council of Immovable Old Works of Art and Monuments a.k.a. *G.E.E.A.Y.K.*) was established. Being a self-governed body, G.E.E.A.Y.K was the only council, which was assigned as a decision maker for the entire built heritage in Turkey. It was consisting of the academics and governmental officials, who were required to have conducted studies or published works on history, archaeology, history of art, architecture and urbanism, as the proof of their expertise.

In 1951, a precious instrument for the provision of public interest in heritage conservation studies was lost. *Halkevi* (People's House) organizations were closed down by Democrat Party due to political row. Beyond their importance in public education, *Halkevi* organizations also had activity branches concerning cultural heritage and heritage conservation (Meydan, 2012, 75, Akşin, 2011, 250).

The changing political conditions in the 1950's and the political instability of 1970's Turkey, triggered two military coup d'états in 1960 and 1980 and these changed the organizational structure of Turkish Republic with a new constitutions and new legal arrangements. *G.E.E.A.Y.K* maintained its existence until 1983, when the Law for the Conservation of Natural and Cultural Properties (code no 2863) came into action. In accordance to this law two types of councils are assigned. Regional Councils for Conservation of Cultural and Natural Properties were responsible of taking decisions in their regions, while the main duty of Higher Council for Conservation of Cultural and Natural Properties was to establish principles to be followed by the regional councils. Both were functioning as the organs of the Ministry of Culture. Unlike the previous legal arrangement, the members of higher council and the regional councils are not obliged to prove their expertise. As of 1986, there were a total of nine Regional Councils (Alsaç, 1992, 49).

In 1987 the code no 3386 came into force, for making alterations in the Law for the Conservation of Natural and Cultural Properties. The Higher Council was turned into an advisory board, which would entirely consist of state officials, for the Regional Councils (Madran, 1989, 53). Similarly, there would be only two academics in the regional councils and the rest of the members would be the state officials. According the 13th article of the law, the regional council members could be dismissed by the will of the Minister, without any reasons (Madran, 1989, 53).

In 2005, so called the Law for the Conservation of Deteriorated Historical and Cultural Immovable Properties by Renewal and Perpetuation (code no 5366) came into force. Two Renewal Area Councils, which were only responsible for taking decisions concerning so-called renewal areas were established in Istanbul.

In 2011, after the establishment of the Ministry of Environment and Urbanism councils for the conservation of natural properties were founded in this ministry, and councils for the conservation of cultural properties were maintained as a body of the Ministry of Culture and Tourism. Until that time conservation of natural and cultural properties were handled by the same councils. These rearrangements caused new problems and conflict of authority in the locations, where cultural and natural properties were integrated.

In 2014, the code no 6546 came into action and *"Çanakkale Savaşı Gelibolu Tarihi Alan Başkanlığı"* (Battle of Dardanelles Department of Gallipoli Historical Area) was established within the Ministry of Culture and Tourism. With this law a new type of heritage, historical area, was defined considering only a single region of war, and a new council named *"Gelibolu Koruma Komisyonu"* (Gallipoli Conservation Commission) was formed to take relevant decisions. In its area of responsibility, it was reporting directly to the head of the department like an advisory board and officially powered instead of the regional council.

As of 2018, there is one Higher Council for Conservation of Cultural Properties, 34 Regional Councils for Conservation of Cultural Properties, 2 Renewal Area Councils for Conservation of Cultural Properties and one Gallipoli Conservation Commission, which makes a total of 38 conservation councils, excluding those of natural heritage. Despite this number, which is likely to grow, the performance of conservation councils are questionable mainly due to the corruption that had been created by continual political interventions of the governments.

Conclusion

Is it possible to maintain the conservation council system as a sustainable policy for heritage conservation? It seems to be beneficial for the governments to constitute conservation councils, which are fully controlled by them in the context of their governmental policies and political goals. After 1980's Turkish governments seem to have adopted the method of constituting councils or commissions as a method of solution to the problems concerning heritage not conservation. Establishing councils is, the governments' method of legitimating actions and probably gainsaying their authoritarian attitude by bringing 'disposable' experts into discussion. One may think that it is a rational approach to evaluate the performances of conservation councils for answering this question. However, it must be remembered that it

seems pretty difficult to rationally analyze the performances of councils, which had been subjected to political manipulation and other interventions, in the context of heritage conservation.

From the conservation specialist point of view, the sustainability of conservation council system in Turkey is a subject of discussion. Quantitative growth is not significant without the increase of quality in all terms. The problems of management and finance need to be solved, and especially the employment of experts should be attached importance to. The fully government-controlled nature of the system is disregarding the role of public support and public participation. In such circumstances, effective and appropriate conservation measures cannot be taken.

References

"Gayrimenkul Eski Eserler ve Anıtlar Yüksek Kurulu teşkiline ve vazifelerine dair kanun, no:5805", (1951, 9 Temmuz), *Resmi Gazete*, Ankara, 7853, 5805.

Akşin, S., (2011). *Kısa Türkiye Tarihi*, Istanbul: Türkiye İş Bankası Yayınları.

Alsaç, Ü., (1992). *Türkiye'de Restorasyon*, İstanbul: İletişim Yayınları.

Güçhan, N.Ş., (2003), "Her Dem Yeşil Yapraklı Bir Ağaç", *Her Dem Yeşil Yapraklı Bir Ağaç Cevat Erder'e Armağan*, Ankara: Orta Doğu Teknik Üniversitesi Mimarlık Fakültesi

Madran, E., (2002). *Tanzimat'tan Cumhuriyet'e Kültür Varlıklarının Korunmasına İlişkin Tutumlar ve Düzenlemeler*, Ankara: Orta Doğu Teknik Üniversitesi Mimarlık Fakültesi.

Madran, E., (1989). "Son 20 Yılda Koruma Yasaları", *Tarihi Kentlerde Planlama/Düzenleme Sorunları, Türkiye II.Dünya Şehircilik Günü Kollokyumu, 6-8 Kasım 1987, Trakya Üniversitesi, Edirne*, Ankara: Bayındırlık ve İskân Bakanlığı Yayınları, 51-53.

Meydan, S., (2012). *Akl-ı Kemal, Atatürk'ün Akıllı Projeleri*, Cilt:2, İstanbul: İnkılap Kitabevi.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Vernacular Techniques as Key to Sustainable Vernacular Architecture: The Case of Wattle and Daub Construction in Mediterranean Region

Hilal Tuğba Örmecioğlu[1]

[1]*Department of Architecture, Akdeniz University, Antalya, Turkey, ormecioglu@akdeniz.edu.tr*

Abstract: In order to sustain cultural heritage, we had to protect the historical environment in which the culture cultivated. Likewise, protection of the vernacular construction systems and materials which make the realization of these environment are strategically important in sustainability of historical environment. These common constructive knowhow of vernacular systems, such as stone masonry of monumental buildings or "hımıs" and "bagdadi" of domestic architecture are much easier to protect and revitalize. Nevertheless, it is observed that more local construction techniques which can be defined as niche are rapidly disappearing. Wattle and daub technique this kind of forgotten vernacular construction technique used in Mediterranean region especially little villages in the Antalya's hinterland; it is emerged and wide spread at the end of 19th century through the mass migrations and effect of moderate climatic conditions.

Keywords: Sustainability of historic environment, vernacular construction, vernacular tectonics, wattle and daub technique

Introduction

Wattle and daub is a composite building material used for making walls, in which a woven lattice of wooden strips called "hayıt" is covered with a sticky material –the adobe- mud usually made of some combination of wet soil, clay, sand, animal dung and straw. This is an old technic, known for ages in Anatolia and especially in Africa. Although the construction technique has positive characteristics such as being recyclable and sustainable building technique, building with natural materials and being primitive enough to be built by maintained by user, this technique became less frequent by time and disappeared due to increase in economic level of the society in and around Antalya region because low-quality of building and not being compatible with industrialized building techniques. In this study, the information gained from investigation of the ruins of old buildings constructed with wattle and daub technique in Antalya-Gebiz district will be presented. The composite use of local masonry technique and wattle and daub techniques will be documented from the gained from the buildings that are partially collapsed will be documented.

Wattle and Daub in Anatolia

Basket weaving is a common technique in Anatolia but today its usage is limited with objects such as basket and wickerwork. Nevertheless it is also used as a traditional building

technique, which utilize the system not only for artistry but uniquely for construction. It is an age-old practice in Anatolia which has many wetlands full of reed fields. Due to archeological studies, basket-weaving is a known technique since 9000 BC. First findings were belonging to Catalhoyuk, where the technique is used for making straw mats for graves as a part of ancient burial rituals (Turktaş, 2012). The studies present that this technique was widely used in Anatolia especially in Neolithic Age. For instance, the remaining of the Neolithic buildings in found Aşağı Pınar-Kırklareli region were all built in wattle and daub technique (Kabul, 1998). These buildings were dated around 5800-5700 BC. The archeological remains in Ilıpınar region and these were dated back to 6000-5400 BC. The buildings in Fikirtepe site were built in the same technique but in another type. They are circular or elliptical in plan, with simple foundation structure (Özdoğan, 2007).

Archeological and historical studies in different regions of the world convey that building by using earth and vegetal structure is a widely known technique in various building cultures. This alternative form of construction (structure and filling) is known under various names in different regions, for instance in Peru "Quincha", in Cuba "Cuje", in El Salvador "bahajareque", "pao pique" in Brazil and "tabiquería" in other Latin American countries (Adeo and Olmos). In Africa wattle and daub building are simple one storey buildings made up of with on simple crops on shallow foundations, it is transformed into a filling system of traditional wooden skeleton with decent details in central Europe. Although the technique has wide variety of types or forms due to soil structure, climatic properties and dominant vegetation of the region, it can be defined basically as a composite building system, based on woven thin-braches covered with sticky earthen material composed of mud, turf, sand and clay.

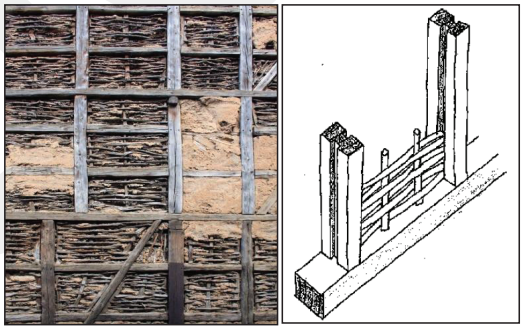


Figure 1. The wattle and daub technique in central Europe; traditional wooden structure filled with wattle and daub.

Fence-Houses (Çit-Evler) in Antalya-Gebiz

Wattle and daub technique was a popular construction system, widely used in and around Antalya until 1950's. There were three main reasons of the preference; first of all Antalya has rich wetlands, full of straws and similar vegetation in its natural flora called "maki". There were many plants which has elastic branches suitable for wattle construction. Secondly, the region has moderate climatic conditions where people do not need for thick wall sections. And lastly, there were mass migration movements in the area at the end of the 19th and beginning of 20th centuries from Aegean islands during the wartimes that people need to build their own houses and this technique is a simple one which can be done by unexperienced normal people. However the buildings studied in this paper is advanced examples, composite with stone masonry walls, hence we can say that they were built by more experienced hands. These houses of the region is called "fence houses (çit evler)" because the wattle and daub system was a common system of fence construction around sheep pens, and garden boundaries.

The wattle and daub buildings in Gebiz region of Antalya is a unique technique combined gable walls made up of stone masonry with timber bonding and wattle and daub walls. The two gable walls are main load bearing elements of the house carrying the hipped roof. They are mostly made up of stone masonry with timber bonding in every 1,5 meter. In addition to being structural, these gable walls are also functional elements, having the chimney imbedded in the section for "ocak", a fire place for both cooking and heating. There are also niches for storage of kitchenware on both sides of the fire places.

Roof structure is made up of timber. The roof ridge is set on the climax of the triangular part of the gable wall, hence in normal span the gable walls are enough for carrying the hipped roof; but if the span is larger, the ridge is supported with one or more pillars in the inner space. If so, there has to be additional pillars on both outer sides supporting the wall purlins. In some of the examples, the central support acts also as a structure of inner partition walls, dividing the space in two or more rooms.

In this system, there are two different types of foundations. The foundations of the masonry walls are made in traditional system with stone footings, while the wattle and daub walls has more shallow foundations. The primary and secondary vertical supports of the wattle parts are stabilized as in pile foundations. Due to height of the wall the timber primary vertical supports are penetrated in earth up to 30-40cm depth, on 2 to 3 meter intervals.

Primary vertical supports are chosen from linear braches which are in section of 10-15cm diameter. Secondary pillars are chosen from the branches of smaller sections, between 5-7 cm diameters and also penetrated to earth up to 30 cm on 40-50 cm intervals. One of the ends of the both types of vertical pillars are sharpened in pile form with a sharp object to easy the penetration. After penetration, pillars are fastened on ground level between two timber bottom plates. As the foundations do not need a deep diggings, local people can make excavation by themselves; hence wattle and daub buildings are easy and fast to build by inexperienced locals.

After construction of the main timber structure, the wall surfaces are woven. In Gebiz region structural parts of the buildings are mostly chosen from pinewood, olive wood or mulberry trees which are commonly growing in the area. On the other hand, there are also suitable plants for the woven parts in close surrounding. In the studied region, oleander, myrtle and chasteberry are the most common plants of Mediterranean landscape which is specially called “maki”. All of these plants have elastic branches proper for weaving. Most of the buildings were constructed by using *Vitex agnus castus*, also called Vitex, Chaste Tree, Chasteberry, Abraham's Balm or Monk's Pepper, is named as “hayıt” in native dialect. This plant is also for making of basket or straw mats in the region. It is typically grown in warm winter climates such as Mediterranean climate, in loose, medium moisture and well-drained soils in full sun. It grows as a vase-shaped up to 1-15 m tall. Before usage, people soak the braches to make more elastic. Then the outer bark is peeled and snags are cleared with a knife. Then these prepared braches are weaved between vertical pillars.

Figure 2. Left: perspective of the construction (drawn by author). Middle: detail photo of the bottom part. Right: Vitex agnus-castus locally called “Hayıt”

After completing the proses of weaving, the mud is prepared to walls covered them in both sides. In order to make proper mud, the earth is especially chosen from steam bed paving

which is rich of clay. Then straw and sometimes sand is added to mud to improve the tension capacity of the material; because straw parts are holding the mud together when it cracks under sun while clay helps to deport water during rain.

Results and discussion

In order to protect historical environment, protection of the vernacular construction systems and materials which make the realization of these environment are strategically important. Local construction techniques in domestic architecture are the results of socio-economic circumstances of the geography, climate and age. Therefore, wattle and daub technique was widely used even in the first half of the 20th century in economically poorer villages of Antalya or rural areas where immigrants were inhabited because of its easy and fast to build qualities.

Although the construction technique has positive characteristics such as being recyclable and sustainable building technique, building with natural materials and being primitive enough to be built by maintained by user, this technique became less frequent by time and disappeared due to increase in economic level of the society in and around Antalya region because low-quality of building and not being compatible with industrialized building techniques. The migration of young people from rural to urban areas is also an important problem in disappearing of local techniques.

References

Adeo W. C and Olmos A. R., Wattle and Daub: Anti-Seismic Construction Handbook, Caraterre Publishings, France (Available on 20.10.2017 at file:///C:/Users/tugbahilal/Downloads/anti_seismic_construction_handbook%20(1).pdf)

Çelik A. et al. (2013). Hatay Yöresinde Bitkisel Örücülük, Akdeniz Sanat Dergisi, 6 (11), 65-74.

Turktaş Z. (2012, 10) Anadolu'da "Hasır Dokuma ve Sepet" Kullanımına İlişkin Eski Bir Örnek: Çatalhöyük, 1. Uluslararası Moda ve Tekstil Tasarımı Sempozyumu, Antalya.

Kabul N. et al. (1998) Kırklareli'nde Deneysel Arkeoloji: Bir Neolitik Çağ Evinin Yeniden Yapılışı", Arkeoloji ve Sanat, 20(82),19-25.

Köse, A. (2005), Türkiye'de Geleneksel Kırsal Konut Planlarında Göçebe Türk Kültürü İzleri. Afyon Kocatepe Üniv. Sosyal Bilimler Dergisi, Cilt VII, Sayı 2, Afyon, s.165-200

Özdoğan, M. (2007) Marmara Bölgesi Neolitik Çağ Kültürleri, Arkeoloji ve Sanat Yayınları1, İstanbul.

EuropeAid/134786/IH/SER/TR. (2016). Technical Assistance for Improving Energy Efficiency in Buildings, Activity A7: Developing typical buildings and proposal of structure for Building inventory in Turkey.

EUROSTAT (2014). Buildings Database [Datafile]. Retrieved from: https://ec.europa.eu/energy/en/eu-buildings-database

İslami, B. (2017). Energy Saving Potential in Turkey. Proceedings of International Symposium on EE in Buildings, Ankara, Turkey.

TS825 (2008). Thermal insulation requirements for buildings (Binalarda Isı Yalıtım Kuralları). Turkish Standards Institute.

TÜİK (2014). Building Permit Statistics. Turkish Statistical Institute.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

A step towards understanding industrial hemp: From hidden industry to a material in architecture

Esen Gökçe Özdamar[1]

[1*]*Assoc. Prof. PhD, Architecture Department, Tekirdağ Namık Kemal University, Faculty of Fine Arts, Design and Architecture, Department of Architecture, Kampus Cad. Kampus Mah. No. 1 Değirmenaltı, Tekirdağ, Turkey, gokceozdamar@gmail.com, +902822502936*

Abstract: Hemp, also known as *cannabis sativa* has been evaluated for many years in the history of humankind from food to clothing, canvas, paper and books due to its benefits from nutritional perspective to highly-effective medicinal effects, strong fibers and durable properties. Our consumer-oriented societies need to rely more on sustainable resources which are harvested using the least amount of water to reduce water consumption in the material production process. With regard to the many beneficial uses of industrial hemp in many areas, this article is a short review of the use of industrial hemp in architecture and construction. When viewed from the point of architecture and construction, industrial hemp can be evaluated from a different perspective. Therefore, this article focuses on the potential of industrial hemp by examining some examples in architecture.

Keywords: hemp (*cannabis sativa*); architecture; building material; cannabric; hempcrete.

Introduction

This article focuses on the future potential of industrial hemp, also known as *cannabis sativa,* as a material in architecture. In the history of humankind, hemp has been evaluated for many years, from nutrition to the nutrition of canvas, paper, and books, to effective medicines, strong fibers, and durability. However, due to the misuse of hemp, illegalization and restrictive policies of governments and industries, many Western societies have enacted laws to regulate or ban it.

Our consumer-oriented societies need to rely more on sustainable resources which are harvested using the least amount of water to reduce water consumption in the material production process. When viewed from the point of architecture and construction, it revives and reminds us the hemp, which should be evaluated from a different perspective to give back its importance. As Pecenko et al. mention, hemp has a potential to become "one of the greener building materials on the market" (Pecenko, Garrett, Garrett, 2014, p. 22).

In the history of humankind, hemp has been one of the most valuable and versatile plants grown both naturally and industrially. Hemp, also known as *cannabis sativa L.* or *cannabis indica L.,* is a plant originated from around 4100 BC in China. Since then, it has spread to many

geographies around the world and is known to have grown in different climates. *Cannabis sativa L.* and *cannabis indica L.* are confused with each other and are often prejudiced because of their different effects on human beings. They are two different species, the first corresponding to industrial hemp, and the second with a high THC (tetrahydrocannabinols) concentration known as its psychoactive chemical for which the plant is misused (Bouloc, 2013, p. 27).

Hemp has been used in many areas, from food to fuel and medicine. Hemp seeds have been valued for nutritional benefits and have been used as one of the main sources of as food because it contains "the highest amount of digestible protein and is very high in essential fatty acids" (Deitch, 2003, p. 8). This versatility of the plant lasted almost 10,000 years, almost "everything people had was made from hemp" (Deitch, 2003, p.8). In addition, oil extracted from hemp seeds was used as a basis for lamp oil and paint and varnishes to waterproof the hulls of wooden ships (Deitch, 2003, p.9). According to medical researchers, hemp oil, also known as cbd (cannabidiol) or medical marijuana, reduces the side effects of cancer chemotherapy as well as cancer treatment and alleviates the symptoms of MS patients, AIDS and many other chronic diseases (Eddy, 2011).

Methods

Hemp has been grown for its fibers since it has the longest, strongest and most durable natural fibers, and has been used for cordage, rope, and cloth (linen), and seeds (Deitch, 2003, p. 7). It was used for cords in the marine industry as well as clothing, canvas, money, and paper (Pecenko, Garrett, Garrett, 2014, p. 24). The cultivation of hemp requires little water and no pesticides or herbicides. It is one of the fastest growing plants in the world and can be used to make products such as paper, textiles, biodegradable plastics, paint, insulation, as well as building materials. Industrial hemp has been used in fuel, paper, fabric, plastics, canvas, linen, tea bags, paper money, cigarette papers and other strong, thin papers that are used to make thick books. In the past, Henry Ford designed a car made of hemp mixed with other materials (Deitch, 2003, p. 223). Hemp is also used in clothing, textiles and paper production. With regard to the many beneficial uses of industrial hemp in many areas, this article is a short review of the use of industrial hemp in architecture and construction. Within this context, two examples; Ein Hod Ecological House designed by Tav Group in Israel and House Renovation designed by Martens Van Caimere Architecten in Belgium are examined.

Findings and Discussion

In the modern world, in architecture and construction, the use of hemp is mainly by turning it into a biocomposite called hempcrete (hemp-lime composite). Processing of the material is similar to concrete. The evaluation of hemp architecture started in the 1980s, particularly in France. Hemp-lime composite is obtained by mixing hemp shiv, lime-based binder, and water. Basic features of hempcrete are; low mechanical strength, low thermal conductivity, high vapor permeability, water absorption, fire-resistant and resistant to biological and chemical corrosion with favorable acoustic properties (Gołębiewski, 2017, p. 163). "The main architectural capability of hempcrete is its natural ability to create a favorable microclimate of the interiors". Moreover, it does not limit architectural design (Gołębiewski, 2017, p. 169). However, the compressive strength of hempcrete is too low, so it requires a supporting material such as a timber or steel frame and can be used for light-weight structures (Hemp, Wonder Material, 2014).

Hempcrete, a concrete-like mixture of wood chips from *cannabis sativa* and a lime-based binder that can be sprayed onto surfaces, poured into slabs or shaped like a mold. This material is fire resistant, virtually impermeable to termites, has highly effective insulation properties and can be grown with very little water. Lime content in hemp blocks absorbs large amounts of carbon dioxide (Cannabric, 2012). Some of the built architectural examples with hemp are shown in Figures 1 and 2 below.

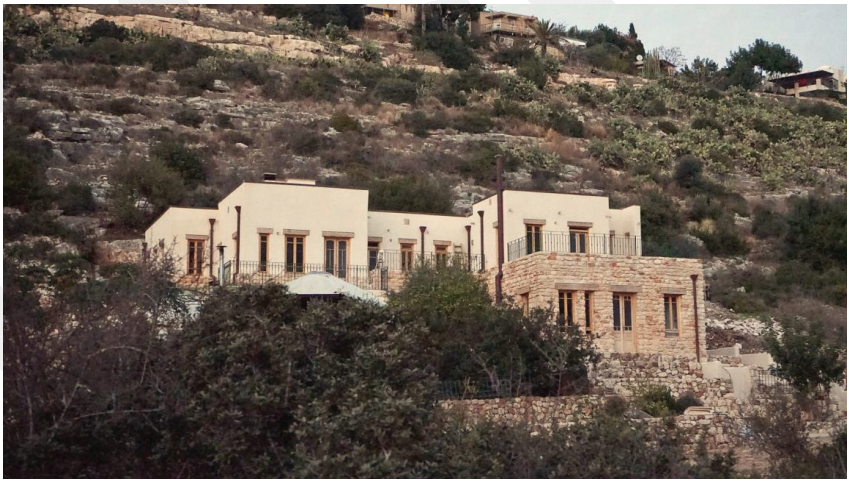


Figure 1. Ein Hod Ecological House, Tav Group, Israel (Wang, 2017).

The Tav group built an ecological terrace house on the hillside of Ein Hod, a rural village, home to artists of 250 square meters, using hempcrete made from hemp hurds, hydrated lime and water. The house is optimized for passive solar energy and natural ventilation to further reduce energy needs. Locally excavated stone forms the walls of lower floor, while hempcrete placed between the wooden frames forms the walls of the upper floors. The interior walls are built from rammed earth and earth-based plaster is applied along the light-filled interior (Wang, 2017).

Figure 2. House Renovation in Belgium, Martens Van Caimere Architecten (Frearson, 2015).

A house in Belgium was renovated with the use of hempcrete. The house is predominantly single-storey, although it does have a small loft floor slotted in beneath the highest point of the roof, as well as a sunken garage. Wooden boards are used to create formwork around the perimeter of the building, and hempcrete composite mixture is poured in layer by layer and after the mixture has dried, the wood is removed. Hemprete is also used in building a garden wall. The rest of the building is divided into four sections, consisting of a kitchen, study and a pair of bedrooms. Other additions include tile floors and kitchen surfaces, bathroom and corridor areas (Frearson, 2015). As in this example, hempcrete is “similar to working with concrete. A wooden formwork is constructed and hempcrete is poured into the

formwork in a series of layers, with steel wire added where necessary to add strength to the construction. After the hempcrete dries, the formwork can be removed" (Materia, 2015).

Conclusion

Regarding Ein Hod Ecological House and renovated house in Belgium, hempcrete, the brick form and other uses of industrial hemp that are not mentioned in this article are becoming more widely sustainable and environmentally friendly materials in architecture and design since they are both economical and easy to produce. Along with the difficulties in production, hemp confronts restrictions such as planting, distribution and use for medical reasons in many countries which we need transgress. However, on the other side, this should not be evaluated as seeing the nature as a raw material that can be functionally used for the purpose and needs of the humankind, but as a way of improving the close relationship between hemp and humankind in our modern societies.

GCRIS

References

Bouloc, P., (2013). Hemp: A Plant with a Worldwide Distribution. In: P. Bouloc, S. Allegret, L. Arnaud, (Eds.), *Hemp: Industrial Production and Uses* (1-3). Wallingford, Oxfordshire, Cambridge, Massachusetts: Cabi.

Cannabric (2012). Towards a Hemp Architecture. Retrieved from http://www.cannabric.com/media/documentos/eb60a_Architizermarch2012.pdf.

Deitch, R. (2003). *Hemp-American History Revisited: Vital Resource to Contentious Weed.* New York: Algora Pub.

Eddy, M., (2011). Medical Marijuana: Review and Analysis of Federal and State Policies. In E. L. Clark, (Ed.) *Cannabis Sativa for Health and Hemp* (1-64). New York: Nova Science Publishers.

Frearson, A. (2015). Hemp-based render gives striated skin to renovated house by Martens Van Caimere. Retrieved from https://www.dezeen.com/2015/10/27/martens-van-caimere-architecten-hempcrete-hemp-render-striated-skin-renovated-house-belgium/.

Gołębiewski, M. (2017). Hemp-Lime Composites in Architectural Design, *KNUV 4* (54), 162-171.

Hemp, Wonder Material (2014, May 25). Retrieved from https://materia.nl/article/hemp-wonder-material/.

Materia, (2015). Beautifully Textured House Innovates with Hemp-Based Material. Retrieved from https://materia.nl/article/beautifully-textured-house-innovates-with-hemp-based-material/.

Novozhilova, M., (2017). 5 surprising products made from hemp. Retrieved from https://inhabitat.com/5-surprising-products-made-from-hemp.

Pecenko, K., Garrett, N., & Garrett, S. (2014). Building with hemp: Pioneering new uses for an old material. *ReNew: Technology for a Sustainable Future*, (129), 22-24. Retrieved from http://www.jstor.org/stable/renetechsustfutu.129.22.

Wang, L., (2017). "Cannabis walls" add warmth to this eco-friendly home in Israel. Retrieved from https://inhabitat.com/cannabis-walls-add-warmth-to-this-eco-friendly-home-in-israel/.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Eco-industrial Parks and Sustainability: A Case of Green Organized Industrial Zone from Turkey

Suna S. Özdemir[1]

[1]*Department of City and Regional Planning, Cankaya University, Ankara, Turkey, sozdemir@cankaya.edu.tr*

Abstract: The concept of sustainable development has been on the agenda since the 1980s. In industrial development, industrial ecology ideas realized the sustainable development goals with Eco-Industrial Parks (EIPs). Drivers and beneficence of EIPs are on competitiveness, economic and social and environmental terms. This paper aims to contribute to the industrial ecology literature by explaining the case of Turkey in developing its EIPs. Notably, as a possible EIP example, İzmir Atatürk Organized Industrial Zone (IAOIZ) is the focus of the paper. IAOIZ shows a case working towards to become and EIPs, but there is still too much to do. At the national level, there is a need for a policy and may be legislation to turn the existing OIZs to EIPs.

Keywords: sustainable development; industrial ecology; eco-industrial parks; green Organized Industrial Zone; Atatürk Organized Industrial Zone

Introduction

Today the adverse effect of human activities on nature and environment is an accepted global concern. To decrease the detrimental effects of human activities on nature and environment for future generations in international, national and local arena several new concepts, approaches and practices have been adopted. Among those, the idea of sustainable development has been introduced by international organizations like the United Nations (UN) since the 1980s. The UN commissioned a group of people from developed and developing countries. World Commission on Environment and Development (WCED), better known as the Brundtland Commission, submitted their report, entitled Our common future, to the UN in 1987 (WCED 1987, Pisani, 2006). Sustainable development has been defined in this report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" to overcome the conflict between rapid urbanization, industrialization and natural system. With the World Environment and Development Conference in Rio in 1992 (also known as Earth Summit, Rio Summit or Rio Conference) the concept of sustainable development gained worldwide recognition. In this conference, three main pillars of sustainable development are defined as balancing environmental integrity, social equity, and economic efficiency.

In the industrial development area, the concept of sustainable development operationalized with industrial ecology ideas. “In nature, there is little or no waste. In natural systems, organisms produce waste which becomes the residual products used in a continuous production and consumption system as it passes along the biological food and reproduction chain. In such a system, organisms, plants, and natural features, which individually possess elements of extreme toxicity that can potentially threaten life, coexist and are mutually supportive of the ecosystems in which they reside or are hosted” (Roberts, 2004:998). Mimicking the natural and biological systems by industrial systems for sustainability is the domain of industrial ecology. It is copying the nature for models of highly efficient use of resources, energy, and wastes.

Policy initiatives depending on the ideas of industrial ecology implemented as Eco-industrial parks (EIPs) (Lowe, 1997; Gibbs and Deutzs, 2005). The most used and common definition of EIPs in the literature is by Lowe (1997), i.e., EIPs is”a community of manufacturing and service businesses located together on a common property. Member businesses seek enhanced environmental, economic, and social performance through collaboration in managing environmental and resource issues. By working together, the community of businesses seeks a collective benefit that is greater than the sum of individual benefits each company would realize by only optimizing its individual performance.” World Bank with other organizations prepared An International Framework for Eco-Industrial Parks in 2017. In this framework, it has been stated that EIP definition evolved to reflect the importance given to the three pillars of sustainable development: environment, social, and economic (Veiga and Magrini, 2009; WB, 2017). There are four key drivers for EIPs. One of the most significant drivers of EIPs is the opportunity to increase business, industrial competitiveness and sustainable growth. The second driver is related to the environment. Providing environmental protection, supporting climate change commitments and resource efficiency are the drivers that support the sustainable industrial development in EIPs. Better social standards such as better working and labor conditions are among the social key drivers of EIPs. Lastly, there are economic drivers of EIPs which are the creation of employment, skills-upgrading of the labor force and linkages between industrial park firms and small and medium-sized enterprises (SMEs) and communities outside the industrial part. In the international framework also four major performance requirements are defined for EIPs. These requirements are park management, environment, economic and social requirements (Table 1).

Table 1. Requirement for EIPs.

Requirement	Topics

Park Management	• Park management services
	  o Park management entity
	  o Park property, common infrastructure and services
	• Monitoring and risk management
	  o Monitoring performance and risks
	  o Information on applicable regulations and standards
	• Planning and zoning
	  o Master plan

Environment	• Management and monitoring
	  o Environmental/Energy Management Systems (EMS and EnMS, respectively)
	• Energy
	  o Energy efficiency
	  o Exchange of waste heat energy and recycling
	• Water
	  o Water efficiency, reuse
	• Climate change and the natural environment
	  o Air, GHG emissions and pollution prevention
	  o Environmental assessment and ecosystem services

Social	• Social management systems
	  o Management team
	• Social infrastructure
	  o Primary social infrastructure

Economic	• Employment generation
	  o Type of employment
	• Local business and SME promotion
	  o SME development
	• Economic value creation
	  o Market demand for EIP services and infrastructure
	  o EIP meets economic interests of the government

Source: Prepared based on WB (2017).

For sustainable and circular economic features of EIPs many countries like USA (Côté & Cohen-Rosenthal 1998; Gibbs and Deutz, 2005); European countries (Dunn, 1998; Schwarz; 1998; Baas and Boons 2004; Jacobson, 2006; Tudor et al. 2007); Japan (Van Berkel et al. 2009), Korea (Jung et al. 2012) and China (Fang et al. 2007; Zhang et al. 2010; Tian et al. 2014) and developing countries like India, Vietnam, Cambodia, Egypt, Morocco, Costa Rica, Colombia, El Salvador, Peru, South Africa, Tunisia (UNIDO, 2017) has implemented the concept. This paper aims to contribute to the industrial ecology literature by explaining the case

of Turkey in developing its EIPs. Notably, as a possible EIP example, İzmir Atatürk Organized Industrial Zone is the focus of the paper.

Methods

The methodology of the study begins with the literature review on sustainable development concerning industrial ecology and EIPs. Secondary data has been gathered based on the current literature. The basic methodology of the study is based on a case study. Turkey's Green Industrial Framework Project and İzmir Atatürk Organized Industrial Zone (İAOIZ) specifically has been explored in this paper. Both secondary and primary data has been gathered to understand the case of AOIZ. Primary data has been collected by interviews with IAOIZ and Ministry of Science, Industry and Technology Directorate General of Productivity which now tries to develop a framework for EIBs development in Turkey.

IAOIZ has been selected as a case because it is defined as one of the industrial parks that try to become an EIP. The Zone has a total area of 6.240.000 m2 located in the northwest of İzmir. There are 572 companies and 37.000 employed people. The companies are from various sectors such as textile, ready-made garments, machine, automotive, metal, plastics, chemicals, food, electric and electronics sectors. Annual turnover, exports, and imports of companies value 7,8 billion, 2,5 billion and 1 billion USD (IAOIZ, 2018).

Findings and Discussion

A project has been initiated in 2017 in Turkey with the World Bank (IFC), and Ministry of Science, Industry, and Technology (MSIT) for developing a Green Organized Industrial Zone (GOIZ) Framework. The main aim of the framework is the redevelopment of existing OIZs to EIPs and developing new OIZs as EIPs. For this aim four pilots, OIZs (IAOIZ, Adana Hacı Sabancı OIZ, Bursa OIZ, Ankara Chamber of Industry OIZ) are selected for developing an action plan to redevelop them as EIPs or GOIZs. Pilot OIZs are explored regarding their resource efficiency, industrial symbiosis, green infrastructure and recycling potentials. The Green OIZs action plans for each pilot OIZs are prepared in the project and eco-efficiency, industrial symbiosis, green infrastructure investment requirements, savings, return rates have been revealed.

One of the most prominent pilot cases is IAOIZ. If IAOIZ would be an EIP, it should invest and save as shown in Table 2. Depending on the requirements to become an EIP if IAOIZ

is evaluated; for park management and shared services, economic, environment, social performance, it will show a case of an industrial park that works towards becoming an EIP (Table 3).

Table 2. Investment and returns in IAOIZ

Investment/Returns	İzmir Atatürk OIZ
First Investment ($)	88,6M
Annual costs saving($/year)	33,0M
Return rate (year)	2,7
Energy efficiency (MWh/year)	128.596
Reduction CO2 (ktCO2e/year)	64
Water efficiency (million m3/year)	2,7
Waste reduction (ton/year)	16
Chemical reduction (ton/year)	13.507

Source: MSIT (2018).

Table 3: IAOIZ performance as EIP

Performance	Topics
Park Management	• 50 km internal roads • Connection to airport and city center • natural gas-fuelled combined cycled power plant with an installed capacity of 120 megawatts (MW). • supplied municipal water • 75-km rainwater drainage system with 11 pumping stations • a fire fighting station
Environment	• TS EN ISO 90001 and TS EN ISO 14001 certified • The environmental management unit • Periodic audits • own laboratory measuring wastewater treatment plant inlet/outlet quality parameters • The Wastewater Treatment Plant (WWTP) • Rainwater and wastewater are collected separately • a natural gas-fuelled 120 MW combined cycle power plant • a 500 kW Solar photovoltaic (PV) plant • a plastic recycling facility on site • solid waste volume report to the Ministry of Environmental and Urbanization • Hazardous waste is transferred to and disposed by mutual agreements with legitimate waste management companies.
Social	• a Private Technical College • a vocational training center, • a sports center, a dispensary, • a kindergarten • a smart camera system for security

	• sectoral workshops • R&D competitions • informative seminars • university-industry cooperative activities • Occupational Health and Safety Assessment Series
Economic	• 37,500 employees • 75 % of the firms are exporters • Total annual turnover of the firms is US$ 7.8 billion • Total annual exports of the firms are valued at US$ 2.5 billion. • The total annual imports amount to US$ 1 billion. • Lower operational costs at the firm level through energy and water efficiency upgrades. o 2,200 MWh/year through the upgrading of electricity motors; o by employing continuous washing with counter-current water/textile flow after dying and printing operations 16,100 m3 of water and 644,000 kWh of electricity annually, with a payback period of c. 1 year. o by installing additional automated metering and monitoring of electricity, fossil fuel and/or thermal energy consumption 5, MWh annual energy efficiency savings with a payback period of c. 0.2 years. This can be achieved

Source: Prepared based on WB (2017) and IAOZ (2018).

Conclusion

The eco-industrial park concept is based upon several fields of research and practice that have emerged in the last decade, including industrial ecology, cleaner production, and sustainable urban planning, architecture, and construction. These fields contribute to the broader movement to demonstrate the principles of sustainable development in policy and concrete projects (Lowe, 2001). For sustainable industrial development, EIPs is essential. Due to the cyclicity and sustainability of the eco-industrial park, it has been attempted all over the world both in developing and in developed countries (Zhao, 2018).EIPs have been promoted environmental and resource conservation benefits, operational costs saving and technology learning and adaptation (UNIDO, 2016). They are beneficial in the form of not only in local infrastructure and environmental, but also they have economic and social benefits.

There is still much to do in IAOIZ to become a green OIZ and EIP. But, they have other projects related and support their aim to become an EIP. These projects are Near Zero Zone Project that aims energy efficiency. Moreover, there is currently no dedicated policy governing eco-industrial parks in Turkey. Therefore, not only the individual cases like IAOIZ but also at

the national level support should be needed, and maybe a program and legislation for EIPs will be required to change the existing OIZs to EIPs.

References

Fang, Y., Cote, R. P., & Qin, R. (2007). Industrial sustainability in China: Practice and prospects for eco-industrial development. Journal of environmental management, 83(3), 315-328.

Gibbs, D., & Deutz, P. (2005). Implementing industrial ecology? Planning for eco-industrial parks in the USA. Geoforum, 36(4), 452-464.

IAOZ (2018). İzmir Atatürk Organized Zone Website, Retrieved from http://www.iaosb.org.tr/

Jung, S., An, K. J., Dodbiba, G., & Fujita, T. (2012). Regional energy-related carbon emission characteristics and potential mitigation in eco-industrial parks in South Korea: Logarithmic mean Divisia index analysis based on the Kaya identity. Energy, 46(1), 231-241.

Lowe, E. A. (1997). Creating by-product resource exchanges: strategies for eco-industrial parks. Journal of cleaner production, 5(1-2), 57-65.

Lowe, E. A. (2001). Eco-industrial park handbook for Asian developing countries. Report to Asian Development Bank.

MSIT (2018). Ministry of Science, Industry and Technology, Directorate of Productivitiy Website, Retrieved from https://vgm.sanayi.gov.tr/index.html?lang=tr.

Pisani, J. A. (2006). Sustainable development–historical roots of the concept. Environmental Sciences, 3(2), 83-96.

Roberts, B. H. (2004). The application of industrial ecology principles and planning guidelines for the development of eco-industrial parks: an Australian case study. Journal of cleaner production, 12(8-10), 997-1010.

Tian, J., Liu, W., Lai, B., Li, X., & Chen, L. (2014). Study of the performance of eco-industrial park development in China. Journal of Cleaner Production, 64, 486-494.

UNIDO (2016). Global Assessment of Eco-Industrial Parks in Developing and Emerging Countries. Report of UNIDO.

Veiga, L. B. E., & Magrini, A. (2009). Eco-industrial park development in Rio de Janeiro, Brazil: a tool for sustainable development. Journal of cleaner production, 17(7), 653-661.

WB (2017) .An International Framework For Eco-Industrial Parks. Report of World Bank.

WCED (1987). Report of the World Commission on Environment and Development: Our Common Future. Report of United Nations.

Zhang, L., Yuan, Z., Bi, J., Zhang, B., & Liu, B. (2010). Eco-industrial parks: national pilot practices in China. Journal of Cleaner Production, 18(5), 504-509.

Zhao, H., Guo, S., & Zhao, H. (2018). Comprehensive benefit evaluation of eco-industrial parks by employing the best-worst method based on circular economy and sustainability. Environment, Development and Sustainability, 20(3), 1229-1253.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Environmental Problems and Policy in Australia

H. Nur Özkan Öztürk[1]

[1] *Research Assistant, Department of Architecture, Çankaya University, Ankara, Turkey, huriyenurozkan@gmail.com*

Abstract: Global warming and climate change is two most challenging problems that our world faced in last several decades. In most parts of the globe, severe effects of these two problems could be observed. The role of the countries is decisive in the domain of environmental politics and policies. Australia is one of the prominent countries regarding its wealth in monetary and environmental terms. That is why, the role of the country is presented and discussed in this study.

Keywords: Climate change; ecological sustainability; Australia

Introduction

Commonwealth of Australia is a part of the continent of Oceania, located in the southern hemisphere, and consisted of one main island with several other smaller islands. Population of the country is recorded as 24,708,863 in 2018, and population density is 3 persons/ km^2 (Australia Population, 2018). According to International Monetary Fund (IMF), Australia is one of the advanced economies in the world (World Economic Outlook, 2018). The country is one of the Annex I and II countries in UNFCCC. Tulip (2014) mentioned in his article that between the years of 2002 and 2012, GDP that was obtained from export of mining is increased 2% to 8%, which is named "Mining Boom" in literature. Uranium and coal are the main underground sources that the country benefitted most. Additionally, nearly three over fourth of electricity generation in the country is produced from the coal power plants (Energy in Australia, 2015). Total CO_2 emission rate of the country is in the mid-level; however, per capita emission rates are quite high, so that 16,35 tones for each average citizen in 2013 (World Bank, 2014). This ratio is higher than many other European countries or important growing economies such as China, Brazil, India, and Russian Federation.

Environmental Problems in the Country

Australia has very many natural wealth especially regarding its land and marine environment. In this aspect, the effect of late human arrival to the island is an argument that had a role in this wealth. While mentioned sites inherit significant amount of biological diversity, some

of them were protected by related organizations, such as UNESCO. Great Barrier Reef, Wet Tropics of Queensland, Gondwana Rainforests of Australia, or Purnululu National Park, Ningaloo Coast are some of the numerous values of the country.

Global warming and climate change is the most relentless problem of the world today that many of the countries are suffered from. Commonwealth Scientific and Industrial Research Organization (CSIRO) published a comprehensive report in 2007, including evaluation of climate change in Australia with possible results in next decades. 2-3 °C increase in the average temperature will have an effect on melting down of ice, and correspondingly rise at sea level, which will have an impact on thermocline circulation in ocean (THC). This scenario will cause serious damages in the land, such as, droughts, ocean acidification, warmer sea surface temperatures, increased heat waves the risk of fires in arid land, etc. (Preston and Jones, 2006).

Although Australia has a rich environment, the lands of the country are also under the serious risk of biodiversity loss and deforestation. Waldron et al. (2017) recorded in their research that 60% of biodiversity of the world has lost between 1996 and 2008 in seven countries in total, just when the country was facing with the “Millennium Drought”. One of the effects of climate change in Western Australia resulted with the collapse of wide forests in 2010 and 2011 (Matusick, et. al., 2012). This problem indirectly affects a minority group in the country, called Aborigines. They still living in their indigenous lifestyles, which brought an important cultural heritage to the country in social terms (Environmental problems in Australia, n.d.). In this regard, problem of deforestation expresses certain type of importance, in order to provide a safe and habitable environment for Aborigines.

Environmental Policy and Management in Australia

There are several significant events that shaped environmental policies of countries in global and national terms. In this part, some of these are mentioned, with respect to national progress in the policy making process in the country.

Australia was represented in the **Earth Summit/Rio Conference** of United Nations Conference on Environment and Development in 1992. At same year, government in Australia presented **National Strategy for Ecologically Sustainable Development (NSED)**. Major objectives and principles of this strategy corresponds with Sustainable Development Goals

declared in Rio. One of the most important legislations in Australia about environmental protection is **Environmental Protection and Biodiversity Conservation Act**, that aimed the protection of natural heritage, started in 2000 and it has become a law in 2013.

In **Millennium Summit** in New York in 2000, which is mentioned in Seyfang (2003), the political attitude of both Australia and United States is not collaborative regarding the induction in the carbon footprint reduction. **Kyoto Protocol (1997)**, the target greenhouse gasses reduction rate of Australia is "increase of 8 per cent above 1990 levels" while EU agreed on 8%, and United States by 7 per cent below 1990 levels. (Dauvergne, 2005). At later periods, Australia ratified the protocol in 12 December 2007, and required to reduce its emission rates by 8% regarding 1990 level, between the years of 2008-2012. (Nielson, n.d.).

Power (2017) mentioned about the targets and attitude of Australia towards **Paris Agreement** of United Nations of Framework Convention on Climate Change. The agreement come into force in 2016. Afterwards, Australia ratified the agreement, and nearly 200 countries agreed on it by then. Australia declared its target GHG emissions by 26-28% below 2005 levels by 2030. Some of the research organizations, including Climate Action Tracker, argued that the INDCs of Australia is as not ambitious as other developed countries, but the government preserved the targets (Power, 2017).

There are several policy methods for the reduction in GHGs and CO_{eq} emissions of Australia, to achieve the reduction target in Paris Agreement. Treatment of renewable sources in national energy generation; Clean Development Mechanism methods; and energy efficiency measures on building stock with necessary groundwork of research and development are several generic mechanisms of reduction policies of the country (Nielson, n.d.). Additionally, Ross and Dovers (2008), underlined that long process of bureaucracy and necessity of "adhocracies", which is "temporary, ad hoc solutions and neither transparent, nor accountable".

Conclusion

In the light of mentioned aspects, Australia is one of the countries that effect of global warming and climate change is obscure and severe. The country inhabits many of the species and natural wealth of the nature in its lands, with the fact that considerable amount of them are under the threat of extinction. On the other hand, Australia is a developed country that is containing the

majority of fossil fuel reserves among the world, mainly coal and uranium. Subsequently, this wealth of underground sources contributed to the economic development of Australia, indeed. At the end, this brings a certain kind of contradiction and dilemma to the overall position of the country. Policymaking in the country is quite challenging. Regarding the mentioned environmental problems there are attempts and precautions that tried to be taken by governmental bodies or non-governmental organizations around the world. However, at the end, the country is under the risk of climate change and global warming with their severe effects, similar with most of the other lands and oceans around the world.

Acknowledgements: This study is prepared within the scope of a graduate course named as "UPL540, Environmental Politics and Policy" given in Middle East Technical University, Ankara, by Assoc. Prof. Dr. Osman Balaban.

References

(2015). Energy in Australia. January 22. Accessed April 25, 2018. https://www.originenergy.com.au/blog/about-energy/energy-in-australia.html.

(2018). *World Economical Outlook.* International Monetary Fund. Retrieved April 26, 2018, from http://www.imf.org/en/Publications/WEO/Issues/2018/03/20/world-economic-outlook-april-2018

Australia Population. (2018). Retrieved April 22, 2018, from http://www.worldometers.info/world-population/australia-population/

Climate change impacts in Australia. (n.d.). Retrieved from Government of Australia: http://www.environment.gov.au/climate-change/climate-science-data/climate-science/impacts

Dauvergne, P. (2005). Globalization and the environment. Global political economy, 448-478.

Environmental problems in Australia. (n.d.). Retrieved April 25, 2018, from http://wwf.panda.org/who_we_are/wwf_offices/australia/environmental_problems_in_australia/

Matusick, G. H., Hardy, G., Ruthrof, K. (2012). *Western Australia's catastrophic forest collapse*. Retrieved April 26, 2018, from http://theconversation.com/western-australias-catastrophic-forest-collapse-6925

Nielson, L. (n.d.). *Emissions control policies*. Retrieved May 28 2018, from Australian Government:

https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook43p/emissioncontrol

Power, S. (2017). *Paris climate agreement: a quick guide.* Parliament of Australia. Retrieved 05 24, 2018, from http://parlinfo.aph.gov.au/parlInfo/download/library/prspub/5623378/upload_binary/5623378.pdf

Preston, B. L., & Jones, R. N. (2006). *Climate change impacts on Australia and the benefits of early action to reduce global greenhouse gas emissions*. Canberra: CSIRO.

Ross, A., & Dovers, S. (2008). Making the harder yards: environmental policy integration in Australia. *Australian Journal of Public Administration*, 67(3), 245-260.

Seyfang, G. (2003). Environmental mega-conferences: from Stockholm to Johannesburg and beyond. *Global Environmental Change 13*, 223-228.

Tulip, P. (2014). *The Effect of the Mining Boom on the Australian Economy.* Bulletin. Retrieved April 26, 2018, from https://www.rba.gov.au/publications/bulletin/2014/dec/pdf/bu-1214-3.pdf

Waldron, A., Miller, D. C., Redding, D., Mooers, A., Kuhn, T. S., Nibbelink, N.,Timmons Roberts, J., Tobias, J. A., Gittlement, J. L. (2017, October 25). Reductions in global biodiversity loss predicted from conservation spending. *Nature*, 364-367. Retrieved from https://www.nature.com/articles/nature24295

World Bank. (2014). *CO2 emissions (metric tons per capita)*. Retrieved 05 19, 2018, from https://data.worldbank.org/indicator/EN.ATM.CO2E.PC

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Defining Cittaslow requirements in the context of sustainability

Ayça Özmen[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, aozmen@cankaya.edu.tr*

Abstract: Cittaslow International Association, a network of small scale urban settlements with population of less than 50.000, is defined as "an alternative sustainable town model" in literature because of adopting similar principles of sustainability. Cittaslow International has a charter and Cittaslow "requirements for excellence", constituted by 72 indicators, clustered under seven principal titles, are one of the most significant parameter of this charter. These requirements contain examples of local practices which target to maintain the essence of Slowness and increase the quality of local life. Within the scope of this paper, it is argued that 72 indicators of requirements are sharing multi-dimensional attributes which explain the sustainable contribution of Cittaslow program to town's management. The paper focuses on integrated approach of Cittaslow requirements within the context of sustainability and aims at developing a new definition on Cittaslow by analysing the contributions and relationships of indicators with each other. By means of diagram method, indicators will be analysed to reveal their sustainable and interrelated points of view. In this sense, diagram, composed on its own motion according to features of indicators, will provide to reinterpret the definition of Cittaslow Movement in a new expression.

Keywords: Cittaslow movement; sustainability; Cittaslow requirements

Introduction

According to Our Common Future-Brundtland Report, sustainability is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.41). For sustainability it is necessary to protect natural resources, maintain healthy economies and distribute assets fairly (Hatipoğlu, 2015, p. 22).

In urban scale sustainability is identified with implementing recycling or reuse systems in resource and energy consumption, distributing environmental resource utilization equitably, increasing the level of social and economic life, reducing class differences, protecting cultural heritage, having organized and participative management mechanisms, seeking solutions to create healthy and livable urban environments (Özcan, 2012, p. 407). Sustainable settlements initiate physical, socio-cultural, economic and administrative approaches such as adopting recycling models in energy systems, balancing between production-consumption-waste, reducing individual carbon footprint, protecting natural habitat, benefitting from the opportunities with sense of social justice and equality (Niemela, 1999; Van Diepen, 2001; Naes, 2001; Özcan, 2012, p. 406).

On the other side, Cittaslow International Association is a network of small scale settlements with population of less than 50.000. It was founded in Orvieto (Italy) in 1999 by mayors of four Italian towns -Bra, Greve in Chianti, Orvieto, Positano-. Since that time, the association has expanded to 252 towns in 30 countries all around the world (data in July 2018 from Cittaslow International, n.d.). Cittaslow presents a holistic town management schedule adopting Slow philosophy. It primarily aims at increasing inhabitants' quality of life by sustaining local values of settlements.

Cittaslow International has a charter which introduces its history, principles, symbol, values, official languages, international and national organization structures, funds, responsibilities, rights, participation conditions and membership requirements in 29 principal articles and 5 appendixes. Besides, Cittaslow criteria, put it differently, "requirements for excellence" are one of the most significant parameter of this charter. Cittaslow requirements for excellence are constituted by 72 indicators, clustered under seven principal titles such as "energy and environmental policies, infrastructure policies, quality of urban life policies, agricultural, touristic and artisan policies, policies for hospitality, awareness and training, social cohesion and partnerships". These requirements are sensitive and amenable to interconnectedness among environmental conservation, economic development and social justice included in the concept of Campbell's 3E (Environment, Economy, Equity) of sustainability (Mayer and Knox, 2006, p. 321-322).

Cittaslow requirements contain local practices in order to maintain the essence of Slowness and increase quality of local life via sustainability (Radstrom, 2011, p. 96). In this context, a settlement with high quality of life offers directly environmental quality and sustainability by putting emphasis on alternative modes of transportation and pedestrian friendly urban design, protecting cultural heritage and urban identity, maintaining local and traditional products and techniques, encouraging public education and making both inhabitants and visitors at home (Radstrom, 2011, p. 96-99).

Cittaslow settlements take measures to air, water, noise and light pollution; produce projects on energy saving and renewable energy resources; promote bicycle riding and public transport services; put emphasis on accessibility; regenerate and enhance green spaces; support sustainable architecture and urban planning, continuity of traditional and local crafts, products and flavours, rural and agricultural development; protect local values; improve social infrastructure; expand awareness on liveability and share their experiences with each other

through implementing Cittaslow requirements and their indicators. However, all outputs are supposed to be local and distinctive (Özmen and Can, 2018, p. 93).

Because of adopting similar principles of aforementioned sustainable city approach, Cittaslow Movement is defined as "an alternative sustainable town model" in literature (Keskin, 2012, p.96; Pink, 2008, p. 99; Milutinovic, 2009, p.9; Mayer and Knox, 2006, p. 321; Carp, 2012, p.137).

Briefly, this paper focuses on integrated approach of Cittaslow requirements within the scope of sustainability and aims at developing a new definition on Cittaslow by analyzing the contributions and relationships of indicators with each other.

Methods

"Cittaslow" is made up of 2 words: italian *citta* (city) and english *slow.* This bilingual name expresses its birth place via Italian expression and its relation with Slow and Slow Food Movement via English one. Furthermore, its charter mentions not to translate the term in any other language (Cittaslow International Charter, 2017).

This interdisciplinary topic, Cittaslow is defined by researchers from different fields such as urban planning, architecture, social sciences, public administration, tourism, business economics, environmental sciences, etc. as an alternative local management and/or sustainable development model and/or urban social movement formed against standardisation created by globalization and aiming to increase quality of local life by adopting Slow Food philosophy.

In order to be the member of Cittaslow Association, towns are expected to submit proposals related to Cittaslow requirements for excellence. These requirements are as hereinbefore mentioned in seven main titles such as "energy and environmental policies, infrastructure policies, quality of urban life policies, agricultural, touristic and artisan policies, policies for hospitality, awareness and training, social cohesion and partnerships".

Within the scope of this paper, it is argued that 72 indicators of requirements are sharing multi-dimensional attributes which explain the sustainable contribution of Cittaslow program to town's management and by means of diagram method, indicators are analysed to reveal their sustainable and interrelated points of view.

Diagram, composed on its own motion according to features of indicators, may provide to reinterpret the essence of Cittaslow Movement in a new expression.

Findings, Discussion

Cittaslow requirements and their indicators are shown in Table 1:

Table 1. Cittaslow requirements for excellence (Cittaslow International Charter, 2017).

CITTASLOW REQUIREMENTS FOR EXCELLENCE	
ENERGY AND ENVIRONMENTAL POLICY	
1.1 Air quality conservation	1.7 Energy saving in buildings and public systems
1.2 Water quality conservation	1.8 Public energy production from renewable sources
1.3 Drinking water consumption of residents	1.9 Reduction of visual pollution, traffic noise
1.4 Urban solid separate waste collection	1.10 Reduction of public light pollution
1.5 Industrial and domestic composting	1.11 Electrical energy consumption of resident families
1.6 Purification of sewage disposal	1.12 Conservation of biodiversity
INFRASTRUCTURE POLICIES	
2.1 Efficient cycle paths connected to public buildings	2.5 Removal of architectual barriers
2.2 Length (in kms) of the urban cycle paths created over the total of kms of urban roads	2.6 Initiatives for family life and pregnant women
2.3 Bicycle parking in interchange zones	2.7 Verified accessibility to medical services
2.4 Planning of ecomobility as an alternative to private cars	2.8 "Sustainable" distribution of merchandise in urban centres
	2.9 Percentage of residents that commutes daily to work in another town
QUALITY OF URBAN LIFE POLICIES	
3.1 Planning for urban resilience	3.10 Development of telecommuting
3.2 Interventions of recovery and increasing the value of civic centres	3.11 Promotion of private sustainable urban planning
3.3 Recovery/creation of social green areas with productive plants and/or fruit trees	3.12 Promotion of social infrastructure
3.4 Urban livableness	3.13 Promotion of public sustainable urban planning
3.5 Requalification and reuse of marginal areas	3.14 Recovery/creation of productive green areas with productive plants and/ or of fruit within the urban perimeter
3.6 Use of ICT in the development of interactive services for citizens and tourists	3.15 Creation of spaces for the commercialization of local products
3.7 Service desk for sustainable architecture	3.16 Protection /increasing value of workshops- creation of natural shopping centers
3.8 Cable network city	3.17 Metre cubes of cement (net infrastructures) in green urban areas
3.9 Monitoring and reduction of pollutants	
AGRICULTURAL, TURISTIC AND ARTISAN POLICIES	
4.1 Development of agro-ecology	4.6 Education of flavors and promoting the use of local products, if possible organic in the catering industry and private consumption
4.2 Protection of handmade and labelled artisan production	4.7 Conservation and increasing the value of local cultural events
4.3 Increasing the value of working techniques and traditional crafts	4.8 Additional hotel capacity
4.4 Increasing the value of rural areas	4.9 Prohibiting the use of GMO in agriculture
4.5 Use of local products, if possible organic, in communal public restaurants	4.10 New ideas for enforcing plans concerning land settlements previously used for agriculture
POLICIES FOR HOSPITALITY, AWARENESS AND TRAINING	
5.1 Good welcome	5.6 Health education
5.2 Increasing awareness of operators and traders	5.7 Systematic and permanence information for the citizens regarding the meaning of Cittaslow
5.3 Availability of "slow" itineraries	5.8 Active presence of associations operating with the administration on Cittaslow themes
5.4 Adoption of active techniques suitable for launching bottom-up processes in the more important administrative decisions	5.9 Support for Cittaslow campaigns
5.5 Permanent training of trainers and /or administrators and employees on Cittaslow slow themes	5.10 Insertion/use of Cittaslow logo on headed paper and website
SOCIAL COHESION	
6.1 Minorities discriminated	6.7 Community association
6.2 Enclave / neighbors	6.8 Multicultural integration
6.3 Integration of disable people	6.9 Political participation
6.4 Children care	6.10 Public housing
6.5 Youth condition	6.11 The existence of youth activity areas, and a youth center
6.6 Poverty	
PARTNERSHIPS	
7.1 Support for Cittaslow campaigns and activity	
7.2 Collaboration with other organizations promoting natural and traditional food	
7.3 Support for twinning projects and cooperation for the development of developing countries covering also the spread philosophies of Cittaslow	

After investigating several case studies of Cittaslow settlements, it is understood that, requirements and their indicators are interrelated and show sustainable characteristics.

For this purpose, titles of Cittaslow requirements are redenominated in sustainable terms as environmental, physical, administrative, economic, social and cultural. Interrelated requirements cluster and intersect with each other to form self-assemble diagram below:

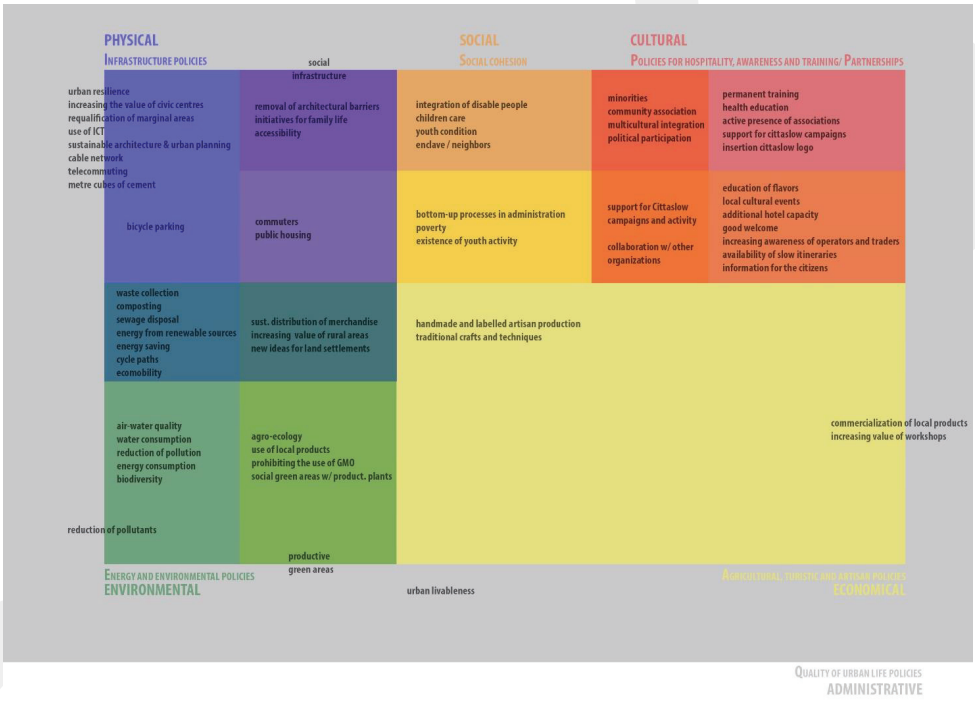


Figure 1. Analysing multi-dimensional contribution of Cittaslow requirements and indicators.

To keep Cittaslow requirements in perspective, indicators under each main topic are interrelated with other topics and indicators. According to Figure 1, Cittaslow requirements can be described as quality of urban life policies which are composed of energy and environmental policies, infrastructure policies, policies for hospitality, awareness and training, social cohesion and partnerships gathered around agricultural, touristic and artisan policies.

This diagram also shows that requirements present multi-dimensional town management program.

Conclusion

To put it in a sustainable point of view, seven titles of Cittaslow requirements such as "energy and environmental policies, infrastructure policies, quality of urban life policies, policies for hospitality, awareness and training, social cohesion and partnerships" can be renamed as environmental, physical, administrative, cultural, social and socio-cultural, respectively. Diagram shows that, each title except administrative one intersects with economic aspect and administrative aspect comprises all of them. As a result, by virtue of the self-assemble diagram of this study, Cittaslow requirements can be defined as an administrative framework which is formed by environmental, physical, social, cultural policies gathered around local economic programmes.

References

Carp, J. (2012). The Town's Abuzz: Collaborative Opportunities for Environmental Professionals in the Slow City Movement. *Environmental Practice, 14,* 130-142.

Cittaslow International, (2017). *Cittaslow International Charter*. Retrieved from http://www.cittaslow.org/sites/default/files/content/page/files/257/charter_cittaslow_en_05_18.pdf

Cittaslow International. *Association*. http://www.cittaslow.org/content/association. (Last Accessed in August 2018).

Hatipoglu, B. (2015). Cittaslow: Quality of Life and Visitor Experiences. *Tourism Planning & Development, 12 (1)*, 20-36.

Keskin, E. B. (2012). Sürdürülebilir Kent Kavramına Farklı Bir Bakış: Yavaş Şehirler (Cittaslow). *Paradoks Ekonomi, Sosyoloji ve Politika Dergisi, 8 (1)*, 81-99.

Mayer, H. & Knox, P. L. (2006). Slow Cities: Sustainable Places in a Fast World. *Journal of Urban Affairs, 28 (4)*, 321–334.

Milutinovic, S. (2010). Citta Slow Movement Ludlow UK. *Urban Sustainable Development: A European Perspective*, 1-10.

Naes, P. (2001). Urban Planning and Sustainable Development, *European Planning Studies, 9 (1)*, 503-524.

Niemelä, M. (1999). Ecology and Urban Planning, *Biodiversity and Conservation, 8 (1)*, 119-131.

Özcan, K. (2012). Sürdürülebilir Kent Modeli. In *Kentsel Planlama Ansiklopedik Sözlük* (pp. 406-407). İstanbul: Ninova Yayınları.

Özmen, A. & Can, M.C. (2018). Cittaslow Hareketi'ne Eleştirel Bir Bakış. *Planlama Dergisi*, 28 (2), 91-101.

Pink, S. (2008). Sense and Sustainability: The Case of the Slow City Movement. *Local Environment, 13 (2)*, 95-106.

Rådström, S. J. (2011). A Place Sustaining Framework for Local Urban Identity: An Introduction and History of Cittaslow. *Italian Journal of Planning Practice, 1 (1)*, 90-113.

Van Diepen, A. ve Voogd, H. (2001). Sustainability and Planning: Does Urban Form Matter?, *International Journal of Sustainable Development, 4 (1)*, 59-74.

WCED, (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Oxford: Oxford University Press.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Creating a start point for continuity of new educational approach by using design

Ahsen Ozturk[1]

[1]*Industrial Design, Ondokuz Mayis University, Samsun, Turkey, ahsenozturk@gmail.com*

Abstract: In the 21st century, there were many changes in technology and science, which affected the designers' role. Designers started to design societies, systems by being a facilitator. One of the fields that designers have contributed is education and in education, design thinking (DT) approach was used in many areas. In literature, there were many theses from the point of management about the effect of DT on innovation; however they offer little insight about whether DT is successful or not about creating a change in schools. This paper aims to investigate how designer initiates a change in minds by using DT method about a new educational approach (STEM) to be the start point of continuity. The research method of this study is case study in which co-design workshops and focus group sessions are held for teachers. Furthermore, this study is examined and evaluated considering the analysis of the data obtained from the interviews, focus group interviews and observations.

Keywords: STEM education; design thinking; using design methods in education; sustainable education.

Introduction

In the 21st century, there were many changes in technology and science, which affected the designers' role. Designers started to design societies, systems and they are expected to solve problems with other disciplines. One of the fields that designers contributed is education and in education, design thinking (DT) approach was used in many areas such as curriculum design, or classroom design (REDlab, n.d.). After reviewing the literature, many theses have been found about DT from the organization perspective (Howard, 2015; Di Russo, 2016). In these studies, DT has been accepted as an approach for innovation within organizations; however the literature offers little insight about whether DT is successful or not about creating a change in education by accepting it as an organization. Furthermore, most of the theses were made by people from management discipline not from design discipline.

In this paper, it is intended to investigate how designer initiates a change in minds by using DT method about a new educational approach, STEM approach (the acronym of the first letters of the word of Science, Technology, Engineering and Mathematics), to be the start point of continuity at school. Since DT approach has been used in education in many areas, in this research, it was used in the creation of STEM activities which includes all disciplines.

Methods

This paper explores the place of design in education by using DT approach in the creation of STEM activities of teachers to find out answer to how designer can initiate change in minds in the context of K12 education about a new approach, since "organizational change" indicates changing of ideas (Giacquinta, 1973). The empirical part of this research consists of two parts, which are;

- Choosing and adapting the DT method for STEM activity planning.
- Organizing co-design workshops and focus groups
- Two workshops with 5th grade teachers in one of the school to create and test the designed STEM activities.

To understand this study extensively, a case study which has two co-design workshops that use DT method as a tool for analysis was preferred. In this study, qualitative research methods were utilized in which data was obtained from researcher notes based on observations in workshops and STEM activities, focus group interviews and semi-structured interviews with students and teachers. Therefore, the result of this research was based on the analysis of these documents.

Findings and Discussion

In the first and second terms of the 2017-2018 academic year, two workshops were held in one of the school. The first workshop was realized at the 18th and the 25th of November and the second one was realized at the 28th of February and 1st of March 2018 with five teachers from different disciplines. In the first one, teachers created and implemented a common STEM activity (including 3 activities) and interdisciplinary courses (including 8 courses). As a result, we were successful in the interdisciplinary courses; however we failed in the two activities of common activity. Considering the first workshop, we confronted many problems. These challenges can be listed as below;

- Due to the MİS exam (an exam for passing to high school from secondary school), teachers had to make extra teaching to students that I barely found time to work with them about our activities.

- Teachers had different commitments to this study and had very busy schedule. At the end of the study, they stated that they preferred to be themselves or with only 1 teacher for activity design due to having less time.
- There was no communication between teachers before the activities since only one of the teachers had an interdisciplinary teaching experience.
- Students had no idea about the STEM activity before.
- Students had so changeable behaviors due to their adolescence problems that teachers could not guess their reactions.
- Students were so focused on the exams that they did not want to deal with STEM. Furthermore, teachers told that students think STEM something temporary at school.
- Students who get used to test questions were confused in the activity about the problems that needed interpretation.
- Students disliked making interdisciplinary courses in speaking and art courses, since these courses have fewer hours in a week.
- The school administration had heard the name STEM before, however they did not know DT approach and there were no implementation of STEM at school.

After reviewing the result, it was found out that students had much impact on teachers and the success of the research. Therefore, I decided to focus on both students and teachers as a stakeholder in the second workshop. In the second term, teachers also told that students did not want to make STEM and I decided not to tell the name "STEM" to the students to make them not scared. Furthermore, we cared more about their exam weeks to plan the activity time, while designing the activity with teachers. We also wanted to inform them one week before the activity about the subjects to make them study. In the second term, the students were also told that the activity being graded. Students liked activities that included theme they love in the first term; therefore, we found an activity theme that attracts students' attention which also included prototyping as they like. As a result, due to the students' complaints and teacher comments, only one activity was created and implemented. According to teachers and students' feedback and my observations, the activity was successful, students' involvements were higher and teachers satisfied from the result.

Conclusion

Due to the complex nature of change and innovation, any implementation regarding to change takes time and needs people understanding. School improvement is based on the change of the students learning, the teachers having the main role and the school as being the supporter (Shen, 2008). Making only one or two trials does not mean it's suitable for all school (Giacquinta, 1973). The result can be different in other classes since there are different students and teachers. Different strategies can be needed by designer to implement and sustain a change. However, if people favor the change, the initiation of change starts. In this study, there were different challenges, however all of them are related to each other, since at school, all of the actors which are stuff (teachers) and customers (students, parents) are inside the organization contrary to the other organizations. Therefore, they are all customers and also stakeholders.

This paper aims to investigate how designer initiates a change in minds by using DT method about a new educational approach (STEM) to be the start point of continuity at school. The findings indicates that designer should take into consideration all of the actors, by starting from the students who are the most being affected one and also affected others (teachers, parents) with their decisions. While in organizations, the change starts from the change in the staff's behavior, in education, the change will start from students and also parents and lastly in the whole organization. As a result, DT in practice should take into consideration the environment, designer, approach and also the users in education (Figure 1).

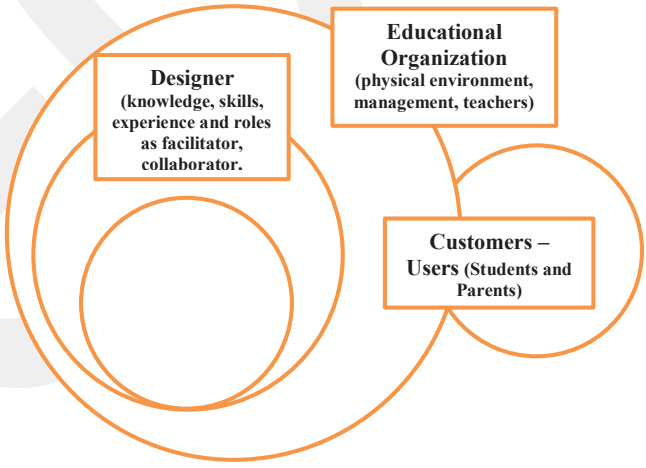


Figure 1. Four elements of Design Thinking in educational practice

References

Di Russo, S. (2016). *Understanding the behaviour of design thinking in complex environments*. (Unpublished doctoral dissertation). Swinburne University of Technology, Australia.

Giacquinta, J. B. (1973). The process of organizational change in schools. *Review of Research in Education*. 1, 178-208.

Howard, Z. (2015). *Understanding design thinking in practice: A qualitative study of design led professionals working with large organisations*. (Unpublished doctoral dissertation). Swinburne University of Technology, Australia.

Nathan, M., & Pearson, G. (2014). *Integration in K–12 STEM education: status, prospects, and an agenda for research*. Paper presented at 121st ASEE Annual Conference & Exposition, IN, USA.

REDlab (n.d. October 11, 2017) Retrieved from http://www.stanford.edu/group/redlab/cgi-bin/

Shen, Y. (2008). The effect of changes and innovation on educational improvement. *International Education Studies*, 1 (3), 73-77.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Prediction of heat cost indicator in a home office using artificial neural network and genetic algorithm models

Yasemin Öztürk[1*], Tuğçe Kazanasmaz[1], Gökmen Tayfur[2]

[1]*Department of Architecture, İzmir Institute of Technology, İzmir, Turkey, yaseminozturk@iyte.edu.tr, tugcekazanasmaz@iyte.edu.tr*
[2]*Department of Civil Engineering, İzmir Institute of Technology, İzmir, Turkey, gokmentayfur@iyte.edu.tr*

Abstract: Artificial intelligence (AI) model applications are increasingly used in science and engineering. Commonly employed AI methods are the Artificial Neural Networks (ANNs), which exemplify the neural cell structure of the human brain having the ability to learn, and Genetic Algorithm (GA), which searches the best solution under some specified constraints. ANN models are successfully used in many disciplines, modelling and control processes due to its learning ability. Both of them can be integrated in estimation of heating costs utilizing basic changes in indoor and outdoor temperature, humidity and illuminance values. This paper aims to predict the heat cost indicator, obtained from an allocator in an existing home office, in İzmir by using the ANN and GA models. The comparison results showed that ANN and GA models successfully estimated the actual heat cost readings with 87% and 79% prediction powers, respectively.

Keywords: home office; heating; ANN; GA; heat cost; prediction.

Introduction

Heating energy use in the residential and office buildings covers a reasonable potion (30%) in the breakdown of total energy consumptions in Turkey (Turhan et.al. 2014). Cost estimation is another issue to reach the required levels of satisfaction for sustainability of economic development in both developing and industrialized countries. If we know the amount of energy used for heating before buildings are constructed, we can take precautions to minimize it to raise the quality of life, efficiency of industrial sectors and economy. Specifically, to learn the possible heat cost corresponding to the heating energy use, even in a single home office, at the early stage of design and constructions can lead professionals to saving energy and finding basic and efficient design solutions. A good way to deal with this problem is to find practical and fast heat use estimation techniques. This study proposes a comparative analysis of ANNs and GA models for this purpose. Although application of AI techniques in building design can be problematic due to variations of many design parameters, this study proposes a simple and unique case model to show how to contribute modifications in climate parameters—temperature, humidity, illuminance—in heating estimation model.

ANNs are database systems formed by artificial neurons in layers and aim to use the ability of the human brain to make decisions very quickly under various conditions in solving

complex problems (Tayfur, 2012; Kazanasmaz et al, 2009). Artificial neurons are clustered in ANNs models to relate to the other neurons via layers, having similar structures (Turhan et al., 2014; Tekkanat et al., 2017)

GAs are search and optimization methods based on natural selection principles. (Azadeh, et al. 2007; Tayfur 2012). They use coded forms rather than parameter sets. GAs which function according to probability rules, require only objective function. The solution is not a complete space but a specific part of it. Performing an efficient search, they reach the solution in a much shorter time (Tayfur 2012; Siemens, 2017). Another advantage is the simultaneous analysis of the population of solutions to reach the best ones.

Model Application

The case room is a home office in İzmir (38°N, 27°E). It has a 12 m^2 floor area and 2.3 m^2 glazing area, facing north. The story height is 2.9 m. Figure 1 schematically shows the home office plan and the heat cost allocator. The home office is mostly used at night time in a week but also used during daytime (between 9 am to 6 pm). That means the room needs to be analysed both during 24 hours and seven days of the week. The climate of İzmir is temperate-humid. The average minimum temperatures during winter vary between 6 and 8°C.

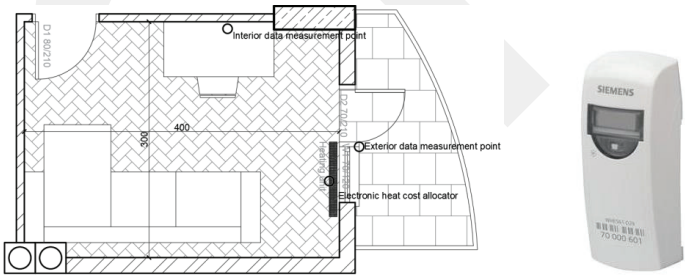


Figure 1. Plan of the home office and heat cost allocator.

Two data loggers – inside and outside the room-- hourly recorded temperature, humidity, illuminance and air velocity. Measurements were taken during 25 days, from November 29 to December 23, 2017. An electronic heat cost allocator (see Figure 1) measures temperature differences and calculates heat consumption due the radiator. The heat use is measured in units, accumulated in a counter unit. It was possible to see real time readings at the screen of the cost allocator.

First, a three-layer ANNs model with a feed-forward type was employed in NeuralTools. The input layer involves 7 neurons for input variables, the hidden layer has two

neurons, the output layer has one neuron for the output variable. Data used in the ANNs model construction was determined from measurement readings as tabulated in Table 1. The measurement period covers sunny, cloudy and rainy days. Data was categorized into training data set (80% of the data) for the learning (training) phase and testing data set (20% of the data) for the prediction phase. To apply the ANN model in NeuralTools, GRNN Numeric Predictor was chosen and a total of 1000 iterations were completed. Accuracy of the model was evaluated with the coefficient of determination (R^2) and error frequencies.

Table 1. Input and output variables

	Data used in the ANNs model	
Input parameters	Minimum	Maximum
interior temperature	19°C	25 °C
exterior temperature	6°C	22 °C
interior humidity	41%	67.6%
exterior humidity	28.93%	82%
exterior illuminance	958 lux	12358 lux
exterior air velocity	0.095 m/s	3.764 m/s
Output parameter		
heat cost indicator	0.02	0.05

Second, a GA model was built aiming to minimize the error function (MAE-mean absolute error) at the output values by changing the weights of the input values. In general, GA models become a valuable predictor by including the variation of parameters that are about structural, material selection and outdoor parameters. However, this study was carried on an existing building to mostly include indoor and outdoor temperature humidity and illuminance to the equation, like the ANN model. GA model obtains the optimal values of the model parameters in Eq. (1) by using the values from interior and exterior measurements. It has set to finish 10000 trials.

$$Q_{calculated} = \alpha \times (\beta_1 \times \text{interior temperature}) + (\beta_2 \times \text{interior humidity}) + (\beta_3 \times \text{interior illuminance}) + (\beta_4 \times \text{exterior temperature}) + (\beta_5 \times \text{exterior humidity}) + (\beta_6 \times \text{exterior illuminance}) + (\beta_7 \times \text{exterior air velocity})) \quad (1)$$

The coefficients (β values), corresponding the impact rates of inputs, are assigned values ranging from -5 to 5. α value is varied between 0-1. Evolver GA solver for Microsoft Excel was employed in this study. The algorithm employs the Recipe Solving Method to minimize the objective function under specified constraints (Palisade Corporation, 2001). Detailed explanations for model applications are available in literature (Tayfur, 2008)

Findings and Discussion

The performance of the ANNs model indicating the results of heat cost indicator is presented in Figure 2 and 3. Histogram of residuals distributed per frequencies showed us that residuals become dense at 0.00 with 300 frequencies in training phase, while testing phase has most intense values at 0.00 with 171 frequencies. Regarding very high coefficient of determination (R^2) value which is 99.5 % and scatter diagram for training phase, the model perfectly predicts the output values. Evaluation in the testing phase with 87.4 % prediction rate satisfied our expectation of predicting output values.

The possible best solutions from GA model were presented in Table 2. The model arrived the best result at its trial 5519. The distribution of trial-error relation in Figure 4 shows how the error percentages get constant at a certain trial. The GA's predicted outputs fit well to the measurement results at a satisfactory R^2 value of 79%.

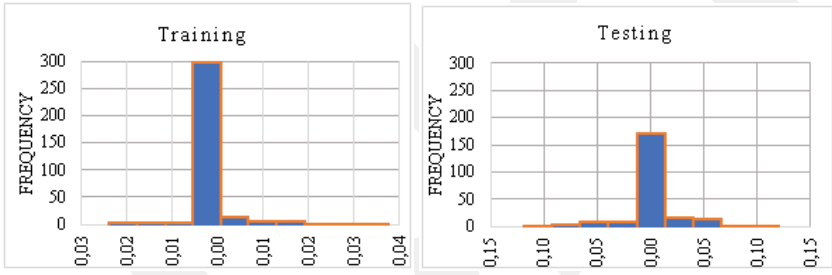


Figure 2. Histogram of residuals for training and testing.

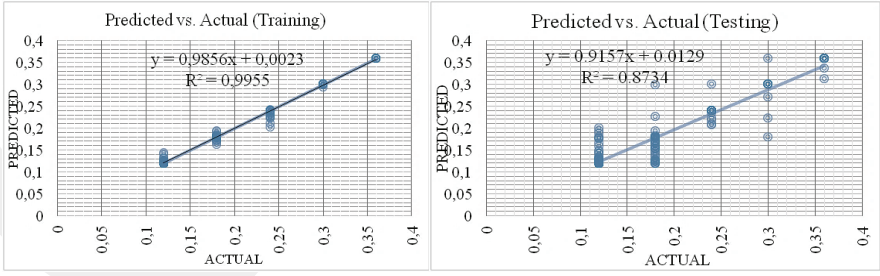


Figure 3. Predicted and actual values in ANN.

Table 2. Best, original and last values of coefficients in GA model

	Trial	Result	α	β_1	β_2	β_3	β_4	β_5	β_6	β_7
Best	5519	0.0001	3.32E-05	4.95	5	1.20	4.96	5	-0.01	4.41
Original	1	0.0006	7.47E-06	3	3	3	1.93	3	0.66	2.18
Last	10000	0.0001	3.34E-05	4.96	4.74	1.41	4.99	4.95	-0.01	2.63

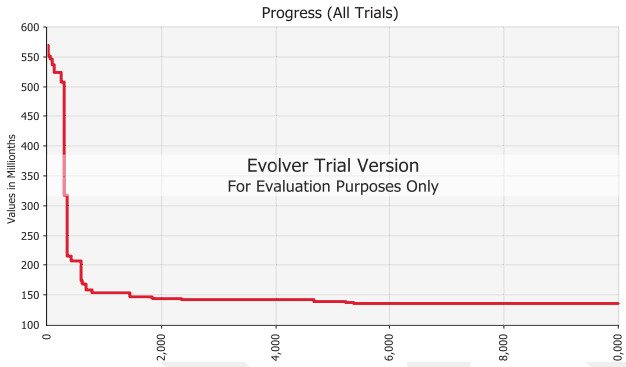


Figure 4. Error percentages per trials in GA.

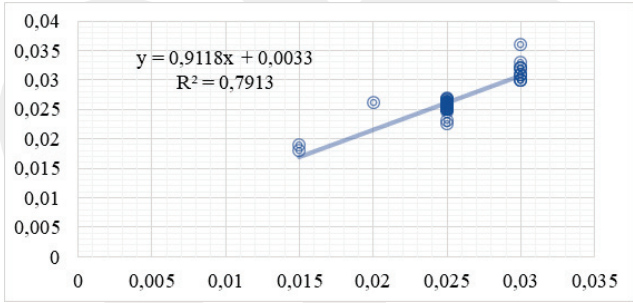


Figure 5. Predicted and actual values in GA.

Conclusion

This study presented the application of ANNs and GA model to predict the heat cost indicator in an existing home office. Findings depicted that ANNs were powerful in generating outputs with an 87% prediction rate; practical and simple when compared to energy simulation techniques; and uncomplicated to employ even for the discipline of the architecture. GA model also showed a satisfactory prediction performance with a 79% prediction rate. The overall study indicates the applicability and accuracy of selected artificial intelligence techniques in the energy use predictions. Further studies may include design

variables like building orientation, materials, site parameters, window openings etc. to strengthen the application and integration of AI models in the design phase.

References

Azadeh, A., Ghaderi, S. F., Tarverdian, S., & Saberi, M. (2007). Integration of artificial neural networks and genetic algorithm to predict electrical energy consumption. Applied Mathematics and Computation, 186(2), 1731–1741. https://doi.org/10.1016/J.AMC.2006.08.093

Kazanasmaz, T., Günaydın, M., & Binol, S. (2009). Artificial neural networks to predict daylight illuminance in office buildings. Building and Environment, 44(8), 1751–1757. https://doi.org/10.1016/j.buildenv.2008.11.012

Palisade Corporation. (2001). The Genetic Algorithm Solver for Microsoft Excel.

Siemens. (2017). WHE55.. - Electronic heat cost allocators with walk-by radio interface. Retrieved January 14, 2018, from https://mall.industry.siemens.com/mall/en/no/Catalog/Product/?mlfb=JXF%3AWHE551-D291

Tayfur G., Moramarco T. Predicting hourly-based flow discharge hydrographs from level data using genetic algorithms. Journal of Hydrology (2008) 352, 77– 93. doi:10.1016/j.jhydrol.2007.12.029

Tayfur, G. (2011). Soft Computing in Water Resources. WIT Press. Retrieved from www.witpress.com

Tekkanat, E., Topaloğlu, M., Kelimeler, A., Kaybı, I., Sistemleri, K. D., & Ağları, Y. S. (2017). Duvarlardaki ısı kaybının yapay sinir ağı ile belirlenmesi ve karar destek sistemi ile malzeme seçimi. Sakarya Üniversitesi Fen Bilimleri Enstitüsü Dergisi. https://doi.org/10.16984/saufenbilder.309565

Turhan, C., Kazanasmaz, T., Uygun, İ. E., Ekmen, K. E., & Akkurt, G. G. (2014). Comparative study of a building energy performance software (KEP-IYTE-ESS) and ANN-based building heat load estimation. Energy and Buildings, 85, 115–125. https://doi.org/10.1016/j.enbuild.2014.09.026

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Comparison of material alternatives in a classroom in terms of daylight distribution and visual comfort survey

Yasemin Öztürk[1*], Tuğçe Kazanasmaz[1], Arzu Cılasun Kunduracı[2]

[1]Department of Architecture, İzmir Institute of Technology, İzmir, Turkey, yaseminozturk@iyte.edu.tr , tugcekazanasmaz@iyte.edu.tr
[2]Department of Interior Architecture and Environmental Design, Yaşar University, İzmir, Turkey, arzu.cilasun@yasar.edu.tr

Abstract: A well-designed daylit space in the educational buildings has an essential impact on understanding and comprehension of students. The aim of this study is to examine the effect of material and color alternatives on student's visual perception and satisfaction from their work environment. Four material alternative combinations in a classroom were examined with a survey among 23 students. Most of the students (60%) rated as "high contrast" for Alternative 1, while Alternative 2 was found to be narrow with 55% rate in terms of spatial perception. Alternative 3was found to be non-uniform with 47% rate regarding lighting quality and spacious with 58% regarding visual satisfaction. Alternative 4 was chosen as the best combination with 65% "like" choice. One lowest reflectance value on floor and higher-similar wall reflectances caused the feeling of "soft" and "non-glaring" among students. Evaluations revealed insight of students' preferences of material decision on classrooms and may guide future design studies for classroom design.

Keywords: daylight design; classroom; material alternatives; questionnaire; visual perception

Introduction

Modern education spaces are designed to meet the various needs of students (licht.wissen 02, 2014). Visual performance affects the speed of eye movement and precision of the task being done; so it enhances the concentration of students and allows them to focus on presentations and learning by providing comfort on visual surrounding and seeing action (Meis, Nocke, Hofmann, & Becker, 2005). Daylight is the main light source to provide above conditions. It is the combination of sun and skylight. Adequate amount of daylight which is distributed evenly is the key concern. (Olesen, 2005; Parise, Martirano, & Di Ponio, 2013). To provide the best daylight quality, color and material selections of interior surfaces have significant role on human perception of daylight and interior space (Brebbia & Domke, 2011; Leslie, 2004). Perception of colors may be interpreted with adjectives to understand the visual comments of human beings on colors and textures (Baek, Hwang, Chung, & Kim, 2008).

Illuminance is the total luminous flux per area on a material's surface from whole directions. Recommended illuminance values vary between 300-500 lux for educational buildings according to EN 12464-1: 2011 and ISO-8995: 2002 (E). Luminance is total luminous intensity spread out from a unit area from a specific direction. Hordijk and Groot suggested a maximum- 3000 cd / m^2 luminance level in classrooms.. The luminance ratio is the rate of

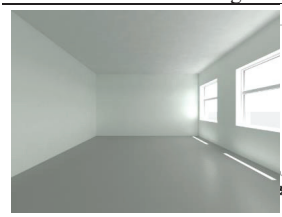
luminance between the working area and the surrounding area; it should be at least 1: 30 (de Bruin-Hordijk & Ellie de Groot, 2010). Surface finishing materials are indispensable in lighting calculations ; since surfaces reflect and distribute daylight in different amounts due to their optical characterization of color and texture.They affect lighting quality and perception. Each color correspond to a significant reflectance. A research on comparative studies of the material quality demostrated that daylight ambiances differ from color and texture choices. Bright color makes the perception of dimension deeper and rises up the perception of color temperature that means the warmth or coolth characteristics of the light source around 300 % at the application to the floor (Jafarian, Demers, Blanchet, & Landry, 2016). Another research on window glazing effecting color quality of transmitted daylight is related in that sense (Dangol, Kruisselbrink, & Rosemann, 2017). This paper examines the relation between surface material variations of ceiling,wall and floor according to color and how students perceive the light quality in each condition.

Model Application

A classroom that has a 55.8 m^2 floor area is selected in Iztech., İzmir (38° N, 26° E). It has 8.88 m length, 3.8 m story height having three windows (12 m2) facing south. The window ratio (total window area / total wall area) is around 55.18%.

Horizontal illuminance measurements were taken at 10:30, 13:00, 15:30 at March 22, 2018 to capture variations of daylight during daytime and state daylight performance throughout the day under partly cloudy sky condition. (Table 1) Six measurement points (A1-A6) were determined with respect to CIBSE recommendations. The existing reflectance values of interior surfaces and transmittance of glazing were determined with the measurement procedure explained in literature (Dangol et al., 2017) (Table 2). The classroom was modeled in Velux which is a daylight simulation tool analyzing the cases according to room geometry, orientation, material choice, date and sky conditions (Table 1). Accuracy is evaluated with the coefficient of determination (R^2) of 84.6 % percentage compatibility, comparing horizontal illuminance readings and daylight illuminance outputs calculated in Velux.

Table 1. Simulation of existing conditions and illuminance measurement values.

Velux scene of existing conditions and measurement points		Illuminance measurements(lux)		
		10:30	*13:00*	*15:30*
	A1	1270	998	403
	A2	2590	1053	382
	A3	1456	1090	336
	A4	1159	1923	740
	A5	2476	2060	883
	A6	2119	1735	790

Alternative Combinations

Field measurements and visualizations show great difference between the existing conditions' material choices in terms of the daylight distribution. The following part includes the material alternatives and the survey about how students evaluated 4 alternative combinations that were given. Firstly, 10 RAL coded matte colors (RAL 1023, 1034, 3015, 5012, 6029, 7009, 7035, 8004, 9002 and 9010) chosen from catalogue according to their reflectance, texture, roughness, mirror effect and material type like painted and wood surfaces.

Table 2. Material combinations and their reflectance.

	Ceiling	Front Wall	Left Wall	Other Walls	Floor
			Codes, Reflectance		
Existing conditions	- 0.84	- 0.92	- 0.92	- 0.92	- 0.61
Alternative 1	RAL3015 0.42	- 0.92	RAL9002 0.68	- 0.92	Cherry wood 0.28
Alternative 2	RAL7035 0.60	- 0.92	RAL5012 0.20	- 0.92	Walnut wood 0.19
Alternative 3	RAL9010 0.85	RAL1023 0.54	- 0.92	- 0.92	Maplewood 0.28
Alternative 4	RAL9010 0.85	- 0.92	RAL9010 0.85	- 0.92	Maple wood 0.28

Secondly, alternative combinations were prepared according to their placements (Table 2). Thirdly, simulation of four material alternatives (Figure 1) provided us views at the same time stamps. Those alternatives were combined according to dark-bright color relationships and their reflectance percentages. Alternatives were generated to get combinations of low (<0.4), medium (0.4-0.6) and high (<0.6) reflectance values (Table 2). Utilizing these scenes, a questionnaire that has totally nine questions was prepared to analyze visual quality evaluations of students regarding surface material variations. The adjectives of questions were selected

referring to literature review (Baek et al., 2008; Jafarian et al., 2016) . The questions of the survey involved light quality adjectives subjected to five levels Likert rating.

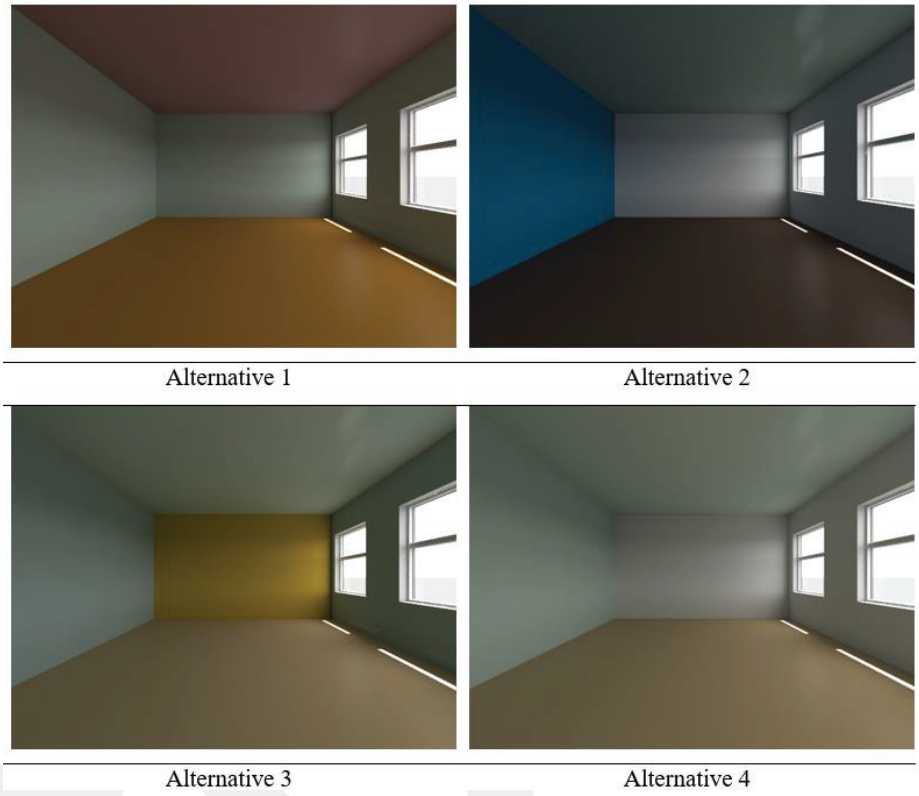


Figure 1. Views of material combinations

Findings and Discussion

A total of 23 undergraduate degree architecture students participated to the survey. Participants observed a total of five scenes corresponding to existing material combination and four alternatives at the same computer screen without changing screen display settings. They were asked to rate the visual qualities between 1 to 5 for given meanings. Regarding the existing condition of the room, 66% of students define the existing condition as low contrast, with rating of 1 and 2. They define the existing conditions as cool with 83 % rate; bright with 77 % rate. 72% of the students preferred to sit at the second and third row closer to the window in existing conditions.

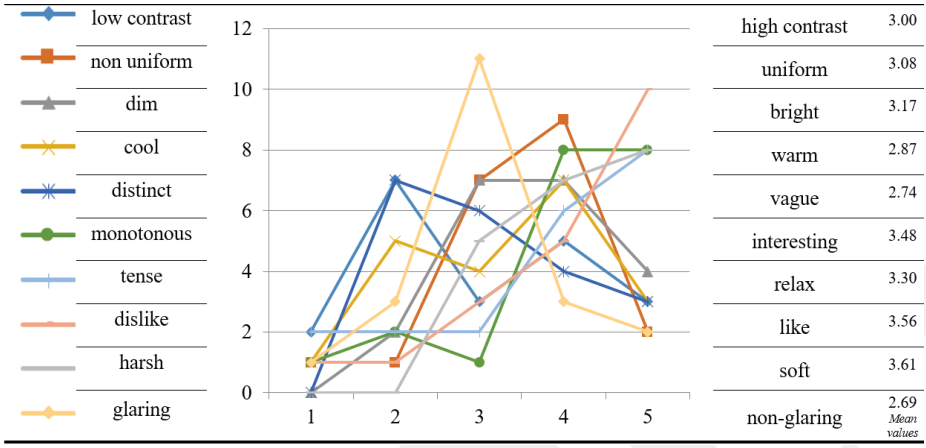


Figure 2. Visual perception results for Alternative 4 as the best option.

Among four alternatives, Alternative 1 was found as 60 % high contrast and was rated as 4 and 5; as 40 % "non-uniform" and was rated as 1 and 2 in terms of visual perception. Students preferred to sit at fourth and fifth rows at the middle of the classroom with a 70% rate. Alternative 3 and 4 were defined as "bright" by 55 % and 70% respectively. Additionally, 65% and 72% of students found those alternatives "interesting" and rated them with 4 and 5. Students preferred to sit at the third and fourth rows at the middle of the classroom on Alternative 4. Finally, students were asked to consider all alternatives and choose the best one. 43% of students chose Alternative 4 as the best option while 16% of students chose Alternative 3 as the second best option. None of the students preferred Alternative 2 and found it %52 dim in terms of lighting quality.

Conclusion

This study analyses the relationship between color choices and visual conditions in a classroom. Results demonstrated that color alternatives had an essential physiological effect on students with 72% of "interesting", 65% of "relax" ambient for the most desirable alternative 4. Alternative 4 was found to be as the most comfortable combination in terms of "uniformity". Mean values of Alternative 4 was calculated as 3 for contrast, 3.08 for uniformity, 3.56 for like and 2.69 for glaring as seen in Fig. 2. Low reflectance on floor could be effective on preferring this alternative. It was found to be softer and less glaring than others. Higher and similar reflectance on all four walls and ceiling could be the reason for such perception. Unlike the study by Jafarian, Demers, Blanchet, & Landry (2016), brighter surfaces caused a feeling of

warmness in most of the students. However, the addition of medium reflectance values here on ceiling or on the left wall was perceived as "tense" by most of the students. Such findings show us how the spatial and light perception can be modified through material variations on surfaces.

References

Baek, S., Hwang, M., Chung, H., & Kim, P. (2008). Kansei factor space classified by information for Kansei image modeling. *Applied Mathematics and Computation*, *205*(Special Issue on Advanced Intelligent Computing Theory and Methodology in Applied Mathematics and Computation), 874–882. Retrieved from http://10.0.3.248/j.amc.2008.05.080

Brebbia, C. A., & Domke, K. (2011). *Light in Engineering, Architecture and the Environment*. Southampton [England]: WIT Press.

Dangol, R., Kruisselbrink, T., & Rosemann, A. (2017). Effect of window glazing on colour quality of transmitted daylight. *Journal of Daylighting*, *4*(2), 37–47.

de Bruin-Hordijk, T., & Ellie de Groot, E. (2010). Lighting in schools. *IEA ECBCS Annex*, *45*.

Jafarian, H., Demers, C., Blanchet, P., & Landry, V. (2016). Lighting ambiances and materialities of wood in architecture "A comparative evaluation of the quality of spaces in relation to interior finishes." *Indoor and Built Environment*.

Leslie, R. P. (2004). *Guide for Daylighting Schools*. North Carolina.

licht.wissen 02. (2014). *Good Lighting for a Better Learning Environment*. Frankfurt.

Meis, M., Nocke, C., Hofmann, S., & Becker, B. (2005). Subjective evaluation of speech and noise in learning environments in the realm of classroom acoustics: Results from laboratory and field experiments. *Journal of the Acoustical Society of America*, *117*(4), 2437.

Olesen, B. W. (2005). Indoor environment-health-comfort and productivity. *Procedings of Clima*.

Parise, G., Martirano, L., & Di Ponio, S. (2013). Energy performance of interior lighting systems. *IEEE Transactions on Industry Applications*, *49*(6), 2793–2801.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

"Reconstructing" Traditional Settlements In Cappadocia: Questions Of Sustainability

Fatma Gül ÖZTÜRK BÜKE[1]

[1]*Architecture Department, Çankaya University, Ankara, Turkey, gulozturk@cankaya.edu.tr*

Abstract: Cappadocia, today a popular tourist destination in central Turkey, is internationally known for its peculiar volcanic landscape and abundant rock-cut architecture. In 1985, the "Göreme National Park and the Rock Sites of Cappadocia" had been inscribed in UNESCO World Heritage List, which in turn led to an increase in visitors' number. Accordingly, by the 1980s, construction of large hotel facilities ignoring the natural, historical and traditional setting accelerated. Parallel to the international trends of the tourism industry, by the end of the 1990s, traditional houses began to be "restored/reconstructed" and turned into "boutique hotels". This transformation first started with individual houses, and followed by houses in neighbouring plots that were put together into hotel complexes. Today, the transformation comprises even entire neighbourhoods. This paper is questioning the rapid physical and conceptual transformation of the traditional settlements with regard to cultural and social sustainability. It also discusses the accuracy and reliability of large scale "reconstruction" projects and the degree of falsification.

Keywords: Cappadocia; cultural & social sustainability; traditional settlements; boutique hotels; conservation and development plan; urban renewal; gentrification; disneyfication; restoration/reconstruction

Introduction

Cappadocia, today a popular tourist destination in central Turkey, is internationally known for its peculiar volcanic landscape and abundant rock-cut architecture. Although the majority of surviving rock-cut architecture and wall paintings therein belongs to the Byzantine period, carved settlements in Cappadocia dates back to Hittites and the traditional way of life has been continued up into the 20th century.

Not only the natural and historical monuments but also the traditional settlements in Cappadocia have been under constant danger due to continuing erosion and human interventions. In 1985, the "Göreme National Park and the Rock Sites of Cappadocia" had been inscribed in UNESCO World Heritage.[1] Entering to the list supplied a legal status to the region concerning the issues of protection, but at the same time it led to increase in visitors' number.

[1] Göreme National Park and the Rock Sites of Cappadocia. *World Heritage List.* Retrieved from UNESCO website http://whc.unesco.org/en/list/357

1980s onwards, like in other parts of Turkey in Cappadocia too, nature and culture have been seen as mere tools serving tourism (Madran & Özgönül, 2003, p. 141). Accordingly, construction of large hotel facilities ignoring the natural, historical and traditional setting accelerated.

By the end of the 1990s, as an alternative to mass tourism and parallel to the international trends, "sustainable tourism" has gained currency (Evcil, 2012). Respectively, "restoration/reconstruction" projects of traditional houses as "boutique hotels" led to the rapid transformation of the traditional settlements. This transformation first started with individual houses, and followed by houses in neighbouring plots that were put together into hotel complexes. At the present, the transformation comprises even entire neighbourhoods (Can, 2007). In this respect, especially the neighbourhoods that were declared as "disaster areas" in 1960s and evacuated subsequently attract attention of the tourism industry; and local authorities intending "revitalization" of these "deteriorated" neighbourhoods see "restorate – operate – transfer" model as a form of project financing.

Indeed, turning "deteriorated" neighbourhoods into "holiday villages" for high budget customers is becoming a trendy model in Cappadocia. Parallel to this, the classification of neighbourhoods as "disaster areas" and correspondingly as "urban renewal areas" has been continuing and with high probability within a decade many traditional sites in Cappadocia will be irreversibly transformed following this model. It is therefore urgent to critically assess the impact of this model on the layout and silhouette of traditional settlements, and on the social and cultural sustainability, especially with regard to issues of "disneyfication" and gentrification. In this respect, the paper will focus on the on-going "Kayakapı Project" in Ürgüp, which is up-to-date the largest "revitalization" project in the region.[2]

Kayakapı is the name of the neighbourhood located on one of the hills of Ürgüp in Cappadocia. The district was declared as "disaster area" in 1969, and initial habitants were forced to leave by law. The process of evacuation lasted till 1984. In 2000 the statue of "disaster area" was officially revoked and in 2001 the site was reclassified as part of the "urban historical site". Since then private properties on the site have been nationalized. Municipality of Ürgüp, intending to "revitalize" the deteriorated neighbourhood, decided for "restorate – operate –

[2] Revitalization Project of Kayakapı. *Kayakapı Premium Caves Cappadocia*. Retrieved from Kayakapi website http://www.kayakapi.com/restoration.aspx

transfer" model as the form of project financing. Accordingly, the site was rented for 49 years to a private investor from tourism industry. (Kabaoğlu & Yıldırım, 2006; Tuna, Özgül Katlav & Dinler, 2017; Yıldırım, 2005). In 2005, Conservation and Development Plan of Ürgüp was approved. Accordingly, so-called "special tourism project area" in Kayakapı comprises "tourism area incl. accommodation"[3] and "tourism area for day-long use"[4] (Kabaoğlu & Yıldırım, 2006, p. 62). The "boutique hotel" in "tourism area incl. accommodation" (still under construction) was partly opened in 2013, and it already irreversibly changed the silhouette of the traditional neighbourhood. The implementation of the plan for "tourism area for day-long use" has not yet started.

Methods

The methodology of the study comprises literature and archive research on theoretical and historical frame of the inquiry; it also comprises site surveys and architectural analysis of the case study. Results of the analysis are interpreted with regard to the theoretical and historical background discussions.

Findings and Discussion

Throughout the 20th c. successive international charters and declarations demonstrated a change of understanding of the definition and extent of "heritage".[5] Now, it has been generally accepted that, not only the isolated monuments but also historical urban sites in their entirety, with their tangible and intangible components that supply the authentic character to the site, need to be protected (Ahunbay, 2014; Erder, 2007; Madran, 2009). Accordingly, in the paper, firstly, the related concepts, such as "traditional architectural heritage", "urban historical sites", "conservation of historical sites" and "conservation and development plan" will be introduced. International charters and declarations, and current Turkish regulations on conservation of historical sites, different methods of interventions and their limitations will be discussed.

---

[3] "Konaklamalı Turizm Alanı"

[4] "Günübirlik Turizm Alanı"

[5] Charters and Declarations. *International Committee on Historic Towns and Villages.* Retrieved from CIVVIH website http://civvih.icomos.org

In the second part of the paper, the boundaries and legal status of the protected regions in Cappadocia will be described. The conservation strategies and methods of interventions will be discussed with regard to idiosyncrasy of Cappadocia.

In the third part, definitions of "sustainable tourism" and "boutique hotels" will be introduced. The tension between tourism and conservation in Cappadocia will be discussed.

In the final part before the conclusion, the "Kayakapı Project" in Ürgüp will be conceptually and physically analysed, the process of the project, present situation and future perspectives will be discussed. Discussions will base, on the one hand, on photographs and aerial photographs showing the transformation of the site and of the historical silhouette. On the other hand, the discussion will base on the Conservation and Development Plan of Ürgüp and on the legal frame of the project. The spatial organization and architectural details of the hotel complex as well as interventions that have been taken place will be also scrutinized.

Conclusion

"Boutique hotels" in historical urban sites offer an alternative to mass tourism and address on higher budget customers. While investors pretend to be faithful to the traditional setting, by the time these establishments have been getting too extent and they irreversibly change the layout and silhouette of the old settlements. The accumulation of "reconstructed" houses comprising the hotel complexes in some parts appears too regular and therefor contrasts the organically developed plans and silhouettes of the initial settlements. Their existence also transforms other houses in the same settlements into restaurants, pensions, boutique hotels, travel agencies, etc. Distract from their initial inhabitants the old settlements are no more living traditional environments, but are inevitably turning into artificial "holiday villages" (Sey, n.d.). With Jacuzzi, cave pools and hearts, all in one's private hotel room, these establishments promise an unforgettable vacation in an "authentic" setting. In fact, they "reconstruct" a "traditional" living environment that has actually never been existed. In short, "disneyfication" and gentrification are two current dangers that the traditional settlements in Cappadocia have been encountering.

Correspondingly, the paper aims a critical assessment towards current model of "restoration/reconstruction" and "reuse" of abandoned neighbourhoods as "boutique hotels" in historical settlements in Cappadocia. Beside questioning the accuracy and reliability of the "reconstruction" projects and adaptability of the new functions with the existing settlements, the paper questions cultural and social sustainability of this model.

References

Ahunbay, Z. (2014). *Tarihi çevre koruma ve restorasyon*. İstanbul: YEM Yayın (7th Ed.).

Can Ş. G. (2007). A critical assessment for reuse of traditional dwellings as "boutique hotels" in Ürgüp (M.A. Thesis). Available from Yükseköğretim Kurulu Başkanlığı Tez Merkezi.

Charters and Declarations. *International Committee on Historic Towns and Villages.* Retrieved from CIVVIH website http://civvih.icomos.org

Erder, C. (2007). *Tarihi çevre bilinci*. Ankara: Orta Doğu Teknik Üniversitesi.

Evcil, A. N. (2012). Nevşehir ve yakın çevresinde sürdürülebilir turizm ve ekoturizm olanakları. In Adem Öger (Ed.), *1. Uluslararası Nevşehir Tarih ve Kültür Sempozyumu Bildirileri, 1* (pp. 17-27). Ankara: Nevşehir Üniversitesi Yayınları.

Göreme National Park and the Rock Sites of Cappadocia. *World Heritage List.* Retrieved from UNESCO website http://whc.unesco.org/en/list/357

Kabaoğlu, C. & Yıldırım Ege, A. (2006). Kayakapi projesi ve Ürgüp'te kentsel dönüşüm. *Kentsel Dönüşüm Tartışmaları 1, TMMOB Mimarlar Odası Ankara Şubesi, 40* (1), 60-65.

Madran, E. (2009). Tarihi çevrenin tarihi. Osmanlı'dan günümüze tarihi çevre: tavırlar, düzenlemeler. *Tarihi Çevrede Koruma: Yaklaşımlar, Uygulamalar*. *TMMOB Mimarlar Odası Ankara Şubesi, Dosya 14* (1), 6-15.

Madran, E. & Özgönül, N. (2003). Kapadokya notları. In N. Ş. Güçhan (Ed.), *Her Dem Yeşil Yapraklı Bir Ağaç, Cevat Erder'e Armağan* (pp.135-154). Ankara: ODTÜ Mimarlık Fakültesi Basım İşliği.

Revitalization Project of Kayakapı. *Kayakapı Premium Caves Cappadocia*. Retrieved from Kayakapi website http://www.kayakapi.com/restoration.aspx

Sey, Y. (n.d.). Sürdürülebilir Kalkınma / "Tarihi Kültürel Mirasın Korunması". *Vizyon 2023 Öngörü Panelleri.* Retrieved from https://www.tubitak.gov.tr/tubitak_content_files/vizyon2023/csk/EK-13.pdf

Tuna, M., Özgül Katlav, E. & Dinler, Y. (2017). Butik otelcilik: Kayakapı kültürel ve doğal çevre koruma ve canlandırma projesi örnek olay incelemesi. *Journal of Recreation and Tourism Research, 4 (4),* 162-173.

Yıldırım, E. (2005). Koruma Planlamasında Bir Örnek: Kayakapı Mahallesi. *Planlama 31*,28-34.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainable Architectural Rehabilitation: the Palm tree Manor in Portugal

Ana Paula Pinheiro[1]

[1]*CIAUD, Lisbon School of Architecture, Lisbon, Portugal, apprbd@gmail.com*

Abstract: To achieve a sustainable future, it is necessary to be efficient when using resources in order to meet the needs of all living beings on Earth. The principle that articulates this system, questions sustainability assumptions regarding governance, economics and ethics; it equates a new attitude on how humanity supplies itself with water, food and energy; it reflects on the qualities of the materials and how to employ them in construction. Thus, in addition to the ecological and social problem, we are dealing with a cultural, political and leadership issue. It is fundamental to know the principles of sustainable design, to enunciate them and to make them compatible with functional programs and human limitations. As a case study on sustainable architectural rehabilitation, we present the Palm tree Manor in Portugal, an architectural rehabilitation of the heritage that took into account the mentioned principles.

Keywords: architectural rehabilitation; heritage; sustainability; glazed ceramic tile; design

Introduction

"'Rehabilitation' is defined as 'the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values.'" (The Secretary of the Interior's Standards for Rehabilitation, 2011, p.1)

The new ecological imperative has wide repercussions in society and architecture implying an aesthetic revision and qualified answers that surpass the degrees of difficulty (regulation, ignorance, or (dis) economic interests). (Pinheiro, A.P., 2017, p.464)

We must consider the issue of sustainability as an opportunity to apply the principle of green intervention: "The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life cycle from siting to design, construction, operation, maintenance, renovation and deconstruction." (Kubba, S., 2012, p.27).

The higher value of the architectural rehabilitation budget must not be the intervention's conditioning factor, since the building must be understood as a process in its lifetime.

One should use traditional and/or technological systems that are as simple as possible and easy to maintain. The maintenance costs over time are a determining factor for the validation of the green building.

Guiding principles of the intervention

To use the principles of sustainable construction (Kibert, C., 2008, p.6): Reduce resource consumption; Reuse resources; Use recyclable resources; Do not use products and techniques harmful to the environment; Do not specify products or techniques that produce harmful gases; Economy; Focus on quality.

Passive systems must be inherent to the constructive solution. Only afterwards should the active systems for energy production be added.

To safeguard the heritage value of the building and place, taking into account:

(1) Recovery of existing materials / reuse;
(2) Use of region materials;
(3) Use of materials that do not deteriorate;
(4) Recovery of traditional tiles;
(5) Creation of green roofs in new areas;
(6) Creation of natural ventilation systems;
(7) Use of shading areas and shutters;
(8) Take advantage from the glazed ceramic tiles and from a visual narrative;
(9) Renewable energy;
(10) Articulation with the adjacent agricultural land for the production of food products

Palm tree Manor in Portugal

The Palm tree Manor is a nineteenth-century building of erudite architecture from the North of Portugal, which was in an advanced state of degradation.

Its architectural rehabilitation, authored by the Architects Ana Paula Pinheiro and Rui Barreiros Duarte, was completed in 2006 (Figure 1).

There was an Integrated Project Process from the first meeting until the end of the project: architects, engineers and client - Domingos de Oliveira.

The legibility of the pre-existing building was evidenced, there being a restraint in the articulation design of the new with the old and no signs were added to the architecture in order to maintain the authenticity of the building.

The relation with the place was deepened through geometry and materiality and it took advantage of the terrain dimensions. In this way, part of the construction was absorbed, creating a better thermal control and insertion in the place that extends through an agricultural land for food production.

This principle is also present in the green roof of the bathhouse, with an extensive system.

Figure 1. Palm tree Manor, Viatodos, Portugal. Photography: Ana Paula Pinheiro, 2006.

In its expansion granite stones, which were recovered from the old ruins and dismantled walls with about 0.60 m of thickness, were used. They were placed according to the traditional stereotomy of the same epoch of the house.

The dimension of the stones, besides their solidity and good thermal behaviour, avoids the expression of the coating stones.

In the interior pavement and in the shutters Riga wood was applied according to the local architectural tradition.

The large openings to the exterior of the ground floor allow a phenomenological experience of dwelling from the kitchen and the living room/pool. On the 1st floor, the master bedroom gives access to a terrace that corresponds to the entire pool cover.

The spaces were reorganized responding to a new experience, having been built an indoor pool that works as a polarizing area of the house life, interconnecting the various social areas.

The introduction of the staircase that develops sinusoidally up to the attic was carefully designed. In this way it takes advantage of the sequences of different points of view.

In the attic, the library coexists with the ancient wooden structure of the roof. The pre-existing exterior volume of the attic window was resized and coated with zinc.

When designing and placing the wooden shutters, natural ventilation, intrusion safety and sun protection were taken into account. For this, a control device was created that permits the exterior windows to be halfway open and the shutters closed indoors, allowing airflow.

Tile Panel Selection

Figure 2. Palm tree Manor. Indoor pool with glazed ceramic tiles. Plastic Artist: Andreas Stöcklein. Photography: Ana Paula Pinheiro, 2006.

In architectural rehabilitation it is fundamental to know the principles of sustainable design, to enunciate them and to make them compatible with functional programs and human limitations: through respecting and responding to the unique features of each place; Creating products guided by the idea of sustainability throughout their lifecycle; Saving energy; Using environmentally responsible materials; Giving preference to natural, reusable, recycled, biodegradable materials; Conserving water; Providing a healthy environment; Reducing or eliminating waste; Giving the correct destination to the waste produced.

This is why tiles have been chosen to cover the new social zones that function as decompression areas of the innermost areas of the room. "The tile panel (...) can be recycled and reused at the end of its life cycle" (Pinheiro, AP, 2015, p. 233).

As a result of the authors' dialogue with the artist Andreas Stöcklein, it was thought to use a glazed ceramic tile panel to coat both walls and pool (Figure 2). The hand-painted tiles were also used in the various areas connected with the swimming pool.

At night, the tiles' panel works as a pictorial background when seen from the outside.

Renewable Energy

Solar panels were used to heat water. These are not visible from the outside as they were placed facing south, in the coverage area of the enlargement of the rooms' area.

Conclusion

It is essential to intervene in the Architectural Rehabilitation in a sustainable, passive and active way, favoured by Design.

The tiles allow an integrated thinking in terms of architectural conception, sustainability and design.

They are sustainable coating materials and favour sustainable design.

Also, the stones along with the soil relation, the green and tile roofs, the creation of shading and crossed ventilation zones, altogether combine the traditional principles with the current precepts of architectural intervention in what energy is concerned.

The cultural and architectural principle can be summarized in knowing how to add (Burra Charter).

This ancestral principle involves time, place, and sustainability.

References

Australia ICOMOS Burra Charter. (2013). *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance.*

Duarte, R., Pinheiro, A.P. (2009). *O Poder da Ideia | The Power of Idea*. 1st edition. Insidecity, Lisbon, p.7.

Grimmer et al. (2011, April 4). *The Secretary of the Interior's Standards for Rehabilitation & illustrated guidelines on sustainability for rehabilitating historic buildings*. [pdf] Washington, D.C.: U.S. Department of the Interior, p.1. Retrieved from http://www.nps.gov/tps/standards/rehabilitation/rehab/energy01.htm

Kibert, C. (2008). *Sustainable Construction: Green Building Design and Delivery*. 2nd edition. John Wiley & Sons, Inc., New Jersey, p.6.

Kubba, S. (2012). *Handbook of Green Building Design and Construction: LEED, BREEAM, and GREEN GLOBES*. Waltham, Oxford: Elsevier, Inc., p.27.

Pinheiro, A.P. (2015). *Glazed ceramic tiles: sustainability and design*, In: GlazeArch2015 International Conference Glazed Ceramics in Architectural Heritage – Proceeedings – Rodrigues & Mimoso (eds), LNEC Lisbon, pp.233-235, 239-242.

Pinheiro, A.P. (2017). *Reabilitação Arquitectónica, Sustentabilidade e Design*. PhD. Lisbon School of Architecture, Lisbon, pp.463-466.

Stöcklein, A. (2007, October). *RBD.APP | Artes Plásticas*. archi NEWS. Nº 6, p.148.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Energy, environmental and economic performance of an innovative solar heating network serving a small-scale Italian district

Antonio Rosato[1*], Antonio Ciervo[2], Giovanni Ciampi[3], Michelangelo Scorpio[4], Sergio Sibilio[5], Luigi Maffei[6]

[1]*Department of Architecture and Industrial Design, University of Campania Luigi Vanvitelli, Aversa, Italy, antonio.rosato@unicampania.it*

Abstract: The performance of a solar hybrid heating network devoted to satisfying the heating demand of a small-scale district, composed of 6 typical single-family houses and 3 typical school buildings, is investigated by means of the dynamic simulation software TRNSYS under the climatic conditions of Naples (south of Italy). The district heating system is mainly composed of a solar collectors array, a short-term sensible thermal energy storage, a long-term borehole thermal energy storage, a natural gas-fuelled internal combustion engine-based micro-cogeneration unit and a heat distribution network. The simulation results are compared with those associated to a conventional heating system in terms of primary energy consumption, carbon dioxide equivalent emissions, operating costs as well as simple pay-back period in order to assess the potential energy, environmental and economic benefits/drawbacks associated to the proposed innovative plant.

Keywords: solar energy; district heating; seasonal thermal energy storage; energy saving; greenhouse gas emissions.

Introduction

Heating and cooling account for approximately 46% of the total global energy use. In particular, energy demand for space heating and domestic hot water (DHW) in residential and commercial buildings represents a large portion of worldwide energy consumption.

Solar energy is a promising option for reducing both energy consumption and harmful gas emissions. One of the longstanding barriers to solar energy technology lies in the noticeable misalignment between energy supply and consumption; long-term storage allows for thermal energy storage over weeks and months, with it being a challenging key technology for solving the time-discrepancy problem of solar energy utilization.

Few papers are available in scientific literature focusing on small-scale solar hybrid district heating systems including a seasonal thermal storage under Italian climatic conditions.

In this paper a solar hybrid heating network devoted to satisfying the heating demand of a small-scale district under the climatic conditions of Naples (south of Italy) has been investigated by means of the dynamic simulation software TRNSYS.

Methods

The district served by the proposed plant is composed of 6 typical Italian single-family residences and 3 typical schools. Three different typologies of both residential buildings (A, B

and C) and schools (Nursery, Nursery School and Elementary School) have been considered. Buildings have been designed according to the Italian legislation requirements in terms of thermal transmittance; the yearly occupancy profiles, electric power demands as well as domestic hot water requirements have been carefully specified according to stochastic methods suggested in the literature (Jordan et al. 2001, Richardson et al. 2012). Table 1 summarizes the main characteristics of end-users composing the district.

Table 1. Main characteristics of buildings.

	Residential buildings			**School buildings**		
	A	**B**	**C**	**Nursery (N)**	**Nursery School (NS)**	**Elementary School (ES)**
Number of buildings (-)	2	2	2	1	1	1
Floor area (m^2)	60	78	114	780	670	1340
Windows' area (m^2)	84	102	230	387	743	670
Volume (m^3)	230	370	448	2480	2203	4470
Maximum number of simultaneous occupants (-)	3	4	5	98	115	145

Figures 1a and 1b show the main architectural features of the buildings.

The schematic of the proposed plant is reported in Figure 1c. In this figure, the following main components of the system can be identified: end-users (6 residential buildings and 3 school buildings), solar field collectors (SF), short-term thermal energy storage (STTES), borehole thermal energy storage (BTES), micro-cogeneration unit (MCHP) and main boiler (MB) as back-up systems, local individual boilers (B) for DHW production of residential buildings only.

Table 2 reports the main characteristics of plant components.

The solar energy captured by the solar thermal collectors is first transferred into the short-term thermal energy storage; from the STTES, if there is a heating demand, the solar energy is transferred into the distribution network, and then to the end-users for space heating. If the solar energy is not immediately required for heating purposes, it can be moved from STTES to the long-term thermal energy storage system during the whole year. During the heating season, thermal energy stored in the BTES field can return into the STTES to provide the required thermal energy. A micro-cogeneration unit (able to simultaneously produce both electric and thermal energy) is used as back-up system to supplement the space heating demand when the collected solar energy cannot meet the energy requirements. A natural gas-

fired boiler has been installed within each single residential building specifically devoted to the domestic hot water production.

Table 2. Main characteristics of plant components.

Solar field collectors (SF)	
Collector typology	Flat plate
Aperture area of a single collector (m^2)	2.31
Tilted angle	30°
Orientation	South
Boreholes thermal energy storage system (BTES)	
Borehole radius (m)	0.15
Inner/outer radius of U-tube pipe (m)	0.01372/0.01669
Center-to-center half distance (m)	0.050
Grout/soil thermal conductivity (W/mK)	5.0/3.0
Borehole depth (m)	20.1
Micro-cogeneration unit (MCHP)	
Engine type	Reciprocating internal combustion engine
Fuel	Natural gas
Rated electric/thermal output (kW)	6.0/11.7
Electric/thermal efficiency at maximum load (%)	28.8/56.2
Main Boiler (MB) and Individual Boiler (B)	
Fuel	Natural gas
Rated capacity (kW)	26.6
Efficiency at rated capacity (-)	0.9213

The TRaNsient SYStems (TRNSYS) software platform has been used to model and simulate the district as well as the plant. In particular, the buildings have been firstly modelled with the Google Sketch-Up TRNSYS3d plug-in (Figure 1d) and then implemented in TRNBUILD (included in the TRNSYS package); finally, the proposed heating network has been simulated in SIMULATION STUDIO (included in the TRNSYS package) (Figure 1e).

The simulation results have been analysed and compared with those associated to a conventional heating system only consisting of single natural gas-fired boilers installed inside each building and used for both space heating and DHW production.

The energy comparison between the proposed and conventional systems has been performed in terms of primary energy consumption by means of the index named Primary Energy Saving (PES):

$$PES = \frac{E_{p,TOT}^{CS} - E_{p,TOT}^{CSHPSS}}{E_{p,TOT}^{CS}} \quad (1)$$

where $E_{p,TOT}^{CSHPSS}$ is the primary energy consumed by the proposed system and $E_{p,TOT}^{CS}$ is the primary energy consumption of the conventional system.

The assessment of the environmental impact has been performed in this study through an energy output-based emission factor approach in terms of global carbon dioxide equivalent emissions by means of the following indicator:

$$\Delta CO_2 = \frac{\left(m_{CO_2}^{CS} - m_{CO_2}^{CSHPSS}\right)}{m_{CO_2}^{CS}} \qquad (2)$$

where $m_{CO_2}^{CSHPSS}$ is the carbon dioxide equivalent emissions of the proposed system and $m_{CO_2}^{CS}$ is the carbon dioxide equivalent emissions of the conventional system.

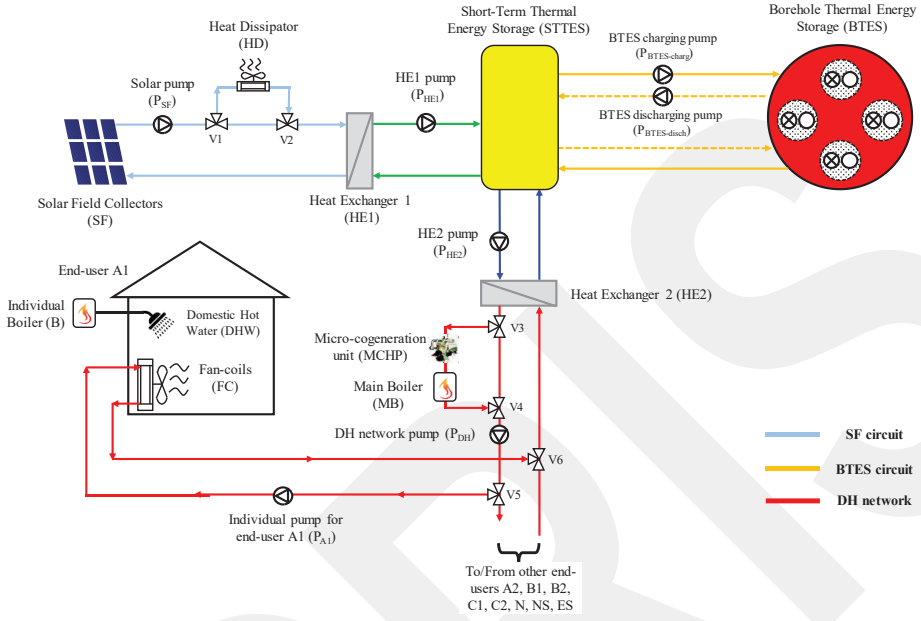
The economic analysis has been performed in terms of both operating and capital costs. The operating costs of the proposed system have been compared with those of the conventional system as follows:

$$\Delta OC = \frac{\left(OC^{CS} - OC^{CSHPSS}\right)}{OC^{CS}} \qquad (3)$$

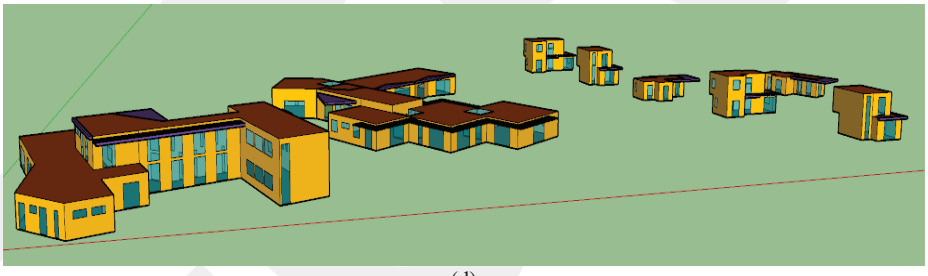
where OC^{CSHPSS} are the operating costs of the proposed system and OC^{CS} are the operating costs of the conventional system. The tariffs of both the electric energy as well as the natural gas have been kept up-to-date according to the Italian scenario.

The Simple Pay-Back (SPB) period has been also evaluated. This economic parameter represents the amount of time required to recover the extra cost of the proposed system thanks to the reduction of operating costs in comparison to the reference system. In calculating the values of SPB periods, the Italian economic incentives for promoting the use of renewable energy-based technologies associated to thermal energy production as well as the Government Capital Grants on the purchase of the cogeneration units have been taken into account.

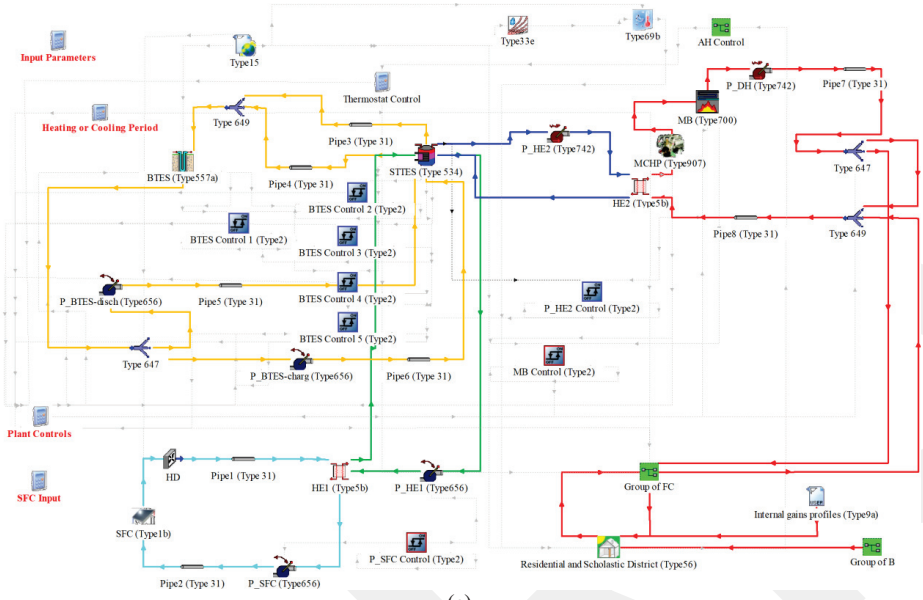
(a) (b)


Heat Dissipator (HD)
Short-Term Thermal Energy Storage (STTES)
Borehole Thermal Energy Storage (BTES)
BTES charging pump ($P_{BTES-charg}$)
Solar pump (P_{SF})
HE1 pump (P_{HE1})
BTES discharging pump ($P_{BTES-disch}$)
V1
V2
Solar Field Collectors (SF)
Heat Exchanger 1 (HE1)
HE2 pump (P_{HE2})
End-user A1
Individual Boiler (B)
Domestic Hot Water (DHW)
Heat Exchanger 2 (HE2)
V3
Micro-cogeneration unit (MCHP)
Fan-coils (FC)
Main Boiler (MB)
V4
DH network pump (P_{DH})
V6
SF circuit
BTES circuit
DH network
V5
Individual pump for end-user A1 (P_{A1})
To/From other end-users A2, B1, B2, C1, C2, N, NS, ES

(c)



(d)



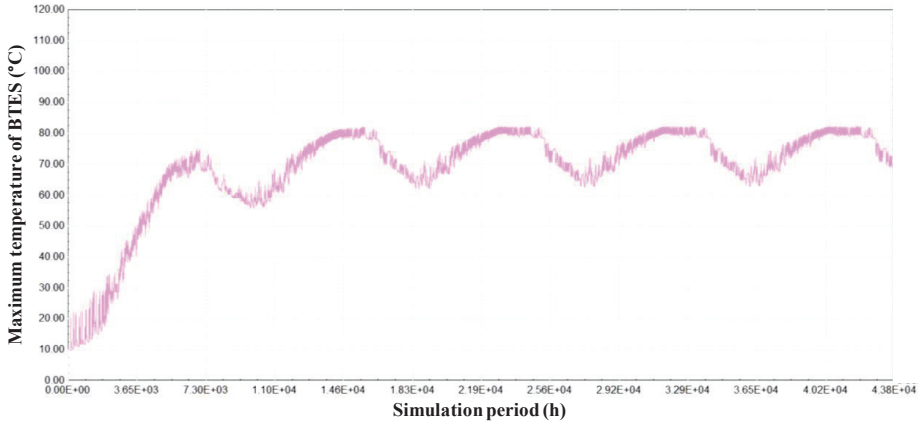
(e)

Figure 1. Architectural features of residential (a) and school (b) buildings; schematic of solar hybrid heating plant (c); buildings model with Google Sketch-Up (d) and schematic of Simulation Studio project (e).

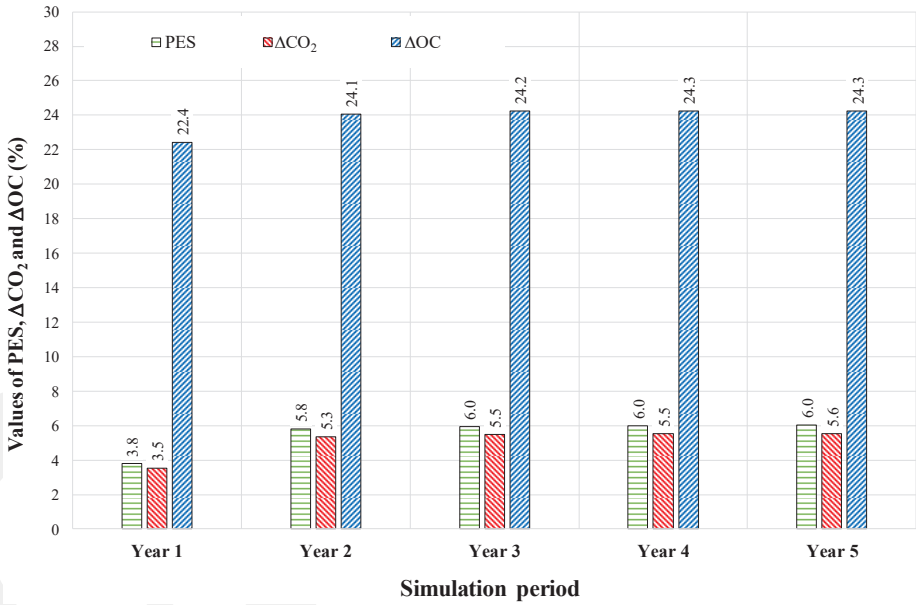
Findings and Discussion

The simulation results highlighted that the yearly thermal energy demand for heating purposes is 13.54 MWh/year for the 6 residential buildings and 11.11 MWh/year for the 3 school buildings.

Figure 2a shows the trend of maximum BTES temperature upon varying the year of operation, highlighting the periods during which the BTES is “charged” (temperature is increasing with the time) and “discharged” (temperature is decreasing with the time). Figure 2b reports the values of PES, □CO_2 and □OC as a function of the year of simulation.



(a)



(b)

Figure 2. Trend of maximum BTES temperature (a) and values of PES, □CO_2 and □OC (b) upon varying the year of operation.

Figure 2b indicates that:

- The values of PES, □CO_2 and □OC increase with the time assuming the maximum values during the 5th year of operation; this is thanks to the fact that the average temperature of the long-term thermal energy storage becomes higher and higher, allowing for a more effective exploitation of solar energy. In particular, they mainly

increase from the 1st to the 2nd year of operation and then become substantially constant;

- Whatever the simulation year is, the values of PES, ΔCO_2 and ΔOC are always positive. This means that the proposed system is able to reduce the primary energy consumption, the carbon dioxide equivalent emissions and the operating costs with respect to the traditional heating system assumed as reference.
- The values of PES range from 3.8% to 6.0%; the parameter ΔCO_2 varies between 3.5% and 5.6%; the reduction in terms of operating costs is in the range 22.4%÷24.3%.

According to the simulation results associated to the 5th year of operation, the simple pay-back period is significant and equal to around 27 years.

Conclusion

A solar hybrid district heating system using a seasonal borehole thermal energy storage was analysed by means of dynamic simulations over a 5-year period under the climatic conditions of Naples (south of Italy). The simulation results have been compared with those associated to a conventional heating system (only consisting of single natural gas-fired boilers) highlighting that the proposed plant is potentially able to reduce the primary energy consumption (up to 6.0%), the carbon dioxide equivalent emissions (up to 5.6%) and the operating costs (up to 24.3%). The SPB is around 27 years.

References

Jordan, U., & Vajen, K. (2001). Realistic Domestic Hot-Water Profiles in Different Time Scales http://sel.me.wisc.edu/trnsys/trnlib/iea-shc-task26/iea-shc-task26-load-profiles-description-jordan.pdf.

Clifford, C., Infield, D., Richardson, I.,& Thomson, M. (2012) Domestic electricity use: a high-resolution energy demand model, *Energy Buildings*, 42 1878-1887, doi: 10.1016/j.enbuild.2010.05.023.

TRNSYS. The transient energy system simulation tool. Available from http://www.trnsys.com.

BEYOND ALL LIMITS 2018**:** International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainable Innovation: Design and New Technologies

Valentina Sapio[1]

Dipartimento di Architettura e Disegno Industriale, Università degli Studi della Campania "Luigi Vanvitelli", Aversa, Italy, valentina.sapio@unicampania.it

Abstract: Processors and drivers, extruders and bits, motors and sinks, they work thanks to the renewable energies. The digital production known as digital fabrication, establishes itself in sustainability field. Is it the nearer future or the evolving present? The determined design is defined green and it follows the energy saving principles, using sustainable materials and giving value to quality and durability of the products without losing functions and appearance. On the basis of this design there is a process and a responsible philosophy for different points of view: environmental, ethical and social. The third industrial revolution overturns the past industrial productive and artisan process, revealing a systematic and technological approach that integrates design and architecture in a view of sustainable development. What happens when the design open itself up to a such available world embracing the principle where the re-use and recycling are the binding prerogatives?

Keywords: sustainable design; process systematization; 3D printers; recycled materials; kilometer zero.

Introduction

An object surfaces from a fluid metal puddle and takes on a big cyborg form (T-1000) assuming human form. A body comes alive from the set of the liquid and materializes in a few minutes. The material concentrates in a single point, flows on the cement floor; it makes its way through the flames and sparks of a blaze a little bit far, in a dark and rigid atmosphere it shapes slowly by assuming human form. It is one of the dystopic atmospheres of the saga of the rebel machines Terminator 2- Judgment Day, entered in the cinematographic science fiction elite. A utopia that is turning true. The 'layer after layer' process of the current additional technologies (3D print) is able to put into practice what James Cameron, the film's director, staged on 1991 performing the fanta-pop imaginary excessively grown during the prolific 80s. The new technique at the service of innovation and efficiency for a more and more sustainable development.

The technical 'means' gets bigger in terms of power and extension by determining the overturning from quantity to quality, applied to our topic, it makes differences between the ancient technique and the present technique.

If the techniqual means is the necessary condition to achieve, whatever aim that cannot be achieved regardless of it, than the achievement of this technical means becomes the

true aim that subordinates everything to it. The planning is the conception of something and the way to realize it, that is the material modelling and energy flows for the human aims. The achievement of a technical means allows the new fabrication methodologies of artistic artefacts, including among the different parts an important prerogative built on innovation and sustainability, which makes extensive use of a new design vision and art in general: a design that can be defined sustainable.

Discussion

The products design with the application of the rules and the data for the production of new objects considering the ecosystem requests, it be at the base of sustainable design. The sustainable design doesn't take on environmental impact of the product anymore: this latter becomes one of the essential qualification of the project. It is always necessary to go beyond the concept of sustainable design associated with the single pieces realizations, of limited series and realized by reuse of rejects; a very little decisive approach considering it with large numbers perspective. Sustainability translates into something more than traditional axiom 'pollute less', unlikely decisive of the environmental problem; today it may be said, to think, choose and consume differently. Fritjof Capra, the physicist and systems theorist, in his essay (1982) *The turn-ing point. Science, society, and the rising culture*, he affirms that a sustainable society can be built only on eco-literacy and eco-design foundations; in the coming years the main task will be to employ, the ecological awareness and the systematic thought to totally change technologies and social institutions. In this way the design deals with the environmental topic both with theoretical sense and with creative imagination, in a long-lasting and common commitment that involve all the participants of a product life cycle.

To ensure that the design defined sustainable puts into effect, everything that goes beyond it or around it has to be considered: the productive process, production impact on environment, trust and reliability of companies and artisans. It is exactly from the productive process in the last decade a new sustainable approach has been produced, it leads to the advent of the third industrial revolution. In the last years the three-dimensional printing phenomena has invaded several fields: art, design, architecture, food, medicine, fashion, and engineering. 3D printers and robots are in continuous development and on it; there is big expectation from a scientific point of view. Creating new products by using new additional or subtractive technologies especially in the design field it would indicate to realize products to directly handle the entire process, determined by William McDonough, American architect

and designer and by Michael Braungart, German chemist in the challenging and visionary manifestation book *Cradle to Cradle: Remaking the way we make things* literally *Dalla culla alla culla: rivedere il modo con cui produciamo le cose*. In the book it is highlighted how to safeguard the ecosystems from our rash aggression and how to contain the fast depletion of natural resources. The products can be designed in order to, after their useful life, they give nourishment for something new, both as "biological nourishing" to re-insert in a safe way in the environment and as "technical nourishing" that round in the industrial cycles in closed loop, without being recycled in low grade use as now the most of recyclable materials is used. Consequently every phase of the complete cycle of production: conception, design, attention, realization, production, comparison between the market and the sale. So, planning according "Cradle to Cradle" principles, it means to introduce life cycle of products basically without refuses because they are inspired to the natural systems, products that can be recycled in an unlimited way or that can return in nature because they are one hundred per cent biodegradable.

The design products realization, by using the new technological mechanisms, that is 3D printers, the laser cut, numerical control machines or the robots, it is highly considered sustainable and green. One need only think the manufacturing process is realized by avoiding resulting material, inasmuch the liquid deposition method overwrites layer after layer the material until the complete object evolution. Moreover, thanks to its particular technique to create honeycomb filling structures, by reducing the required material quantity and obtaining in any case a strong product. Another important progress is the kilometre zero, where philosophy and ecology put together: one may think to see the product printed in the nearer point of printing, even if the object has been thought to the other side of the globe. A clean cut on the entire transport chain of the product, an operation that everyday causes in the area tonnes of CO2 emitted by vehicle exhaust gases and on the Earth with millions of wastes and dissipated energy.

Conclusion

A true revolution on the entrepreneurial, logistic and information technology plan. As a matter of the fact, the bits travel from a side to another of the planet, to get changed in atoms where you want. The most important international advice network on materials and innovative and sustainable processes, Material ConneXion, with its headquarters in the United

States, Europe, Asia, it archives in a database of 40 new materials, all with respectful features for the environment and usable in the new productive technological processes.

Verify the respect of all these criteria linked to the sustainability, it requires complex evaluations, hard to make regulations, but in a long-term should bring, since that is the wish of Association for the Industrial Design (ADI), a kind of quality certification, a " labelling guarantees" that guarantees the respect of sustainability parameters to safeguard the consumer choice.

The designer is called to go beyond the eco-compatible products development, tending to suggest sustainable behaviours, to prefigure life scenarios in radical solution of continuity with the present, giving up also to the traditional function of the designer of the shape/role to become links designer.

References

Capra F. (1982). *The turn-ing point. Science, society, and the rising culture,* pp. 157. .
McDonough W., Braungart M. (2003). *Cradle to Cradle: Remaking the way we make things,* pp. *82,* 93- 97.
Anderson C. (2013). *Makers. Per una nuova rivoluzione industriale,* pp. 132.
Santachiara D. (2017). *Digital Fabbrication*, pp. 43.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Change of Cultural Memory on an Iconic Historic Structure: Narmanlı Han

Sedef Sav[1]

[1]*Interior Architecture & Environmental Design, İstanbul Kültür University, İstanbul, Turkey, s.sav@iku.edu.tr*

Abstract: Narmanlı Han[1] is one of the most important iconic historic structure with its intangible dimensions in the memory of the city. According to its distinctive history, it could be observed that the building was used as a centre for culture and art due to its significant settlers. Since 2015, there was a renewal project has been going on in spite of the public's concern. To understand this renewal project better, similar recent renewal projects in Beyoğlu has been analysed in this study. Additionally, according to theoretical background, texts and regulations such as FARO Convention, Recommendation on the Historic Urban Landscape, the Burra Charter and the Charter of Krakow were analysed to underline both tangible and intangible dimensions of the cultural heritages. In consideration of the interviews with the old users of Narmanlı Han, study aims to clarify the intangible dimensions of the building.

Keywords: Narmanlı Han; heritage preservation; intangible dimension; cultural memory.

Introduction

Narmanlı Han, the subject of this study, is one of the most important iconic historic structure with its intangible dimensions in the memory of the city. According to its distinctive history, it could be observed that the building was used as a centre for culture and art due to its significant settlers. Since 2015, there was a renewal project has been going on in spite of the public's concern. To understand this renewal project better, recent renewal projects in Beyoğlu has been analysed.

Additionally, a theoretical research about conservation, tangible and intangible dimensions of a historic building, cultural memory and identity has been conducted. According to theoretical background, texts and regulations were analysed to underline both tangible and intangible dimensions of the cultural heritages. Also, in consideration of the research about the settlers of Narmanlı Han, this study aims to clarify the intangible values of the building.

[1] "Lodging", correspond of the Turkish word "Han" in English, means "a room or rooms rented out to someone, usually in the same residence as the owner" (URL-1).

Theoretical Background

FARO Convention[2] (2005) defines cultural heritage as a group of resources inherited from the past which people identify. It includes all aspects of the environment resulting from the interaction between people and places through time (Council of Europe, 2005). UNESCO defines intangible heritage as the practices, representations, expressions, knowledge, objects, artifacts and cultural spaces associated therewith the communities recognize as part of their cultural heritage (UNESCO HUL, 2011).

Burra Charter defines cultural significance with sub-definitions such as aesthetic, historic, scientific, social or spiritual values for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, meanings, records, related places and related objects. Meanings generally relate to intangible dimensions such as symbolic qualities and memories and they denote what a place signifies, indicates, evokes or expresses to people (The Australia ICOMOS, 2013). The charter of Krakow also underlines the importance of intangible dimensions of heritages. According to Krakow, each community, by means of its collective memory and consciousness of its past, is responsible for the identification as well as the management of its heritage (The Charter of Krakow, 2000).

Preserving a historic heritage with its social significance is important to ensure sustainability of cultural memory, identity and both tangible and intangible dimensions of the heritage. Heritage is about a sense of place that helps people to position themselves as a community (Figure 1).

Recent Renovated Buildings in Beyoğlu

Cercle d'Orient. Bristol Hotel, Tarlabaşı Neighbourhood and Deveaux Apartments are one of the significant buildings should be spoken with regards to their process of conservation. Hundreds of historic buildings in Tarlabaşı neighbourhood demolished except some of their facades (URL-2). Pera Museum, the reuse project of Bristol Hotel, can be also evaluate in this context. The project also protected original facade and added a new modern construction into original space. After demolishing Deveaux apartments built in 1892, a huge shopping center, Demirören shopping mall, now stood there on the same site as an imitation of it.

[2] Council of Europe Framework Convention on the Value of Cultural Heritage for Society.

Figure 1. Diagram about the concept of conservation (Sav, 2018)

Cercle d'Orient and the apartments nearby it in the same field refunctioned as a shopping mall complex since 2016 in despite of the protests against demolishment. The public were against this renewal and reuse project by reason of the fact that "İpek Sineması", "Rüya Sineması", "Emek Sineması" and "Melek Apartmanı" will be demolished[3]. For all that, the project has been built as the way it was designed.

Main reasons behind these renewal projects are administrators turn values of the city into economic value and the stakeholders gain unearned income from such projects (Figure 2).

[3] Also see; Dosya: Emek Sineması, Cercle d'Orient ve Bir Beyoğlu Hikâyesi (2016). Mimarist Journal, Year 16, Vol. 57, pp 24-63.

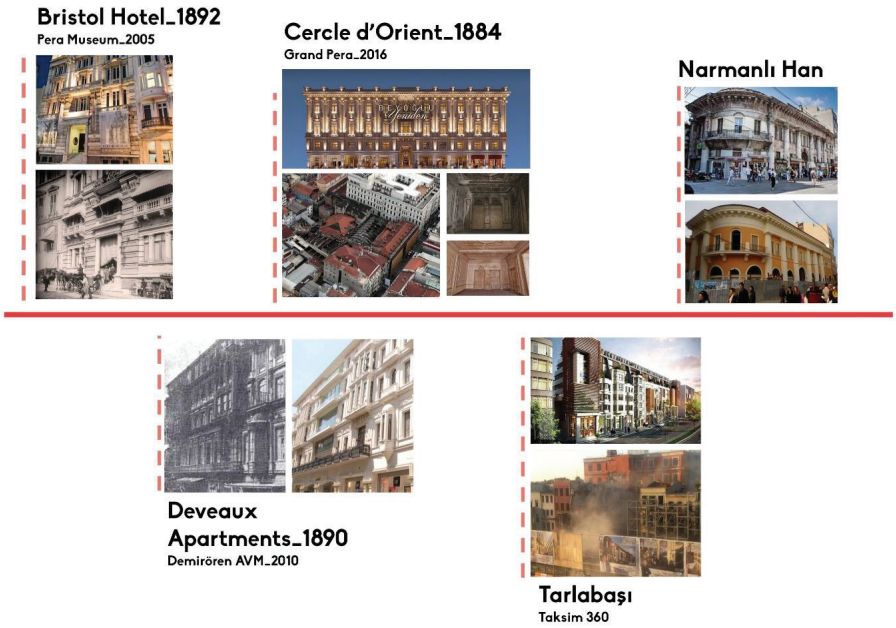


Figure 2. Recent renewal projects in Beyoğlu (Sav, 2018).

Intangible Dimensions of Narmanlı Han Related to Cultural Memory

Narmanlı Han, has had various functions with its various inhabitants. In order to better understand its history and inherent, it's necessary to search and discover all these layers. The building of Narmanlı Han was originally built for the purpose of Russian Embassy sometime after 1831 and Its embassy function lasted until 1845, after a new one opened on the Grand Rue de Pera.

The businessmen Avni and Sıtkı Narmanlı bought the building in 1933 to settle their offices. They also rent the rest of the building to artists, writers, publishing houses and this attitude turned this place into a bohemian art and culture centre. Ahmet Hamdi Tanpınar lived and produced his work in there, including "Huzur" novel (Taner, 1980). Three rooms have been rented by the sculpturer Firsek Karol and she turned this place into a sculpture atelier (Üsdiken, 2002). Gravure artist and painter Aliye Berger, also lived in top floor of Narmanlı Han. She lived, produced her work in that floor and also held exhibitions (Figure 3). Her atelier was also a center for the artists to gathered, talk and work together (Figure 4).

Figure 3. Invitation of the opening Aliye Berger's Art Exhibition in Narmanlı Han, Archive of Taha Toros.

Figure 4. Violinist Ayla Erduran with Aliye Berger in her Atelier, Narmanlı Han, Archive of Eliza Day (URL-3).

Bedri Rahmi Eyüboğlu was another one of the artists who lived and work in Narmanlı Han. After Aliye Berger and Eyüboğlu's ateliers labeled as a place to show and visit, Narmanlı Han has a strong reputation in painting and sculpture. Jamanak[4], founded by Misak and Sarkis Koçunyan brothers in 1908, moved to Narmanlı Han in mid 1960s and continue its existence there around thirty years (Koçunyan, 2015) (Figure 5).

Renewal Project of Narmanlı Han

Narmanlı Han's fifteen percent of ownership sold to Yapı Kredi Koray Incorporated Company with the aim of a restoration project around 2000s. The restoration project, adding a three-storey concrete block above the historical building, was approved by the conservation committee (Kalkan, 2000) (Figure 6). Nevertheless, the project could not even start due to the protests of non-governmental organizations.

[4] Armenian word "Jamanak" means "Zaman" in Turkish and "Time" in English (Koçunyan, 2015).

a.

b.

'Ermenice gazetelerin gelec

Türkiye'de Ermenice yayın yapan iki gazetenin en eskisi olan Jamanak (Zaman) 82 yaşında. Ara Koç, ondan tam beş yıl sonra doğmuş ama onunla büyümüş, hep onunla yaşamış. Jamanak'ı babası ve amcası kurmuş. O ise gazetede ilk olarak, Getronagan Ermeni Lisesi'ni bitirmesinin hemen ardından çalışmaya başlamış. Gazetenin İstiklal Caddesi Narmanlı Han'daki yerin tam karşısındaki eski büroda kara dizgi makinasının başına ilk geçişini duygu ve hüzün karışımı bir ifadeyle anlatıyor. Uzun yıllar müretteplik yapmış ama sık sık da daktilonun başına oturmuş. En çok gezi yazıları yazmış. Bugün hâlâ yazıyor. Fakat babası ve amcasının ölümlerinden sonra Jamanak'ın idari sorumluluğunu yüklenmiş bir kişi olarak daha çok bir gazete patronu gibi konuşuyor, davranıyor.

Aslında Jamanak bir aile gazetesi. Ara Koç'un kızkardeşleri de idari işlerde görev alıyorlar. Eşi Lili Koç gazetenin sürekli yazarlarından. Öyle ki, 55 yıllık gazeteci Ara Koç, "Onun yazıları benimkilerden iyi" diye itiraf ediyor. Koç çiftinin bir oğulları var ve her nasılsa o gazetecilik yapmıyor.

Sivas'ın Gürün ilçesine yerleşmiş Halep kökenli bir ailenin

Ara Koç, Jamanak'ta diğer ülkelerdeki Ermeni gazetelerinden derlemelere de yer veriyor.

Figure 5. a. Ara Koçunyan, son of one of the founders of Jamanak newspaper, at his office in Narmanlı Han (Ara Güler). b. Güneş Gazetesi, 1990, Archive of Taha Toros.

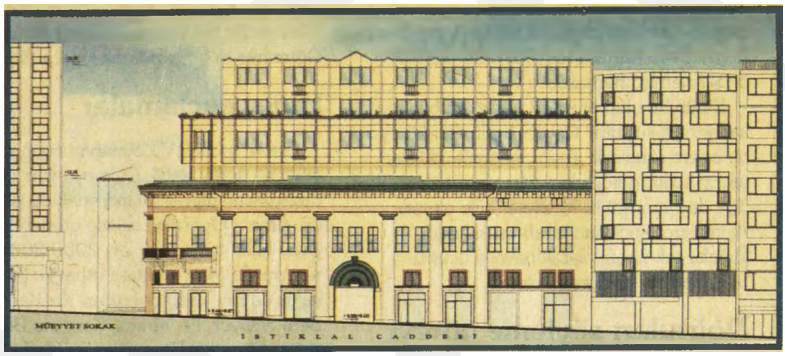


Figure 6. Front view of Narmanlı Han Restoration project (Kalkan, 2000).

In 2013, the property of Narmanlı Han sold to businessmen Tekin Esen and Mehmet Erkul. The restoration project, approved by the conservation committee in 2015, has been protested many times by the non-governmental organizations. However, restoration works in the historic building started last year and some sections inside Narmanlı Han were demolished and the trees in the inner garden were dismantled (Figure 7).

Figure 7. New facade of Narmanlı Han (Sav, 2018).

Details about the renewal project has been never shared with the public. According to the process of renewal project, it could be stated that the building was cut off from the ground due to the new function decision about inner garden. In addition, the architect designed an ornamental pool which has no relation with the buildings history and authenticity. In accordance with the renewal project, all parts of the building except front facade has been demolished and a new interior space totally different from the old one has been identified. By the reason of architect used modern construction techniques to build a new space, it's hard to understand the techniques of the era in which the building was built and also it is no longer possible to transfer them to future generations. On the other hand, all the traces, layers, sediment that the building has does not exist anymore.

Conclusion

The renewal project of Narmanlı Han has never been intended to preserve its intangible dimensions related to cultural memory. The project was more like using one original facade and imitating all other form of the building. The difference between renewal and restoration, a dialectic between replica and relic, is important to mention. Renewal projects maintain rather optimistically that the past is never truly gone, it can always be revived better than before. On the other hand, restoration maintain believe in the intrinsic power of an object or a building to keep us connected to the lives of earlier generations (Neumeier, 2015).

According to buildings history, it could be observed that the building was once one of the culture and art center of Beyoğlu due to its distinctive settlers. Sustainability of city identity and memory related to Narmanlı Han could be only possible by recognizing those figures of its memory.

References

Council of Europe CoE (2005). Council of Europe Framework Convention on the Value of Cultural Heritage for Society- The Faro Convention. Retrieved from https://www.coe.int/en/web/conventions/full-list/-/conventions/rms/0900001680083746

Kalkan, E. (2000). Narmanlı Han Kat Çıkıyor. Hürriyet Newspaper, Archive of Taha Toros. http://earsiv.sehir.edu.tr:8080/xmlui/handle/11498/4965 Retrieved date 07.01.2018

Koçunyan, A. (2015). Jamanak Gazetesi 1915. Toplumsal Tarih Dergisi, 256, pp 10-11.

Taner, H. (1980). Ahmet Hamdi Tanpınar'ın En Bereketli Yılları Narmanlı Yurdu'ndaki Bekâr Odasında Geçti. Milliyet Sanat, Vol. 14, pp 26-28.

The Australia ICOMOS (2013). The Burra Charter- The Australia ICOMOS Charter for Places of Cultural Significance. Retrieved from http://australia.icomos.org/publications/burra-charter-practice-notes/

The Charter of Krakow (2000). Principles for the Conservation and Restoration of Built Heritage. Retrieved from http://smartheritage.com/wp-content/uploads/2015/03/KRAKOV-CHARTER-2000.pdf

UNESCO HUL (2011). Recommendation on the Historic Urban Landscape. Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=48857&URL_DO=DO_TOPIC&URL_SECTION=201.html

Üsdiken, B. (2002). Dünden Bugüne İstanbul Ansiklopedisi'nde kaleme aldığı Narmanlı Han maddesi. İstanbul Dergisi, April, pp 131.

URL-1. Retrieved date 07.01.2018
https://en.oxforddictionaries.com/definition/lodging

URL-2. Retrieved date 07.01.2018
http://www.arkitera.com/haber/22197/civi-bile-cakilamayan-tarlabasi-nasil-yikildi_

URL-3. Retrieved date 07.01.2018
http://blog.saltonline.org/post/158702922474/arşivden-çıktı-eliza-day-bu-hikâyenin-neresinde

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The value of the scrap objects in design: which actions to promote it?

Francesca La Rocca[1*], Chiara Scarpitti[2]

[1]*Department of Engineering, University of Campania "Luigi Vanvitelli", Aversa, Italy, francesca.larocca@unicampania.it*
[2]*Department of Engineering, University of Campania "Luigi Vanvitelli", Aversa, Italy chiarascarpitti@gmail.com*

Abstract: The paper presented describes an action-research about the concept of re-design, re-use, reinterpretation of the materials, productive processes and digital technologies in the scrap objects. Starting from a reflection on the anthropological meanings of the objects, about their materials and functions, the activities suggested are an attemp to reinvent them, throught a strong contemporary design perspective. The methods concern mappings, co-design activities, transnational meetings, in order to achieve transdisciplinary workshop, design and art productions, open talks and travelling exhibitions. The final objective concern the strengthening of a contemporary eco-friendly design, constantly updated throught a lively web platform able to connect all the creative players, linked by this renovated vision of sustainability.

Keywords: contemporary design; reuse; scrap objects; sustainable design.

Introduction

Reintegrating and recovering waste and turning it into a resource not only represents an inescapable environmental must, but it also yields a chance for a deep cultural renewal; far from being only a technical-economical problem, it closely involves, and might overcome, deep-rooted ideological resistances.

Irresponsible industrial production causes what Vilém Flusser has called the "exponential deluge of objects": we enter information into automatic machines so that they produce an ever increasing quantity of things that are bound to become rejects in a very short time, deprived of any value (Flusser, 2003; Latouche, 2013). The re-using of materials and objects is a crucial research subject in the international cultural debate and a relevant issue in contemporary design. In Italy, Giulio Iacchetti's and Italo Rota proposed "Upside-Down Factory" ("La fabbrica al contrario"), a project started in 2012 at the Nuova Accademia di Belle Arti of Milan, that represents a significant instance going in that direction. In many different ways, also many other contemporary designers have been working around the issue of re-using. Amongst them, we can name Enzo Mari, Fernando e Humberto Campana, Jurgen Bey, Ron Arad, Massimiliano Adami, Yonel Hildago, Martino Gamper, Paolo Ulian, Mugi Yamamoto, Hella Jongerius, Donata Parrucini, Li Xiaofeng, Lorenzo Damiani, Jesse Howard, Gaspard Tiné-Berès. Beside individual professionals, or random initiatives, however, there is

so far no European structured network which may be up to selecting and encouraging the choicest creative enterprises in this field.

Figure 1. Jurgen Bey, Kokon Furniture, (1999).u

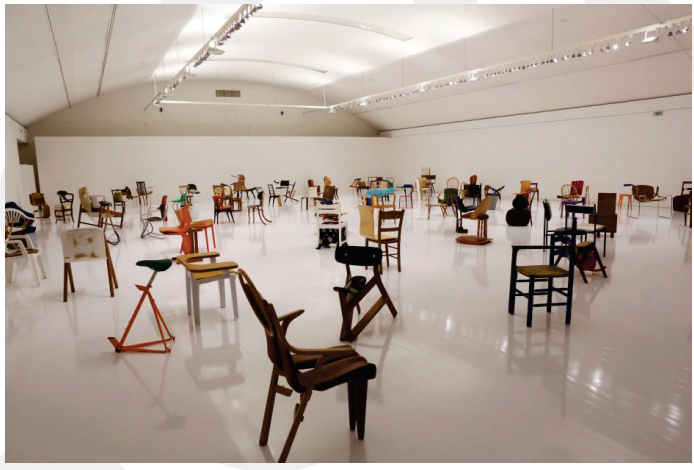


Figure 2. Martino Gamper, 100 chair in 100 days (2006).

Promoting the culture of reuse in design

The research starts with a reflection on the thinking paths that guide relationships with the objects, throught a new sensitivity to the reinterpretation of the obsolete and discarded object toward an ecological, economic and artistic value (Fuad-Luke, 2003). The proposed strategy aims to the creation of a fruitful dialogue between cultural actors, such as artists, designers, researchers and theoreticians, but also to involve the stakeholders of the productive and entrepreneurial ecosystem.

As Frida Doveil wrote:

> (…) The culture of Repairable Making is able to force us to look again at the paradoxes and contradictions that surround products: new/used, popular/luxury, perfect/imperfect, durable/ephemeral, simplified/complex. (…) Reparability implies a new relationship of balance: the re-humanization of use and consumption. Even before being considered a physical characteristic of an object, it is a philosophical category which looks at the importance of things (…)". (Doveil, 2013)

This paper is aimed to be a proposal for a new action-research about the concept of re-design. The main idea is based on two assumptions: first, we plan to explore the new potentialities a used object yields by highlighting its liability to take up a new function or a new sense; secondly, we plan to endow scrap or obsolete objects with a second life by finding new inspirational and creative potentialities.

The philosophy of the re-use doesn't merely involve retrieving objects, but it also gives new life to the material culture, which can stimulate collaborative behaviours. The neologism *thinkering* (crossing thinking and tinkering) means the idea of interacting with a network of knowledge, tools and communities of interest; productively testing, adapting, and reusing object and skills, sharing these activities with other minds in consonance (Antonelli, 2011). For these reasons, the project proposes an idea of workshops as moments where craft laboratories collaborate with fab lab, involving citizens, experimenting all together new kinds of manufacturing processes and sustainable practices.

A special design section will focus the reuse of the digital devices, through a different reuse of the materials, the 3D printing machines and the open source platforms, as for instance Instructables or Thingiverse. The design activities can develop in many different ways, by disassembling, recombine, repair or reinvented the objects themselves.

Seminars, events and public talks will critically work on the "life" of the object, which has been variously represented in literature, arts and design in the Twentieth century (Duque, 2007; Bodei 2010).

In particular it's important to focus on:

- "time", as a particularly favourable standpoint from which we will survey objects;
- obsolete objects and the value of the "worn-out and broken" in contemporary literature and art;
- the new technological imaginary of the objects.

Figure 3. Jesse Howard, Transparent Tools,x (2012).

Figure 4. Studio Minale Maeda, Keystone Tripod, (SLS PA, wood) (2014).

The internationalisation of the creative players

Connecting creativity and the control of the products' life cycle may prompt new ideas on entrepreneurial levels and give new shapes to designers', both to industrial management's and consumers' roles (Vezzoli, 2016). Re-using can offer a new life to the material culture

that the scrap objects bring along them and which may merge with innovative practices. So, according to the concept of the project, the connection between creativity and the products' life cycle may generate new entrepreneurial ideas and give new opportunities to designers, artists, creatives in general and citizens.

The proposal looks at integrated actions aimed to strengthen and internationalise creative players (designers and artists in a broad sense) that nowadays work on the critical re-interpretation of used objects. The overall goal is to put forward a development, business and internationalisation strategy capable of promoting new talents. This will be achieved on one hand through workshops, conferences, exhibitions, design and art productions investigating a critical approach on the "life cycle" of the object; on the other hand, through mobility programmes targeting the art of "re-use".

The main objectives of this action-research are:

- Promote the visibility of creative actors working on the subject of redesign;
- Enhance awareness of people on the theme of creative re-design and reparability
- Promote the mobility of artists and designers and the transnational circulation of cultural and creative works based on the re-use practices.
- Promote international cooperation to support innovation, expansion of the audience and new business models in the field of re-design;
- Consolidate the professional network of the sector of the re-design, and its ability to operate transnationally.

To support the entire network, it's crucial to create and manage a *web platform* intertwined with all the different actions, expression of the international community of creative players, for the coordination of the different activities. In particular, it envisages the creation of a website for the internal and external communication, the cultural exchange between the different players, the visibility of the works of designers and artists involved, the calls and the cultural appointments.

A relevant task will be contacting the creative people interested in the field of redesign, acquire data about their careers, arranging interviews with them, promoting a real and efficient network of exchange. The platform aims to become a reference point for the community of designer and artists, individuals or associations that work in this field.

Figure 5. Francesca Lanzavecchia, Lungo come il viaggio, Design Destinations, MAXXI Museum (Rome, 2014).

A designer-to consumer approach

Nowadays the designer-to-consumer approach (D2C) is a common model to spread new ideas and methodologies, as well as marketing products through the Internet (Olivares, 2012). Indeed, through web platforms, self-producer designers can reach consumers all around the world, establishing a direct link with the public. Starting from this point, the action-project propose to create and registrate a specific reuse *brand* in a strategic vision, in order to strength the entire network of the stakeholders.

The main idea is to build a truly competitive business system which can sustain itself, through the development of different business models suitable to the designers and artists, working in this field of redesign and reuse. It's a kind of open business model based upon redesign services, where designers and consumers can be involve with participatory co-design processes, obtaining and building, also with their visions, specific business models (Manzini, 2015).

Conclusions

The project proposal is in an open research phase. Therefore, it represents the first cell of an organism that aspires to be fully efficient. However, not a few are the expected final results as:

- the creation of an international web platform for the promotion of all creative actors interested in the philosophy of reuse, through an international network aimed at building partnerships and new contacts;
- the production of design and art collections, leading to travelling exhibitions, thanks to the creation of a fruitful and collaborative dialogue between all cultural actors involved;
- the affirmation of a *reuse mark*, through the acquisition of financial and management skills and the development and testing of new creative business models;
- a sensitive involvement of citizens in redesign activities, through the open awareness sustainability workshops and the active participations in dissemination events, such as talks and open exhibitions.

Althought the entire research project belong both to Francesca La Rocca and Chiara Scarpitti, the paragraphs 1, 2 are written by F. La Rocca, while the paragraphs 3,4,5 are written by C. Scarpitti.

References

Antonelli, P. (2011). *States of Design 03: Thinkering.* Domus n. 948, giugno.
Bodei, R. (2010). *La vita delle cose.* Roma-Bari: Editori Laterza.
Fabris, G. (2010). *La società post-crescita. Consumi e stili di vita.* Milano: Egea.
Faud-Luke, A. (2003) *Eco-design: progetti per un futuro sostenibile*. Modena: Logos.
Doveil. F. (2013). *(Repairability among) The fortunes of quality.* In ADI Design Index 2013. Milano: ADI Publisher.
Doveil F. (2013) *Some of the most interesting projects developed to encourage repairability in over twenty different countries* Retrieved from http://rriparabile.com/repair-projects/
Duque, F. (2007). *La fresca rovina della terra. Dell'arte e i suoi rifiuti.* Napoli: Bibliopolis.
Granelli, A. (2010). *Artigiani del digitale. Come creare valore con le nuove tecnologie.* Bologna: Luca Sossella Ed.
Vilém Flusser, *Filosofia del design*. Milano: Bruno Mondadori 2003.
Latouche, S. (2013). *Usa e getta. Le follie dell'obsolescenza programmata.* Torino: Bollati Boringhieri.
Manzini, E. (2015). *Design, When Everybody Designs: An Introduction to Design for Social Innovation.* Cambridge: The Mit Press.
Olivares, J. (2012) *D2C Generation*. Domus n. 964, dicembre.

Slade G. (2006). *Made to break, Technology and Obsolescence in America*. Boston: Harvard University Press.
Vergine, L. (2006). *Quando i rifiuti diventano arte TRASH rubbish mongo.* Milano: Skira.
Vezzoli, C. (2016). *Design di prodotto per la sostenibilità ambientale.* Milano: Zanichelli.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Suggestions for Refurbishment of Existing K-12 Schools in The Light of Sustainable Criteria

Hafize Nur Sılay Emir[1]

[1] *Department of Architecture and Landscape, Kingston University London, London, UK, k1528136@kingston.ac.uk*

Abstract: Sustainable structures are significant in terms of protecting natural resources. Buildings need to be designed environmentally friendly in terms of energy consumption, water consumption, and material usage. Therefore, school buildings in various countries have been designed in line with sustainable criteria in recent years. This research aims to propose how sustainable systems used in schools elsewhere can be adapted to improve the sustainability of existing school buildings in Turkey. In this study, green building certification systems (LEED and BREEAM) and sustainable school samples from the world have been examined for the refurbishment of existing K-12 school buildings. In this context, a four-stage proposal will be presented for the sustainable renovation of school buildings built with standard projects without regard to climate and environmental conditions. Thus, while comfortable learning environments increase academic achievements of students, school buildings will undertake the role of a third teacher for raising of ecologically literate individuals.

Keywords: K-12; sustainable refurbishment; education; ecological literacy

INTRODUCTION

When consumers in construction sector think that nature has unlimited resources, they use natural resources unconsciously and cause the deterioration of the ecological balance. According to Dixon, almost 45% of world energy is consumed by buildings globally (Dixon, 2010). Buildings in member states of the OECD[1] account for nearly 35% of total energy use (www.iea.org). In addition to having the environmental awareness of designers, it is crucial to gain next generations same awareness through the buildings they produce. In addition to the curriculum, designing educational buildings undertaking the task of a laboratory as a "learning environment that teaches sustainability" will undoubtedly become a more effective tool for creating such consciousness. Design interventions to existing buildings as well as the construction of new, sustainable educational buildings will both contribute to the creation of

[1] The OECD is a unique forum where the governments of thirty democracies work together to address the economic, social and environmental challenges of globalisation. The OECD member countries are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States.

sustainable learning environments and to reduce resource consumption. The main objective of this research is to make a contribution to promoting sustainability, and the refinement of standard existing K-12 school buildings[2] by increasing comfort conditions, decreasing energy use, offering a healthy indoor environment, and supporting education with sustainable architecture.

There are many alternatives in the intervention possibilities, but this research may not include

In this regard, a detailed literature review was made on topics about sustainability, sustainable school architecture, sustainable certification systems, and environmental literacy.

Sustainability is defined by the World Commission on Environment and Development as "meeting the needs of today without compromising the ability of future generations to meet their own needs" (WCED, 1987).

Bachman defined sustainability as a broad term for the healthy habitation of nature. Also, according to him, "The systems mode of sustainability addresses biological patterns as well as the physics of building energy use" (Bachman, 2003). In this context, sustainability rating tools are referenced to determine the level of sustainability in buildings and to obtain a comparison between each building. Rating tools vary from country to country depending on the individual characteristics of each country, such as the climate and type of building stock. Each rating tools for different countries have different parameters.

There are a number of standards, methodologies, and tools about environmental assessment and certification system with regard to building stock. LEED, BREEAM, CASBEE and so on are most common and widely used across the world.

[2] K-12, a term used in education and educational technology in the United States, Canada, and possibly other countries, is a short form for the publicly-supported school grades prior to college. These grades are kindergarten (K) and the 1st through the 12th grade (1-12).

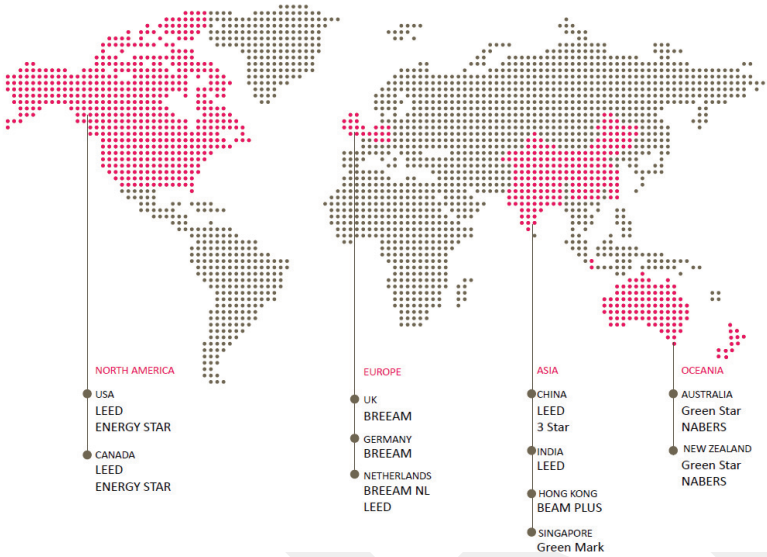


Figure 1. Countries and applicable sustainability systems

This section below discusses certification systems which have versions for schools such as BREEAM and LEED. Also, BREEAM and LEED are used extensively as a building rating tool in Turkey.

BREEAM (UK)

Categories	**Points**
Management	13
Health& Wellbeing	13
Energy	26
Transport	10
Water	6
Materials	13
Waste	9
Land Use & Ecology	10
Pollution	14
Innovation	10

Table 1. BREEAM Categories and points (http://www.breeam.org, 2010)

LEED (USA)

Credit Categories	Possible Points
Sustainable Sites	26
Water Efficiency	10
Energy & Atmosphere	35
Materials & Resources	14
Indoor Environmental Quality	15
Innovation in Design	6
Regional Priority	4
Total Credit Points	110

Table 2: LEED-NC credit categories analysis

In essence, sustainable school buildings contain the principles of reducing, reuse, recycle, protecting nature, eliminating toxins, life-cycle costing and quality (Kibert, 2005).

Dorsey and L'Esperance stated that "Every new structure that is constructed without sustainable principles is a lost opportunity for the lifetime of that building." Schools are an ideal application of sustainable design but if the building itself is not used to help teach students about sustainability and their role in a sustainable future, the full benefits are lost. (Dorsey and L'Esperance, 2000).

METHODOLOGY

This section will show a number of sustainable school buildings from around the world.

In this study, educational buildings will be identified for detailed research focusing on that sustainable design and the energy efficiency features which can be adapted to existing school buildings will be investigated. So, successful sustainable school building examples around the world will shed light on this project in terms of adaptable architectural features.

Based on LEED -BREEAM certification systems, school samples from the world using local and natural materials, recycling, having climate-sensitive design with the lowest energy requirement were investigated. The design strategies used were examined.

Pathways World School, Arvali/India

By getting 86 total points according to LEED score table, the school qualified to receive LEED PLATINIUM in 2016. Materials and resources among categories become prominent. Pathways Schools adopted old architectural methodologies and techniques using natural materials thereby achieving healthy indoor environments with significantly less energy requirements.

Figure 2. Pathways World School(usgbc.org)

Figure 3. Lake Mills Elementary School (usgbc.org)

Lake Mills Elementary School, USA

By getting 80 total points according to LEED score table, the school qualified to receive LEED PLATINIUM in 2016. Energy and atmosphere among categories become prominent.

Green features include a vegetated green roof, photovoltaic system, solar hot water system, and operable windows. Design strategies enable to school to reduce energy consumption 65 percent and water 37 percent.

Ayrshire College - Kilmarnock Campus, UK

The building achieved BREEAM 85.09% rating of 'Outstanding'. Natural lighting and ventilation features become prominent.

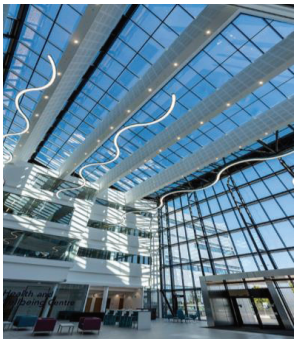


Figure 4. Ayrshire College (breeam.com)

Figure 5. OIB Technical High School (archdaily.com)

OIB Technical High School, Bursa/Turkey

The building has a BREEAM In-Use 'Very Good' Certificate. Most significant features are natural ventilation and land use.

Maple Dale Middle School, Wisconsin

The school was the first in the world to earn certification under the LEED v Operations and Maintenance: Schools rating system, achieving LEED Gold certification. Recycled and locally sourced material was used in building material selection (www.usgbc.org).

Figure 6. Maple Dale Middle School

Figure 7. Howe Dell Primary School, Hatfield, U.K. (howedell.herts.sch.uk).

Howe Dell Primary School, UK

The building achieved BREEAM 'Excellent'. The school uses renewable energy sources in heating and cooling systems.

Sidwell Friends Middle School, Washington

The Middle School Building is the first K-12 school in the United States to have a LEED Platinum rating. Water-efficient landscaping and treating waste water features meet building's 93% of water need.

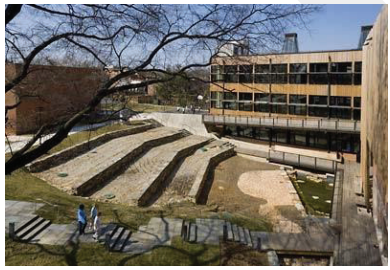


Figure 8. Sidwell Friends Middle School (www.usgbc.org, 2007).

FINDINGS and DISCUSSION

Sustainability is a concept that should be respected not only for today but also for future generations. Sustainable schools have environmentally friendly features. As a result of the researches carried out;

Maple Dale Middle School (Wisconsin) with recycled and locally sourced material, OIB Technical High School (Bursa) with natural ventilation and land use, Howe Dell Primary School (UK) and Lake Mills Elementary School (USA) with energy-efficient design, Sidwell Friends Middle School (Washington) with landscape design and waste water treatment become more predominant.

On the sustainable improvement of existing buildings, these sustainable school examples will illuminate future studies.

Sustainable refurbishment suggestions

A four-stage proposal is presented for the refurbishment of existing K-12 schools. Existing schools are expected to be improved every year by realising one stage. These steps;

1. stage:

- Student-centred, environment-friendly practices could be supported with a curriculum in order to enhance students' environmental awareness.
- After maintenance of water and electrical installation, photocell fittings and lighting equipment could be selected.
- Vacuum assisted toilets and pressurized reservoirs could be used.
- The system to convert organic wastes could be prepared.
- Collection areas for materials such as paper, glass, plastic, metal, batteries, domestic oil could be created. Paper and plastic waste could be recycled at the art workshop. This is important for children to become conscious and responsible individuals.

2. stage:

- Rainwater and gray water could be recycled and used for irrigation and siphons.
- Solar chimneys and multi-directional opening windows for natural ventilation, HVAC system for air conditioning could be created. Recycling units can be observed by students.

3. stage:

- Vertical gardening could be designed to prevent warming on the sun-drenched facades.
- In cold climates, building exterior facade lining; in hot climate regions, window shades and light shelves could be applied.
- Local and natural materials could be selected for renovation of interiors.
- Roof garden might be created in order to provide insulation.

4. stage:

- Both electricity and heat energy might be provided with solar panels to be located on the south side and the roof of the buildings.
- The afforestation to the north of the gardens can reduce the wind effect.

- For landscape design, plant species that require less water and suitable for local soil construction could be selected.
- The playgrounds designed with inspiration by nature can be arranged with the greenhouses where the students grow vegetables.

CONCLUSION

For this reason, there is a need to re-evaluate existing school buildings that have standard projects, from the viewpoint of sustainability; in order to raise sustainability awareness among children at early ages and to seek an opportunity to reduce the energy consumption of these buildings.

Proposed sustainable interventions will contribute to the increase in the academic achievement of the students by designing comfortable learning environments for them. School buildings with sustainable criteria will take the role of a third teacher and prepare the ground to train ecologically literate individuals.

At the same time, since this proposal is a gradual system (for 4 years), it is possible to achieve the result without forcing the budget of the Ministry of National Education. When these four steps are addressed more extensively, this is a significant research on behalf of the creating of the basis of a new certification system for K-12 schools, specific to Turkey.

REFERENCES

Bachman, L. R., (2003). Integrated Buildings: The Systems Basis of Architecture, John Wiley & Sons, New Jersey.

Building Research Establishment (BRE) Global. (2016, March). Retrieved from http://www.breeam.org/filelibrary/Technical%20Manuals/SD5068_1_0_BREEAM_Datacentres_2010.pdf

Dixon, W., (2010). The Impacts of Construction and the Built Environment, Briefing Notes, Willmott-Dixon Group.

Dorsey, J., & L'Esperance, C., (2000). Sustainable Design Guidelines for the Construction of New Facilities and the Renovation of Existing Structure, Education Resources Information Centre (ERIC). Retrieved from http://www.eric.ed.gov/PDFS/ED454689.pdf.

Ford, A., (2007). Designing the Sustainable School. Bastow The Images Publishing Group, Victoria, Australia.

Kibert, C., (2005). Sustainable Construction: Green Building Design and Delivery. New Jersey: John&Wiley&Sons, Inc.

Leadership in Energy and Environmental Design (LEED). (2016, March). Retrieved from http://www.yesilbina.com/leed-sertifikasi_a18.html

LPA., (2009). Green School Primer: Lessons in Sustainability. Bastow The Images Publishing Group, Victoria, Australia.

World Commission on Environment and Development, "Our Common Future Report", (1987). Oxford University Press, London.

https://www.iea.org/publications/freepublications/publication/Building_Codes.pdf

http://www.yesilbina.com/leed-sertifikasi_a18.html

https://kierantimberlake.com/pages/view/230, accessed in 2016.

http://www.aiatopten.org/node/140, accessed in 2017.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Opaque and transparent innovative systems for a smart second skin building envelope

Sergio Sibilio[1], Antonio Rosato[1], Michelangelo Scorpio[1], Giovanni Ciampi[1], Giuseppina Iuliano[1], Yorgos Spanodimitriou[1*]

[1]Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa (CE), Italy
sergio.sibilio@unicampania.it, antonio.rosato@unicampania.it, michelangelo.scorpio@unicampania.it, giovanni.ciampi@unicampania.it, giuseppina.iuliano@unicampania.it, yorgos.spanodimitriou@unicampania.it

Abstract: The extended abstract defines the state-of-the-art of innovative materials for the building envelope with references to researches under development and market availability, and their application in real-world scenarios. This development therefore will allow us to understand which weaknesses and strengths of the processes are from theoretical and practical point-of-view, materials and techniques that can be applied, for the performance improvement of dynamic/adaptive building façades in a multidisciplinary optimization path.

Keywords: smart façades; dynamic materials; building second skin.

Introduction

According to the European Energy Performance of Building Directive, building envelope should be considered no more as a static barrier, but as a dynamic system.

Innovative and dynamic components can help designers to reach this objective. For this reason, the most innovative systems and interesting applications are reviewed.

Transparent systems.

Dynamic transparent systems modulate solar inputs while ensuring excellent visual and energy performances (Rezai & Shannigrahi, 2017). They can be distinguished in passive or active control systems (Fig.1).

Passive dynamic control systems have an adaptive layer that self-regulate responding to external stimuli. The most promising can be considered:

(1) Photo-Chromic glasses (PC), that change colour when hit by solar radiation (Wu, Zhao, Huang, & Lim , 2017);

(2) Thermo-Chromic glasses (TC), that change colour when hit by solar radiation and the temperature reaches the threshold value (Rezai & Shannigrahi, 2017);

(3) Phase Change Materials (PCM), switch from solid to liquid, and vice-versa, when temperature reaches a threshold value, absorbing or releasing energy, which make it useful for both light and heat control (Fokaidas, Kylili, & Kalogirou, 2015).

Unlike passive dynamic control materials, active control systems can be controlled through electrical stimuli. Electro-Chromic glasses (EC) change their optical and thermal properties passing from a transparent to a tinted state; however, the switching time is quite slow (between 5 and 12 min). In the Gas-Chromic glasses (GS), the dynamic layer reacts to specific gasses to change state from transparent to tinted; this system, while operatively limited, is cheaper and faster than EC glasses. The Suspended-Particle Devices (SPD) and the Liquid-Crystal Devices (LCDs) modulate their optical and thermal properties by aligning the suspended particles inside them through an electromagnetic field: when aligned, the light can pass through and the glass appears transparent, otherwise the light is blocked and it appears milky. In order to maintain every determined state, a continuous flow of energy is necessary. (Casini, 2018)

Tab. 1 lists the maximum commercialized size, the visible light transmission coefficient (τ_{vis}), the Solar Heat Gain Coefficient (SHGC), and thermal transmittance (U) of these materials.

Tab. 1: Characteristics of the dynamic glazing.

Devices	Size (mm)	τ_{vis} (%)	SHGC (%)	U (W/m^2K)	Switching speed (s)
PC	3000×2000	90.7(clear) 53.4(tinted)	88(clear) 78(tinted)	5.52	15-30
TC	3000×2000	50(25°C) 12(65°C)	29(25°C) 13(65°C)	1.36	~1.5×10^2
PCM	3000×2000	8-28(solid) 12-44(liquid)	33(winter, solid) 6(summer, solid) 35(winter, liquid) 9(summer, liquid)	0.48	~28.8×10^2
EC	1550×4400	60(clear) 1(dark)	49(clear) 6(dark)	1.64	30-72
GS	1550×any length	54(clear) 15(dark)	65(clear) 28(dark)	2.30	<60
SPD	1524×any length	65(clear) 0.5(dark)	57(clear) 6(dark)	1.50	1-3

LCD	1828×3567	75(clear) 50(dark)	69(clear) 55(dark)	1.59	4×10^{-2}

Recently, new prototypes (especially those with nanotechnologies) are studied and realized to control independently the infrared radiation.

Opaque systems.

Opaque systems improve the overall building energy performances, for example maximizing its thermal solar gain in winter or improving passive cooling in summer. Fig. 1 shows the distinction between static and dynamic systems, according to their ability to change properties and performances as the boundary conditions change.

Technological innovation in static systems has mainly concerned materials, developing Super-Insulating Materials (SIM) which mainly exploit three technologies to reduce heat exchange: the radiative heat reflection, the nano-porosity and the vacuum:

(1) in the heat-reflecting materials, a low-emission and reflective layer limit the radiative heat exchange (Saber, 2012).

(2) materials with nano-porosity (as aerogel, composed for 99.8% of air) block conduction thanks to gases poor heat conductivity, and convection thanks to poor air circulation inside of the material.

(3) vacuum technology (used for vacuum panels) allows to break down convective and conductive exchanges. A great limitation comes from the package extreme fragility. (Lupton, Jeffers, Tobias, & Imperiale, 2002).

The Tab. 2 lists the size, thickness and thermal conductivity (λ) of some SIM using different technologies.

Tab. 2: Main characteristics of the analysed passive SIM.

Devices	Size (mm)	Thickness (mm)	λ (W/mK)
Heat-reflecting materials	1600×12.600	40	0.03
Aerogel materials	1400×720-1500×1000	10-20-30	0.015
Vacuum panels	100×600	7 to 30	0.007

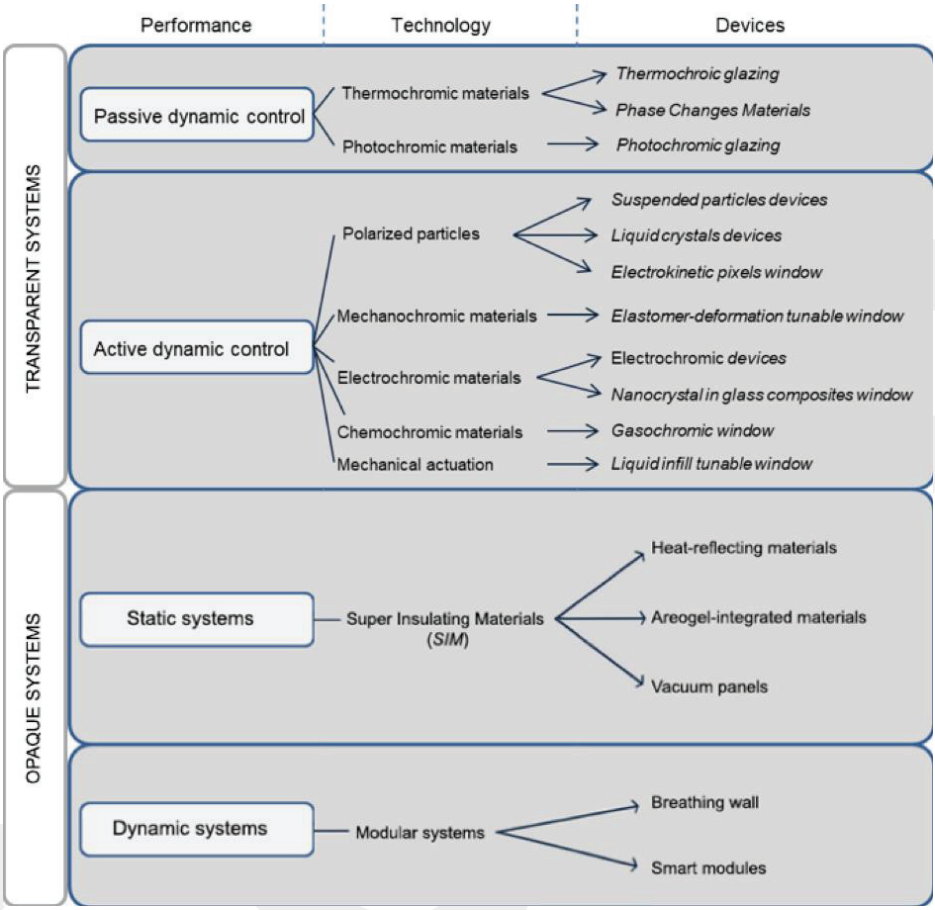


Fig. 1: Dynamic and opaque systems.

Dynamic systems include both materials with dynamic layers and smart modules, which can be mechanically regulated to modulate the air flow and the thermal insulation.

The breathing wall is a second skin on the external building walls. It creates an air cavity that, through dynamic devices integration, is able to modify its thermal behaviour upon varying of external conditions (Imbabi & Smith, 2007).

Smart modules are used to realize more complex structures, that can modify the energetic behaviour in different envelope zones: the smart module for the Al-Bahr Tower is a good example of these systems.

Designed from the traditional Islamic *Mashrabiya*, each dynamic module is composed of aluminium frames, glass-fibre meshes and PTFE panels, driven by linear motors.
Each module can operate independently or as a system in response to the sun position, to manage the whole shading on the entire façade, or to create an air gap with the external walls (Attia, 2016).

Dynamic and adaptive façades: three case-studio

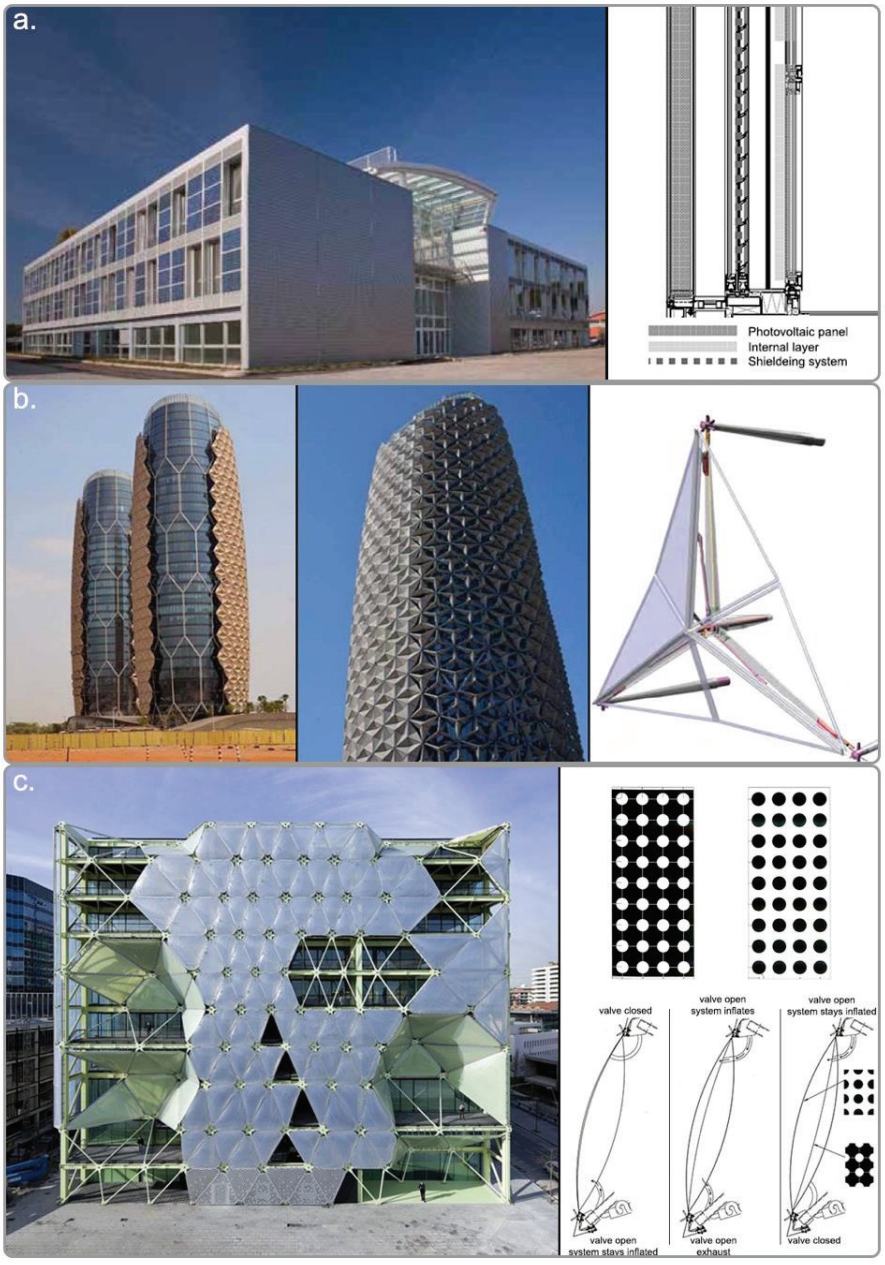
The variety of existing dynamic systems allows a wide range of solutions, from the most simple and cost-effective, easily applicable to existing buildings, to the more complex ones, which are more appropriate for new designs. Furthermore, in the more complex designs it is possible to observe how the difference between transparent and opaque devices becomes very labile, considering their high dynamicity. The three case-studio below can better show these different approaches to the envelope design.

The first case concerns a design for a new box-type façade in the ICT centre in Lucca, consisting of an opaque and a transparent module within an aluminium frame. As we can see in Fig. 2a, both modules have movable panels (PV, glass, etc.) that can slide between them, allowing a customization according to the building needs (Sala & Romano, 2011).

The second case is the application of the smart-module cited previously on the Al-Bahr Towers. The control system can deploy all the modules in a continuous arrangement, to completely interrupt the view and create a continuous ventilated façade or reach intermediate solutions that promote shading while allowing the view (Attia, 2016), as seen in Fig. 2b.

The third case is the Media TIC building in Barcelona, which represents the most complex case in which the system can dynamically switch from transparent to opaque thanks to more than 500 sensors. The South-East façade has a mosaic composition of triangular “cushions”, as seen in Fig. 2c, while the South-West façade is wrapped entirely by a single “cushion”; every “cushion” is made of three ETFE layers: the position of the central one determines the transparency of the module (Albiñana, et al., 2011).

Finally, Fig. 2d shows the physical results, advantages and disadvantages of the analysed cases.


a.
Photovoltaic panel
Internal layer
Shieldeing system
b.
c.
valve closed
valve open
system inflates
valve open
system stays inflated
valve open
system stays inflated
valve open
exhaust
valve closed

d.

Project	Technology	Physical results	Advantages	Disadvantages
ICT Centre	Composite module	In winter configuration: -Heating needs decreased by 5%; -Internal illumination of 300 lux. In summer configuration: -Primary energy need decreased by 30%; -Internal illumination of 592 lux.	Decreased transmittance value to 0.6 W/m^{2}K; Modular system (i.e. allows to use PV panels too).	Most panels don't have automatic control; It's required a good lighting system, even in daytime, during winter.
Al-Bahr Towers	Shading module	Reduced solar gain by more than 50%	Automatic control system; Presence of external sensors; 86% of occupants declare to have from very good to acceptable thermal comfort.	System updated every 15 minutes
Media-TIC	ETFE "cushions"	Reduced solar radiation between 65-90%; 55% CO2 reduction related to shading; 4-10% CO2 reduction related to energy efficient smart sensors.	Hi-efficiency and automatic control system; Presence of external sensors.	Complex control system

Fig. 2: a. External view and module stratigraphy of ICT Centre; b. External view, module arrangement and module detailed view of Al-Bahr Towers; c. External view and ETFE module detail of Media-TIC Centre; d. the main results, advantages and disadvantages of each analysed solution.

Conclusion

This study shows the possibility to further design and optimize the smart modules for building envelopes, a component that in the next future will become more and more dynamic and interactive: improving its efficiency, its ease of implementation and its economic impact will certainly help the diffusion and the evolution of the contemporary building panorama.

References

Albiñana, M., Burry, M., Català, A., Folch, R., Giralt-Miracle, D., Hereu, J., . . . Serra, A. (2011). *Media-ICT.* Barcelona: Actar Publishers.

Attia, S. (2016). Evaluation of adaptive facades: The case study of Al Bahr Towers in the UAE. *QScience Proceedings.*

Casini, M. (2018). Active dynamic windows for buildings: A review. *Renewable Energy, 119*, 923-934.

Fokaidas, P.A., Kylili, A., & Kalogirou, S.A. (2015). Phase change materials (PCMs) integrated into transparent building elements: a review. *Mater Renew Sustain Energy, 4*(6), 3-13.

Imbabi, M., & Smith, P. (2007). Dynamic breathing buildings – the future. *The e2 Energy Solutions Conference and Expo.* Olympia, London.

Lupton, E., Jeffers, G., Tobias, J., & Imperiale, A. (2002). *Skin: Surface, Substance and Design.* Laurence King Publishing.

Rezai , S.D., & Shannigrahi, S. (2017). A review of conventional, advanced, and smart glazing technologies and materials for improving indoor environment. *Solar Energy Materials and Solar Cells, 159*, 26-51.

Saber, H.H. (2012). Investigation of thermal performance of reflective insulations for different applications. *Building and Environment, 52*, 32-44. Retrieved from https://doi.org/10.1016/j.buildenv.2011.12.010

Sala, M., & Romano, R. (2011). SMART SKIN ENVELOPE. INTEGRAZIONE ARCHITETTONICA DI TECNOLOGIE PER IL RISPARMIO ENERGETICO. *Il progetto sostenibile 26*, 76-79.

Wu, L.Y., Zhao, Q., Huang, H., & Lim, R. (2017). Sol-gel based photochromic coating for solar responsive smart window. *Surface & Coatings Technology, 320*, 601-607.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainable Urban Planning: Analysis of Open Public Spaces in Post-Soviet Districts of Lithuanian Cities

Jolita Sinkienė [1*], Kęstutis Zaleckis[2], Indrė Gražulevičiūtė-Vileniškė[3], Jurga Vitkuvienė[4], Brigita Tranavičiūtė[5], Huriye Armağan Doğan[6], Tomas Grunskis[7]

[1]*Department of Art and Humanities, Kaunas University of Technology, Kaunas, Lithuania, jolita.sinkiene@ktu.lt*
[2]*Department of Architecture and Urbanism, Kaunas University of Technology, Kaunas, Lithuania, kestutis.zaleckis@ktu.lt*
[3]*Department of Architecture and Urbanism, Kaunas University of Technology, Kaunas, Lithuania, indre.grazuleviciute@ktu.lt*
[4]*Department of Architecture and Urbanism, Kaunas University of Technology, Kaunas, Lithuania, jurga.vitkuviene@ktu.lt*
[5]*Institute of Architecture and Construction, Kaunas University of Technology, Kaunas, Lithuania, brigita.tranaviciute@ktu.lt*
[6] *Institute of Architecture and Construction, Kaunas University of Technology, Kaunas, Lithuania, huriye.dogan@ktu.lt*
[7]*Department of Architecture, Vilnius Academy of Arts, Vilnius, Lithuania, grunskis@gmail.com*

Abstract

The concept of sustainability has been established by the requirement of the preservation of the natural resources, which would form a balance between the environment and nature that can be transferred to the future generations. Nevertheless, it is possible to observe the same idea in architecture and urban development of the cities. However, in the case of Lithuania, by the impact of the massive modernist urbanisation of the Soviet era, the previously organically developing urban structures have been interrupted. Therefore, the characteristics of architecture, that contain the ability to communicate memory and identity which is needed for the sustainable urban development been affected. This research presents the results of a multi-disciplinary research aimed at assessment of the impact of Soviet-era modernisation on the usage of public space in Lithuanian cities. The study focuses on comparative analysis of the selected open public spaces/districts of Kaunas city in three periods (1938, 1990, 2016).

Keywords: sociotop; sustainability; public space; urban development; Kaunas

Introduction

The political, social and economic changes after the restoration of Lithuania's independence in 1990 had significantly altered the planning practices and results in all cities of the country. Since the country's Soviet occupation in 1945, the previous continuity and the sustainability of the Lithuanian cities started to be interrupted by the expansion of the massive modernist housing areas and the new regulations in urban social, economic as well as spatial models were introduced. In the period 1960 -1990, the Soviet modernist urban policies had radically changed existing urban structures, lifestyles, and imposed new and different urban

planning models. Furthermore, it is still possible to see these models in Lithuanian cities, and they are frequently applied in the present day. In order to understand the changes in urban character and avoid the uncontrolled developments in the current status of the cities, researchers, professionals and the society must be aware of these changes which are rooted in the past. Furthermore, the economic, social and environmental aspects of these changes and how they have affected the quality of life in Lithuania needs to be analysed. Therefore, the situation requires complex analysis on the evaluation of social-spatial genotype of the Lithuanian cities and needs a specific methodology which can be applied in cities with different structures and scales.

The analysis of modernist urbanism of the Soviet era was introduced by the senior generation of researchers in Lithuania, analysing the situation based on classical methodologies, mainly on the objects with higher architectural values. On the other hand, the new generation researchers working in the field devote attention to this subject, including Petrulis, Drėmaitė (Petrulis& Drėmaitė, 2012), Tutlytė (Tutlytė, 2002), Zaleckis and Matijošaitienė (Zaleckis & Matijošaitienė, 2011, 2013), by using different methods, such as: socio-historical approach, art criticism approach and mathematical approach as the space syntax. However, even though the research community managed to research the Soviet era modernist urbanism in a complex way, a more detailed analysis is still lacking and requires more attention and different approaches in a broader scope.

The aim of this research is to determine (based on the cases of Lithuanian cities) if/how/why the use of open urban public spaces in modernistic Soviet-era districts have changed and what impact this urban planning practice had made on the social, economic and environmental realms of the local communities and the city in general.

Methods

To achieve this aim, the multi-disciplinary team of researchers representing social sciences (public management, history) and arts (architecture, urban planning) developed and applied a multi-faceted research methodology to identify and understand the pre-conditions and consequences of the modernist planning with a particular focus on the open urban spaces. Three main research methods were applied: Space Syntax analysis (computer-simulated Graph method); document analysis (historical, geo-, administrative, other); Sociotop analysis (site observations, user questionnaires, expert interviews).

Findings and Discussion

The preliminary results show that the Soviet-era modernist planning have made a significant (both negative and positive) impact on the use of the open public spaces and, consequently, on the economic, social and environmental sub-systems of these multi-apartment block districts and the city in general.

According to the complex analysis adopted by the methodology of this research, it is possible to state that the massive housing had a direct impact on the lifestyle of its residents. Majority of Lithuanians who previously lived in rural areas in single-family housing units were moved to massive multi-apartment housing estates, which eventuated in cutting first of all the interaction among the people and also the people and the nature. The traditional vernacular architecture in this region used to establish close contact with the social and natural environment. Yet the newly designed public spaces could not satisfy these needs. Upon the assessment of the structure and the content of the post-Soviet open public spaces Kaunas city (case study), it was noted that the spaces still lack focus on both social and natural environments. From social perspective - there is a lack of infrastructure for common activities representing different social groups of local population; the main focus so far is on the children's and teenagers' needs; middle aged and especially elderly people's needs are disregarded. Moreover, the circumstances which arise from the consequences of the local climate conditions are also omitted (almost no infrastructure for outdoor activities in winter period). There is a great lack/demand for the small architecture objects, also art objects and activities (music, dance, street art, other), and other objects facilitating the individual and group activities of different social groups. From the nature perspective, there is a lack of inclusion of water (small ponds, fountains), flower gardens, well-kept greenery, areas for care for the wild animals, community gardens, etc, The research provides a set of specific recommendations for the communities of post-Soviet multi-apartment block areas for redevelopment and thus achieving a more sustainable way of living of local communities.

Conclusion

The transformation established by the massive modernist urbanism of the Soviet era in Lithuania had a crucial effect on the sustainable development of Lithuanian cities. The new way of living which has been dictated by the government generated visible and invisible consequences in the social and economic aspects. Therefore, the usage of open public spaces and the activities taking place in these spaces has also transformed. To better understand the

reasons and consequences of the life-style of communities in modernistic (planned and developed in the Soviet period) urban spaces in Lithuanian multi-apartment housing districts, a set of multi-disciplinary research methods was utilised and the social and natural environment realms of the case study areas analysed. As a result, a complex methodology was developed and tested. It can be calibrated and applied to other cities undergoing similar transformations.

Acknowledgements: This research was funded by a grant (28 02 2017 No. S-MOD-17-16/SV3-0364) from the Research Council of Lithuania.

References

Drėmaitė, M., Petrulis, V., Tutlytė, J. (2012). Architektūra Sovietinėje Lietuvoje, Vilnius:Vilniaus Dailės Akademijos leidykla

Tutlytė, J. (2002). Rekreacinė architektūra Lietuvos kurortuose (1940–1990): Kompleksinis Kokybės Vertinimas. Kaunas: Vytauto Didžiojo universitetas

Zaleckis, K., Matijošaitienė, I. (2011). Hidden urban revolution in Kaunas Downtown Area: 1935-1988-2011. In: *The Proceedings of the 8th international space syntax symposium,* Pontificia Universidad Católica de Chile

Zaleckis, K., Matijošaitienė, I. (2013). Space syntax analysis of Kaunas: Some methodological aspects. *Journal of sustainable architecture and civil engineering*, 1(2), doi:10.5755/j01.sace.1.2.2791

Zaleckis, K., Matijošaitienė, I., Sinkienė, J. (2013). Spatial structure of a city and security of inhabitants: The Post-Soviet case. *Paper presented at ICASS 2013: 3rd international conference on applied social science,* Taipei, Taiwan, Newark: Information engineering research institute

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

An analysis on mixed-use high-rise residential complexes in Istanbul as to their prioritization of evaluation categories in LEED

Özge Süzer[1*], Meltem Yılmaz[2]

[1]Department of Interior Architecture, Çankaya University, Ankara, Turkey,
[1]Department of Interior Architecture and Environment Design, Hacettepe University, Ankara, Turkey
ozgesuzer@cankaya.edu.tr

[2]Department of Interior Architecture and Environment Design, Hacettepe University, Ankara, Turkey, meltemy@hacettepe.edu.tr

Abstract: The most globally used environmental assessment tool; LEED, offers the certification of projects according to the evaluation criteria of green buildings. Furthermore, emerging mixed-use high-rise residential complexes (MHRC) in metropolitans like Istanbul draw attention, as they help reduce carbon emissions by providing various facilities in one entity for its residents. Yet, they also have negative effects on resources, due to excessive energy consumptions owing to their high user capacities. The objective of this study is to analyse LEED certified MHRC in Istanbul, regarding their prioritization of evaluation categories. LEED's database revealed nine certified MHRC under the NC scheme. Based on their gained points, mean ranks ($\overline{R}$) of categories were calculated, which indicated the priorities given by this building typology in Istanbul. The obtained category priority order was then compared to the one implied by LEED's assigned category weights. It was found that EA gained much lower attention than needed.

Keywords: green building certificate systems; LEED; category priorities; mixed-use residential complexes; Istanbul

Introduction

Today, around 40% of the total global energy demand and material use is due to the human activities related to the construction sector (Erlandsson & Borg, 2003) The building industry is largely responsible of the global environmental impact, while it also is a field, where significant improvement on the issue has been and is continuing to be accomplished (Zabalza Bribián, Aranda Usón, & Scarpellini, 2009). Since green buildings provide energy, water and material conservation, economic savings, as well as, healthy and high-quality spaces; they have gained considerable public support and have become the major pioneering field in sustainable development (Ali & Al Nsairat, 2009). As to green building rating systems, LEED is considered to be the most prominent and widely used environmental assessment tool at the global scale (Wu, Mao, Wang, Song, & Wang, 2016).

On the other hand, the emergence of mixed-use high-rise residential complexes (MHRC) has drawn attention with their sustainable approach, as they provide various facilities in a single entity for its residents who wish to keep up with the fast urban life and act

as semi-open public spaces at the same time. Besides the residential units, these mixed-use complexes provide facilities such as, fitness centers, shopping malls, cafes and restaurants. Since the residents have the opportunity to access various amenities within their residential buildings, these projects help to reduce the extra carbons to be emitted for transportation. However, they also have an unsustainable approach, as they consume too much energy owing to the large population they serve to. Furthermore, they have negative effects on the transportation in their area, as these complexes easily become a place of attraction for citizens (Zengel & Deneri, 2007). These luxurious residential complexes have been increasing in numbers especially in Istanbul, to meet the needs of high income groups. Therefore, these high budget, self-sufficient projects are expected to adopt a sustainable approach as a social responsibility.

This paper presents an evaluation of these LEED certified MHRC in Istanbul, regarding their prioritization of green building assessment categories. The main aim is to find out; to what degree these green projects comply with the priority order of evaluation categories, set forth by LEED authorities.

This study is partially produced from a PhD thesis, which had conducted a multitude of in-depth case study analyses on several MHRC projects, which had *claimed* to have a *green* approach and provided insights into the mentioned issue, regarding this building typology in Istanbul (Suzer, 2012).

Methods

For gathering data on projects to be used in the analysis of the present study, LEED's online project database was used. From the search on its project directory, by using the search filters of; *Istanbul* as the city, *v.3* as the LEED version, *New Constructions* as the scheme, and selecting only *Certified* projects, the database gave the results of a total of 32 projects (USGBC, 2018). After careful screening of these results, it was found that, out of 32, only nine projects could be identified in the MHRC category. The certification scores of these nine projects were used for the analysis of this study. The names of these projects and their numbering used for Table 1 are as follows:

(1) 42 Maslak Tower A
(2) Andromeda Gold Residence
(3) Istanbloom
(4) Narlife
(5) Nidapark Seyrantepe
(6) Selenium Retro
(7) Tekfen Bomonti Apartments
(8) Tekfen Hep Istanbul
(9) The House Residence

The reason for selecting the New Constructions (NC) scheme for this analysis is due to the fact that this scheme offers a more extensive field of use when compared to other schemes, and is expected to yield higher certification numbers when MHRC projects are considered. Moreover, it is also important to note that, the mentioned system's database revealed that there are no such certified projects yet, under its latest version, which is version 4 (v.4). Its previous version, v.3, was launched in 2009 and has a significant number of registered projects in Istanbul that are still under certification process.

LEED NC v.3 scheme is composed of five main categories which are; (i) Energy and Atmosphere (EA), (ii) Sustainable Sites (SS), (iii) Indoor Environmental Quality (IEQ), (iv) Materials and Resources (MR) and (v) Water Efficiency (WE). The total points assigned to the credits presented under each category make up a total of 100 base points. The additional two categories of evaluation are Innovation and Regional Priority, which add extra 10 bonus points (USGBC, 2009). The certification process simply involves the summation of achieved points for each credit, under each category.

The point allocation system for its credits, which is based on scientific studies and the consensus of LEED authorities, in fact, implies a priority among these categories. These credit points imply an implicit weighting system among the categories of evaluation, as they display a certain weight within the total 100 base points (Suzer, 2015). The weighting system of LEED NC, v.3 for its categories and hence, their priority orders (in parenthesis) are given below (USGBC, 2009):

- Energy and atmosphere 35 /100 points (1.)
- Sustainable sites 26 /100 points (2.)
- Indoor environmental quality 15 /100 points (3.)
- Materials and resources 14 /100 points (4.)
- Water efficiency 10 /100 points (5.)

As to the method of analysis, firstly, the achieved points (AP) by the projects under each category, were divided by the total available points (TAP) allocated to categories, to find the *category scores (CS)* of projects (see Table 1).

Table 1. Category score details of MHRC projects.

Project #	EA			SS			IEQ			MR			WE		
	AP	TAP	*CS*	AP	TAP	*CS*	AP	TAP	*CS*	AP	TAP	*CS*	AP	TAP	*CS*
1	22	35	*0.63*	15	26	*0.58*	8	15	*0.53*	6	14	*0.43*	4	10	*0.40*
2	11	35	*0.31*	22	26	*0.85*	8	15	*0.53*	6	14	*0.43*	4	10	*0.40*
3	13	35	*0.37*	23	26	*0.88*	7	15	*0.47*	4	14	*0.29*	8	10	*0.80*
4a	14	35	*0.40*	16	26	*0.62*	7	15	*0.47*	6	14	*0.43*	7	10	*0.70*
4b	13	35	*0.37*	16	26	*0.62*	9	15	*0.60*	6	14	*0.43*	7	10	*0.70*
4c	15	35	*0.43*	16	26	*0.62*	8	15	*0.53*	6	14	*0.43*	7	10	*0.70*
5	14	35	*0.40*	21	26	*0.81*	9	15	*0.60*	5	14	*0.36*	6	10	*0.60*
6	18	35	*0.51*	16	26	*0.62*	7	15	*0.47*	7	14	*0.50*	4	10	*0.40*
7	11	35	*0.31*	23	26	*0.88*	7	15	*0.47*	6	14	*0.43*	6	10	*0.60*
8a	11	35	*0.31*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	2	10	*0.20*
8b	10	35	*0.29*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	4	10	*0.40*
8c	11	35	*0.31*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	4	10	*0.40*
8d	10	35	*0.29*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	4	10	*0.40*
8e	11	35	*0.31*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	4	10	*0.40*
8f	9	35	*0.26*	20	26	*0.77*	8	15	*0.53*	5	14	*0.36*	4	10	*0.40*
8g	9	35	*0.26*	20	26	*0.77*	8	15	*0.53*	4	14	*0.29*	4	10	*0.40*
9	12	35	*0.34*	22	26	*0.85*	10	15	*0.67*	3	14	*0.21*	10	10	*1.00*

Notes. Projects numbers 4 and 8 have separate certifications for their different building blocks, noted here as a, b, c, etc.

After that, by using these CS values, rank-order tests were conducted to assess the priority order among these groups of data. The CS values were sorted in ascending order, so that each case was assigned a rank that indicated where in the order it appeared (Argyrous, 2011). After that, the rank sum (ΣR) and mean rank ($\overline{R}$) were calculated for each category. Higher the mean rank value meant higher success, thus higher priority given to that category. Based on the calculated mean rank for each category, their priority order was found out (Figure 1).

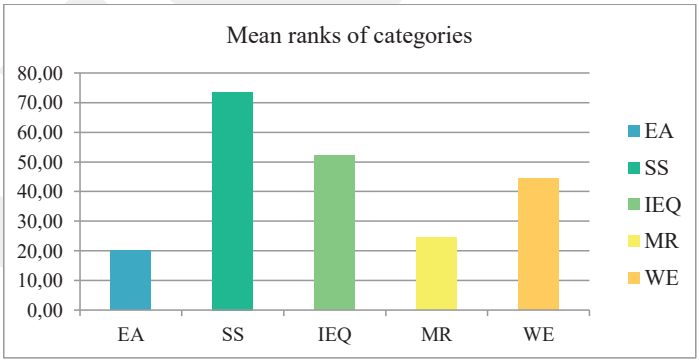


Figure 1. Mean ranks of categories for MHRC projects.

Notes. Mean rank values; EA: 20.24, SS: 73.59, IEQ: 52.24, MR: 24.41, WE: 44.53.

To see statistically, if some categories received much more attention than others, or if there was a rather more uniform distribution of scores throughout the groups, a Kruskal-Wallis (KW) test was conducted (Table 2). According to the KW test, it is seen that there is highly significant difference among the rankings of the categories ($p < 0.001$).

Table 2. Kruskal-Wallis test conducted on CS

Kruskal-Wallis Test

	EA	SS	IEQ	MR	WE	
median	0.3142857	0.7692308	0.5333333	0.3571429	0.4	
rank sum	344	1251	888	415	757	
count	17	17	17	17	17	85
mean rank	20.24	73.59	52.24	24.41	44.53	
r^2/n	6960.94	92058.88	46384.94	10130.88	33708.76	189244.41
H-stat						52.66
H-ties						52.98
df						4
p-value						8.593E-11
alpha						0.05
sig						yes

Finally, the priority order established by these projects was compared with the order set forth by LEED, using its implicit category weightings (Figure 2).

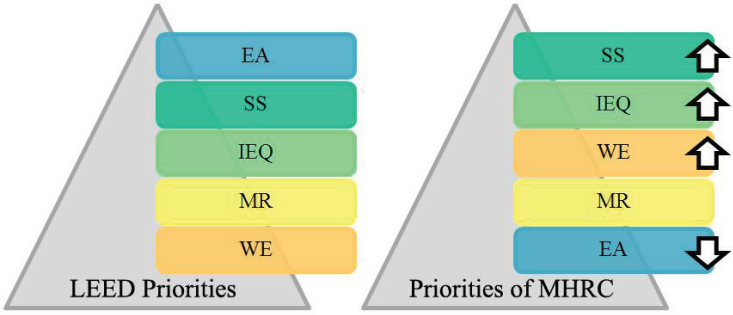


Figure 2. Comparison of priority order of categories; according to LEED weightings (left) and MHRC project results (right).

Findings and Discussion

As displayed in Figure 2, the findings of this study show that the category with the lowest score is EA for these projects, in stark contrast to LEED's proposal. It is a well-known fact that today, the most alarming environmental problem the world is facing is global warming and the excessive emission of harmful gases, because of the increased usage of fossil fuels instead of renewable resources. Unfortunately, the resulting CS values of the projects point out quite the opposite, as EA lies at the bottom of the hierarchy pyramid, as the *last* environmental concern for these projects, while it stands as the *first* category for the LEED system. It implies that this category has not allocated enough emphasis as required, in the applications of the mentioned building typology in Istanbul. The reason for this finding is believed to be mostly related to economic concerns. In their study, Wu et al. underlined that credits of EA, such as; "…optimized energy performance through energy modelling (EAc1), on-site renewable energy (EAc2) and enhanced commissioning (EAc3) are believed to be the biggest added expenses for LEED projects" (Wu et al., 2016).

Furthermore, other studies in literature have also found that MR and EA categories (which are also the categories with the two lowest performances in the present study), are the two most difficult ones to obtain credits from (Moussa & Farag, 2017; Wu et al., 2016). This issue is believed to be related to certain applicability problems, such as; difficulties in reaching certified building materials and products, and/or the availability of the market for green technologies.

Another important finding is that, even though six years have passed from the conducted PhD study which this study is based on, ironically, it is seen that the results have not changed for this building typology in Istanbul. The projects, which did not possess a green label (were not certified), but were claiming to have a green approach were analysed by a multitude of in-depth case study analyses. The mentioned PhD study had also revealed that EA category was the last concern in the hierarchy pyramid for those projects (Suzer, 2012).

Conclusion

Green building industry is considered as the flagship of sustainable development today and its most important environmental issue is based on minimizing energy consumptions, providing energy conservation and using renewable resources in these buildings. Yet, the results of this study show that energy issue has turned out to be the last concern for the analysed LEED certified MHRC projects in Istanbul. It is not so easy to comprehend this

result since Istanbul and Turkey have an advantageous location, in regard to benefitting from renewable resources like solar, geothermal or wind energy (Yilmaz, 2008). The problem of having EA category as the least priority for this building typology in Istanbul may be due to administrative difficulties and/or economic barriers in implementing green initiatives in Turkey. To promote green initiatives, governmental tax incentives should be increased as in countries like Japan, UK or USA (KPMG-International, 2015).

Together with certain improvements as to the availability of the market for green products and services, these rapidly multiplying self-sufficient high budget MHRC projects must be encouraged for increasing their level of success in this fundamental category. Furthermore, to attain results more in-line with LEED priorities and to obtain more sustainable living environments, the awareness of designers and investors on the issue should be increased so that, the mentality can evolve from a *point-chasing* approach for easier categories, to thinking of the *public welfare* during the design and certification processes of such buildings.

References

Ali, H. H., & Al Nsairat, S. F. (2009). Developing a green building assessment tool for developing countries – Case of Jordan. *Building and Environment, 44*(5), 1053-1064. doi:https://doi.org/10.1016/j.buildenv.2008.07.015

Argyrous, G. (2011). *Statistics for Research: With a Guide to SPSS*: SAGE Publications.

Erlandsson, M., & Borg, M. (2003). Generic LCA-methodology applicable for buildings, constructions and operation services—today practice and development needs. *Building and Environment, 38*(7), 919-938. doi:https://doi.org/10.1016/S0360-1323(03)00031-3

KPMG-International. (2015). Taxes and Incentives for Renewable Energy. Retrieved from https://assets.kpmg.com/content/dam/kpmg/pdf/2015/09/taxes-and-incentives-2015-web-v2.pdf

Moussa, R. A., & Farag, A. A. (2017). The Applicability of LEED of New Construction (LEED-NC) in the Middle East. *Procedia Environmental Sciences, 37*, 572-583. doi:https://doi.org/10.1016/j.proenv.2017.03.044

Suzer, O. (2012). *Sustainable Design Criteria for Mixed-Use High-Rise Residential Buildings.* (PhD Thesis), Hacettepe University.

Suzer, O. (2015). A comparative review of environmental concern prioritization: LEED vs other major certification systems. *Journal of Environmental Management, 154*, 266-283. doi:https://doi.org/10.1016/j.jenvman.2015.02.029

USGBC. (2009). LEED 2009 For New Constructions and Major Renovations. Retrieved from https://www.usgbc.org/sites/default/files/LEED%202009%20RS_NC_07.01.14_clean_0.pdf

USGBC. (2018). LEED Project Directory. Retrieved from https://www.usgbc.org/projects

Wu, P., Mao, C., Wang, J., Song, Y., & Wang, X. (2016). A decade review of the credits obtained by LEED v2.2 certified green building projects. *Building and Environment, 102*, 167-178. doi:https://doi.org/10.1016/j.buildenv.2016.03.026

Yilmaz, M. (2008). *Sustainable Housing Design Considerations for Turkey: Planning and Design Principles*. Ankara: Hacettepe University Publications.

Zabalza Bribián, I., Aranda Usón, A., & Scarpellini, S. (2009). Life cycle assessment in buildings: State-of-the-art and simplified LCA methodology as a complement for building certification. *Building and Environment, 44*(12), 2510-2520. doi:https://doi.org/10.1016/j.buildenv.2009.05.001

Zengel, R., & Deneri, B. (2007). Yükselen yapı bağlamında Türkiye'de kondominyumlara bir bakış. *Yapı Dergisi, 32*.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

A Conservation Process of Cultural Heritage: Ankara Saraçoğlu Quarter

Gülşah Şenocak[1]

[1]*Interior Architecture and Environmental Design, TOBB ETU, Ankara, Turkey, gsenocak@etu.edu.tr*

Abstract: Conservation of cultural and historical patterns are important in creating the identity and protecting the sustainability of the cities. This article is about one of the first mass housing projects in Ankara, Saraçoğlu residential area. The area was built in 1944-45 to solve the housing problem of civil servants and continued to serve until 2015. Despite being located next to the city center, this district, which has remained in its own surroundings is now facing the process of urban transformation. The aim of this study is to evaluate the Saraçoğlu Quarter with its buildings and to demonstrate the efforts to protect the cultural heritage in district. All kinds of written and visual sources related to the quarter were scanned, the area was photographed and the article was supported by images. Saraçoğlu residential area is considered as an important cultural asset in the city's memory.

Keywords: Saraçoğlu Quarter; Cultural Heritage; Urban Transformation

Introduction

Rapid population growth in the cities threatens especially the historical patterns in the centers. The losses in these patterns, which are considered as our cultural heritage, cause the identity and sustainability of the district to disappear. These losses in the different districts of the city threaten the sustainability of the entire city. In Ankara, early republic period buildings are losing their importance and demolishing the day after day. Saraçoğlu Quarter, one of the building complexes that have become a symbol of the city and Republic, faces the process of urban transformation and is subject to discussion with expectation of rant. During the first years of Republic, Ankara undertook a leading role in the urbanization process of the country (Keleş & Duru, 2008). State staffs and immigration from the years of the War of Independence led to housing problems in the city. Saraçoğlu Quarter, which was built with the help of the state, is valuable because it has the experience of a period, the institutionalization of the state and the first traces of Ankara which started construction. The settlement is in Kızılay, Ankara's city center. The quarter is adjacent to ministry buildings and additional service buildings of official institutions. Saraçoğlu Quarter is located in the city center today and has great potential in terms of both location and structure (Bayraktar, 2017). It is one of the most significant examples of the Second National Architecture Movement which is effective after 1939 in Turkey. The quarter that designed by the architect Paul Bonatz, consists 75 buildings and 435 apartments. He used the elements of ''Turkish House'' while creating buildings. Saraçoğlu Quarter, one of the first mass housing projects of the Republic, was designed on the basis of a

gardencity approach with residential, social facilities, green spaces and public spaces for civil servants (Panzini, 2014). Saraçoğlu Quarter is important as to how reflects the ‘’Turkish House’’, how functionally adapts apartment typology and how the deal with the idea of the neighborhood with social spaces, public buildings, dwellings and green spaces.

Figure 1. Saraçoğlu Quarter’s top view (Ankara Büyükşehir Belediyesi, 2018).

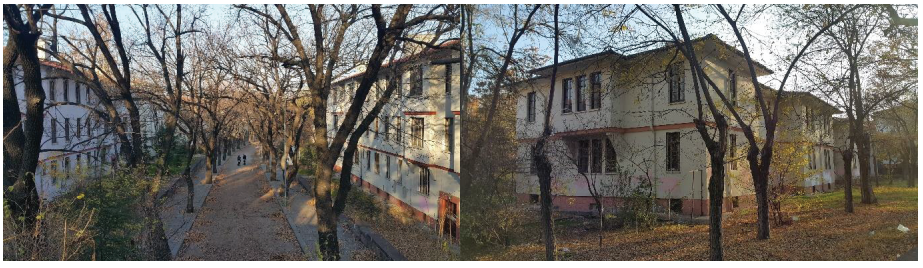


Figure 2. Saraçoğlu Quarter’s inside and buildings.

In the study, Saraçoğlu Quarter was examined as a mass housing with the positive and negative criticisms from the architectural environments in the period when it was built. As a result, data on the urban transformation project which is wanted to be done in Saraçoğlu Quarter were presented. The general situation of the settlement has also been discussed in other studies. This study focuses on the legal struggle on the territorial rights in 2013-2018. In addition to provide general information about the residential area, this study aims to shed light on the transformations made in Saraçoğlu last five years.

In the first part of the study, architectural approaches in Ankara between 1923-1950 were discussed. It is important to understand the architectural approaches and this period's Ankara in order to understand Saraçoğlu Quarter. In the second part of the study, quarter was examined in terms of architecture, structures and arrangement within the settlement. The settlement was discussed with the general lines and its gardencity approach. In the third part of the study, the importance, the process and the decisions taken about its future are examined. Especially in the period of 2013-2018, the legal struggle on the territorial rights was tried to be conveyed. Data of Urban Transformation project which has planned to done are gathered and outline is formed.

Methods

The study has been made by written and visual literature survey and observations made on the district in 2017 and 2018. The Council of Ministers and Council of State decisions taken in 2013-2018 have examined. At the same time interviews, panels and notifications for Saraçoğlu were also utilized. After 2015, some of the roads in the area were closed and access to houses were prohibited. Therefore, these regions are not photographed, only benefited from the sources. All the available sources related to Saraçoğlu Quarter, observations and decisions taken from the official newspaper were evaluated and a current situation analysis of the settlement was made.

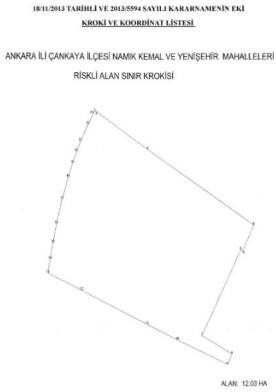
Findings and Discussion

The findings were obtained by data analysis as a result of literature review, observation and photographing. As a result of the written and visual literature examination, it is seen that the settlement has emerged for a great need and it met this need until 2015. It has also been noted that discussions on quarter have existed since the time it was built. The fact that the settlement is located in the center is also a trigger for these discussions.

Historical areas and buildings are important assets that define the identities of cities and carry them to the future. Saraçoğlu is in a special position because it is the most important example of one of the first mass housing made by the state (Tanrıverdi, 2012). The aim of the study is consider this settlement with its past and present values and to demonstrate the planned urban transformation by giving the process it is going through.

Struggle for Conservation at Saraçoğlu Quarter

Since the disaster law was enacted in 2012 and Ankara Chamber of Architects opened the first counterclaims in 2014, the legal battle has been going on in order to be conveyed territorial rights. In 2013 due to the risk of disaster, the district was declared risky area and process begun (Ankara İli, 2013). Within the scope of the study, Saraçoğlu Quarter Project, which was announced by the Metropolitan Municipality, was examined. In the presentation, it is stated that the settlement will be transform into a culture and art center (Emlak Rotası, 2018).



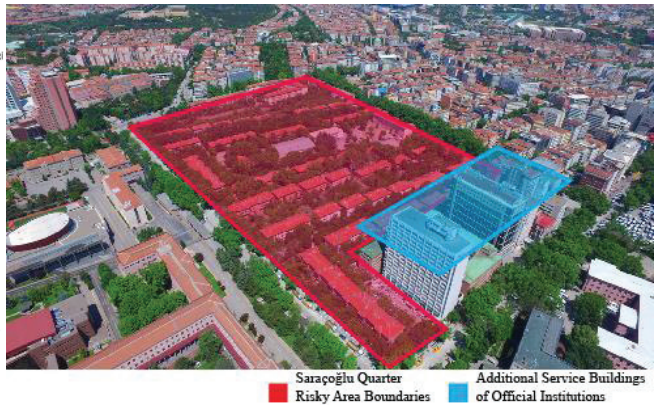


Figure 3. Risky area boundary plan, left (Ankara İli, 2013)

Figure 4. Saraçoğlu Quarter risky area

Conclusion

Saraçoğlu Quarter is an important settlement due to its purpose and arrangement. Maintaining this form of existence is important for Saraçoğlu, who is adjacent to the center with its green spaces but far from its density. Saraçoğlu needs to protect its presence as an important cultural heritage and urban site that defines Ankara's city memory. Decision on the declare of risky areas and removal of the lodging allocations taken in 2013-2014 and the urban transformation processes talks in 2017-2018, should not be separated from each other and evaluated together. It turns out that Saraçoğlu project that has been thought and developed since the disaster law came out. The urban transformation foreseen and the stated "preservation" must be defined in such a way that the content is not to be questioned.

A footnote was set up on how our cultural heritage, Saraçoğlu Quarter, should be addressed in the process of urban transformation. The quarter should continue to exist as an

urban site area while preserving the texture within the city. By carrying the city's memory in this way, the cultural heritage will be able to reach the future generations of Ankara. At the same time the identity and sustainability of the district will be preserved.

References

Ankara Büyükşehir Belediyesi. (2018, 10 August). Saraçoğlu Mahallesi Yeniden Hayat Bulacak. Access address: http://www.ankara.bel.tr/haberler/saracoglu-mahallesi-yeniden-hayat-bulacak/#.W21Ne84zbIU

Ankara İli, Çankaya İlçesi, Namık Kemal Mahallesi Sınırları İçerisinde Bulunan Bazı Alanların Riskli Alan İlan Edilmesi Hakkında Karar. (2013, 8 February). Official Newspaper (Issue:28553). Access address: http://www.resmigazete.gov.tr/eskiler/2013/02/20130208.htm

Bayraktar, N. (2017). Ankara Yazıları. Ankara: Nobel Press.

Emlak Rotası, (2018, 21 March). Saraçoğlu Mahallesi Projesi Basın Toplantısı [Video File]. Access address: https://www.youtube.com/watch?v=qQVUwAf2J58

Keleş, R., & Duru, B. (2008). Ankara'nın Ülke Kentleşmesindeki Etkilerine Tarihsel Bir Bakış. Mülkiye, 27-44, 261.

Panzini, N. (May, 2014). The Kleinstadt as a Model fort he Modern City. The Case Study of Saraçoğlu Residential area of P. Bonatz in Ankara, Proceeding of the 2nd ICAUD International Conference in Architecture and Urban Design, Epoka University, 08-10 May, Tirana, Albania. Access address: http://dspace.epoka.edu.al/handle/1/878

Tanrıverdi, Z. (2012). The Historic Environmental Analysis Protection of Ankara Saraçoğlu Quarter and A Sample Structure Restoration (Unpublished MSc. Thesis). Yıldız Technical University Natural and Applied Science, İstanbul.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Learning from Cohousing: Social Contact Design Patterns for Cohesion and Sustainability

Şule Taşlı Pektaş[1]

[1]*The Department of Architecture, Başkent University, Ankara, Turkey, stpektas@baskent.edu.tr*

Abstract: Sustaining social contact and cohesion remains to be a problem in mass housing. The conventional mass housing practices create sharp boundaries between the public and private domains which hinders the opportunities for social contact and sense of togetherness. In order to alleviate the problem, this paper revisits cohousing theory and applications. Cohousing is an intentional community of private houses with a common house and shared closed, open and semi-open public spaces. The main aims of cohousing settlements are increasing social cohesion, sharing of resources and promoting a participatory development process. Investigating the related literature and cohousing case studies, this paper proposes fifteen design patterns which can be used in any housing project to increase social sustainability and connection.

Keywords: social sustainability; social cohesion; cohousing; social contact design; design patterns

Introduction

Housing has remained to be an important problem in developing countries under the pressure of increasing population, competitive market conditions and less than optimal policies. In the current situation in Turkey, a house is conceived and produced as an expensive commodity rather than a part of communal living. As a result, housing settlements and individual housing units are isolated from their neighbourhood by excessive security and surveillance measures. Even in a single housing complex, there are sharp distinctions (and so called thresholds) between the private and public spaces so that the dwellers hardly know about each other. This creates feelings of isolation and loneliness among the occupants and ultimately affects their well-beings (Kayserili and Kocaman, 2014).

It is clear that the problem explained above is a multi-faceted one and has economic, cultural, political and sociological components. However, this paper aims to focus on the problem from a designer's perspective and its central question is: "What can architectural design do to increase social contact and cohesion in housing projects?" In order to answer this question, a specific type of residential development; namely, cohousing is investigated.

Cohousing communities are typically compact developments with private homes and communal spaces. A common house that provides cooking and dining facilities for shared meals is often found in a cohousing. The common house may include a guest room, shared

laundry, children's rooms, community meeting room and exercise rooms. Shared open space typically includes common greenery, community gardens, shared parking on the periphery of the settlement and shared pathways (The Cohousing Association of the US, 2018). This type of housing began in Denmark in the late 1960s, and spread to North America in the late 1980s. Husband and wife architects McCamant and Durret (1994) brought the concept to the US in 1980s and defined the term *Social Contact Design* as the physical design that encourages a strong sense of community.

Methods

The methodology of this study is based on Christopher Alexander's design patterns (Alexander et al., 1977). A design pattern is a reusable solution to a design problem within a particular field. Alexander noted that design is a complex process and design knowledge is widespread, diffuse and unorganized. On the other hand, the design problems increase in quantity and difficulty and change in a fast pace. He recommended an analytical approach to design which views the design process as a system consisting of interdependent sub-systems (Alexander, 1964).

Alexander defines a design pattern as "a three-part rule which expresses a relation between a certain context, a problem and a solution" (Alexander et al., 1977, page 8). He calls the logical structure *a pattern language* and the subsystems *patterns*. He compiled 253 design patterns for urban, architectural, and interior design problems in his famous book titled "A Pattern Language: Towns, Buildings, Construction" (Alexander et al., 1977).

Alexander's work has been very influential in many fields. Software engineering in particular has made extensive use of design patterns as reusable chunks of programming components. Some of the other fields which embraced design patterns are: graphical user interfaces, participatory design, communication, workplace design, education science and web usability.

Most pattern research elicits patterns from case studies and the documentation of the best practices. The design patterns are assumed to be useful information grounded in real life examples. Patterns describe a solution at the tactical level, i.e. they are not usually as specific as a heuristic or as detailed as a design guideline; but they make experience in a community shareable and transferable to other domains.

Within this framework, the current study presents fifteen social contact design patterns that were derived from the related literature (Marcus, 2000; Sanguinetti, 2014; Williams,

2008) and pre-validated by the examination of several cohousing project examples from the US. The study focuses on the US cohousing projects, since they are well-documented by The Cohousing Association of the US (2018) and the official web-sites of the cohousing settlements. This research is still in-progress and a survey is being conducted in order to specify the importance of each design pattern in supporting social contact.

Findings and Discussion

The design patterns and their groupings specified in the first round of research are listed in Table 1.

Table 1. Social contact design patterns elicited from the case studies.

General Planning
1) A deliberate size that balances capacity for intimacy and stability
2) Absence of hierarchy among the housing units
Communal Spaces
3) Provision of indoor and outdoor communal facilities
4) A shared outdoor space bounded in whole, or part by the dwellings it serves
5) Good visibility into all communal spaces
6) Centrality and accessibility of the common house
7) A circulation system connecting all communal spaces
8) Use of circulation elements (halls, corridors) as communal spaces
Car Parking
9) Car parking outside the community
10) Car parking design which requires that residents walk from peripheral parking to their home past other dwellings
Public and Private Spaces
11) Gradual transitions and balance between public and private spaces
12) Provision of semi-private outdoor spaces close to private units for socializing
Relationships with the Neighbourhood
13) Site plan encouraging the neighbours to walk through the community
14) Open greenery connecting physically and/or visually with neighbourhood greenery
15) Building design features blending in the neighbourhood

Conclusion

Social isolation is a common problem in contemporary residential development. This study presents some social contact design patterns within a design patterns research framework. Since this paper is a part of an on-going research project, the findings are still limited and tentative. However, the author believes that the proposed methodology and the insights gained from this research would be useful for architects who strive for designing socially sustainable and cohesive housing environments.

References

Alexander, C., Fiksdahl-King, I., Ishikawa, S., Jacobson, M., Silverstein, M., & Shlomo, A. (1977). *A pattern language: towns, buildings, construction*. Oxford: Oxford University Press.

Alexander, C. (1964). *Notes on the synthesis of form* (Vol. 5). Cambridge, MA: Harvard University Press.

Durret, C.,& McCamant, K. (1994). *Cohousing: A contemporary approach to housing ourselves*. California: Ten Speed Press.

Kayserili, A., & Kocaman, S. (2014). Türkiye'de modern konut kültürü. A. Keçeli, & Ş. Çelikoğlu (Eds.), *Kent çalışmaları I: Kentsel mekan, sosyal dışlanma, marka kentler, yoksulluk, peyzaj, kentsel gelişim ve kentleşme sorunları* (pp. 253-274). Ankara: Detay Yayınları.

Marcus, C. C. (2000). Site planning, building design and a sense of community: An analysis of six cohousing schemes in Denmark, Sweden, and the Netherlands. *Journal of Architectural and Planning Research*, 17(2), 146-163.

Sanguinetti, A. (2014). Transformational practices in cohousing: Enhancing residents' connection to community and nature. *Journal of Environmental Psychology,* 40, 86-96.

The Cohousing Association of the US. (2018). The Cohousing Association of the United States Homepage. Available at: http://www.cohousing.org/ (Last Accessed: July 1, 2018)

Williams, J. (2008). Predicting an American future of cohousing. *Futures*, 40, 268-286.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Urban transformation in Turkey; which aims disaster preventive and sustainable development or else?

Binali Tercan [1]

[1]*Department of City and Regional Planning, Bolu Abant İzzet Baysal University, Bolu, Turkey, binalitercan@hotmail.com ; tercan_b@ibu.edu.tr*

Abstract: In recent years, urban transformation projects in Turkey are very prevalent urban renewal application. By this study, it is aimed to realise and find out the importance of "disasters and sustainability" taken into account in determining the process of urban transformation areas. After a basic terminological discussion, legal aspects of urban transformation laws in Turkey going to be evaluated chronologically. Then, institutional structures and scope of authority will be discussed. At the end, outcomes of this legal and institutional structures will be evaluated with due consideration of disaster and sustainability on implementation projects in disaster prone greater municipalities.

Keywords: Urban transformation; Disasters; Sustainability; Site selection; Urban rent.

Introduction

Sustainability and disaster risk terms were highlighted both in the Hyogo Framework for Action 2005-2015's strategic goal that relate to 'the integration of disaster risk reduction into sustainable development policies and planning', and paragraphs 186-189 under the sub section 'disaster risk reduction' of the Rio+20 outcome 'The future we want'. As in global scale, these terms has started to be used in Turkish disaster risk management plans as well. Disaster Risk Management (DRM) and Sustainable Development (SD) will improve risk reduction and building resilience (https://en.unesco.org/greencitizens/stories/disaster-risk-management-sustainable-development).

It is noteworthy that in recent years the number of disasters has increased in Turkey, especially in urban areas. In this context, "Urban Transformation Laws" have been issued in order to create new living spaces by taking into account the safety and sustainability principles that come to our minds and to facilitate the relocation of disaster-affected areas in urban areas. The compatibility of the practice of transformation laws that have been used as a tool for reducing disaster risk, will be assessed in the historical periods on the Greater Municipal areas of Istanbul, Bursa and Ankara Metropolitan cities, mainly with TOKİ applications.

The main objective of the study is to realise the importance of "disasters and sustainability" in determining the process of urban transformation areas and construction period. Most of the urban transformation projects were done mainly to regulate urban rent.

There were many tools to do this but by new transformation laws, disaster risk used as a threat. Expropriation and property ownership problems lessened by this way.

Methods

Urban transformation project practices in different cities will be evaluated within the framework of current legislation, implementing regulations and general rules on urban transformation and will be evaluated by support of the literature on theoretical basis of disaster risk reduction and sustainability. Legal contradictions and institutional authority confusions will be clarified by legal texts. Court files of Chamber of City Planners and Architects, observational experiences and judicial decisions is going to be used.

Findings and Discussion

Essential questions which going to be answered during the study are as follow; what is the level of disaster risk for the major urban areas and urban structures in our country? Is your existing / domestic disaster legislation sufficient to reduce the risk? What are the circumstances that are not sufficient? Whether the existing risky structures which have been made illegally have been brought to amendment due to the abandonment of disaster by means of the abolished conversion laws? How much of the transformation of urban areas and proximity to the conversion sites reduces the risk of urban disaster? To what extent is the sustainability principle taken into account in the urban transformation projects? In the context of these questions and their answers, the physical and social problems of the city will be discussed through implemented cases.

A very important part of the urban transformation areas is close to the city centres where the land exchange value is high. Urban transformation practices were hardly ever done in areas where the urban rent is low but disaster risk is high. Tough not very detailed. There was adequate legislation in the issues of disaster risk reduction and urban transformation in Turkey. Although the existing of disaster related legislation, contradictory structures have been realized. Deficiencies in supervision and construction practices in the urban areas of the last fifty years, constitute the present risky building stock. Recently updated and new published legislation, which makes it easier to forcibly confiscate, brings forgiveness to illegally constructed buildings, facilitates the sharing of rents but, insufficient in terms of risk reduction and creation of sustainable living spaces.

Conclusion

Disasters have a devastating impact upon fragile eco-systems, destroy schools and hospitals affecting health and educational outcomes, and result in increased social tensions and weakening institutional support systems for social policy. The cost of disasters is really high in terms of the lives lost and the damages to the social, economic and environmental assets. TOKI has been the most effective actor in increasing the housing supply by urban transformation projects in Turkey. But social planning and equity issues had not been seen from their applications.

References

5216 Sayılı Büyükşehir Belediyesi Kanunu, 23/07/2004 tarih ve 25531 sayılı Resmî Gazete.
5302 Sayılı İl Özel İdaresi Kanunu, 04/03/2005 tarih ve 25745 sayılı Resmî Gazete.
5355 Sayılı Mahalli İdare Birlikleri Kanunu, 11/06/2005 tarih ve 25842 sayılı Resmî Gazete.
5393 Sayılı Belediye Kanunu, 13/7/2005 tarih ve 25874 sayılı Resmî Gazete.
5902 Sayılı Afet ve Acil Durum Yönetimi Başkanlığının Teşkilat ve Görevleri Hakkında Kanunu, 17/06/2009 tarih ve 27261 sayılı Resmî Gazete.
5998 Sayılı Belediye Kanunu"nda Değişiklik Yapılmasına İlişkin Kanun, 24/06/2010 tarih ve 27621 sayılı Resmî Gazete.
6306 Sayılı Afet Riski Altındaki Alanların Dönüştürülmesi Hakkında Kanun, 31/05/2012 tarih ve 28309 sayılı Resmî Gazete.
7269 Sayılı Umumi Hayata Müessir Afetler Dolayısıyla Alınacak Tedbirlerle Yapılacak Yardımlara Dair Kanun, 25/05/1959 tarih ve 10213 sayılı Resmî Gazete.
Ekşi, A. (2016), Afet Yönetiminde Temel Etik İlkeler ve İkilemler", Bütünleşik Afet Yönetimi, Ed. Toprak Karaman, Z. ve Altay, A. İlkem Yayınevi, İzmir.
Ergünay, O. (2009), "Doğal Afetler ve Sürdürülebilir Kalkınma." *Deprem Sempozyumu*, 11-12 Kasım 2009, Abant İzzet Baysal Üniversitesi, Bolu.
Karaman, Z. T. (2016) Afetlerde Hızlı Çevresel Etki Değerlendirmesi ve Alan Yönetiminde Kritik Sorgulamalar, Bütünleşik Afet Yönetimi içinde,İzmir.
Tercan, B.(2018) Türkiye"de afet politikaları ve kentsel dönüşüm. Abant Kültürel Araştırmalar Dergisi, 3(5): 102-120.
Toprak Karman, Z. (2017), "Afetlerde Hızlı Çevresel Etki Değerlendirmesi ve Afet Yönetiminde Kritik Sorgulamalar", *Afet Yönetimi*, Ed. Özgür Önder, Murat Yaman, Ekin Basın Yayın Dağıtım, Bursa.
Toprak, Z. (2012). Çevre Yönetimi ve Politikası. Albi Yayınları 3. Baskı . İzmir. ss:271- 291.
Ulusal Deprem Stratejisi ve Eylem Planı-2023 (UDSEP-2023), 18 Ağustos 2011 tarih ve 28029 sayılı Resmî Gazete.
Yönder, A.& Türkoğlu, H. (2011) "Post 1999 developments in Disaster Management in Turkey: The regulatory frameworks and implementation of land use planning for disaster risk reduction in Istanbul." Case study prepared for ISDR Global Assessment Report 2011.
Yücel, G. (2009) Depremden Fiziksel ve Sosyal Etkilenebilirlik Değerlendirme Modeli: Avcılar Örneği. Yayımlanmamış Doktora Tezi, İstanbul: Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü.
https://en.unesco.org/greencitizens/stories/disaster-risk-management-sustainable-development
https://www.unece.org/fileadmin/DAM/trade/wp6/AreasOfWork/StandardsAndNorms/_notes/Standards_and_DRR/Brochure_FINAL_WEB.pdf

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The sound as factor of reuse of Cultural Heritage in a modern key

Roxana Adina Toma*, Massimiliano Masullo, Luigi Maffei

Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", Aversa, Italy, e-mail: roxanaadina.toma@unicampania.it

Abstract: Cultural heritage is one of the most important aspect of our historical memory which must be protected and valued. This can be done through the architectural conservation of historical buildings or through the valorisation of their cultural function. The sound can play a key role for these sites and for their reuse, implementing urban revitalization strategies and providing them new functions for the needs of society. Today many cultural sites already host temporary spectacles, such as: live music events, artistic exhibitions, musicals and theatrical performances; on the other side they could be used for the restoration of citizens and tourists. This paper shows the different uses of historical sites where the sound is used for human well-being and for conservative and regenerative purposes.

Keywords: cultural heritage; sound; human well-being.

Introduction

Lost or undervalued urban spaces of historical Mediterranean cities are often related to the cultural heritage: most of them are monuments or proofs of the past history of places. Common responsibility to safeguard them for the future generations require appropriate strategies in order to preserve their authenticity. Modern and adaptive reuses of the cultural sites that pay attention to the historical and architectonic values can be considered valid alternative conservation strategies able to enhance, at the same time, also the wellbeing of society (ICOMOS, 1964).

Moreover, management or conservation decisions are affected by the sociocultural, economic and political values and by their interactions. In particular, the sphere of sociocultural values is linked not only to the historical and artistic aspects, but also to the place attachment that refers to the social cohesion and community identity (De la Torre, 2002). People generally spend time in heritage sites and buildings because they are looking for learning, cultural or recreational experiences, that imply the desire to be entertained, to be emotionally involved in the past or to learn the physical nature of the site and its historic background (Ariffin, Zahari, & Radzi, 2017).

Lost cultural spaces or in-between spaces of the heritage such as courtyards of ancient buildings, cloisters or historic cafes sidewalks, may serve as places of mediation with the

intrinsic capacity to improve social interaction, develop sense of community and for revitalization and environmental protection purposes (Can & Heath, 2016).

Sound and Cultural Heritage

The sound is one of the most important sensory modalities by which citizens and tourists perceive the cities. It characterizes the environment and influence the people behaviour. For that, architects, engineers and urban planners are paying even more attention to the sound design of cities. Indeed, there is a tight connection between the feelings of pleasure that people can have in public spaces due both, for the physical characteristics and for the experiences they lived. Through the sound factor the past can live again in modern key: on one hand the sound can be the main actor in creative and cultural practises staged in places belonging to the history that enchant the audience with the beauty and the suggestiveness of the heritage site, on the other hand the sound in sites of historical and cultural relevance can have restorative benefits on citizens and tourists.

This paper shows two main different uses of historical sites where the sound can play a meaningful role for the conservation and regeneration of cultural heritage sites and for the human well-being.

Creative reuse of Cultural Heritage sites

Renewal and transformation's projects aimed to recover historic buildings can save them from abandonment and extinction. The proof are the numerous cultural heritage sites that, in the last decades have been used in a modern key. Most of them host creative events or performing arts, where the human voice or the music are made suggestive by the context. In this regard an example is the Cloister of *San Francesco alle Scale* in Ancona (Italy) where acoustics' studies showed how this ancient site can be reused as an excellent open or covered theatre for classical music performance, jazz concerts and prose shows (Baroncini, Iannotti, Mattei & Zazzini, 2004).

Furthermore, in recent years numerous experiences, now consolidated, have used and still use the ancient open-air theatres or arenas as places for concerts or other types of shows. Some significant examples are those of the Arena di Verona (Italy), Arena of Nimes (France), Arena of Arles (France), Pula Arena (Croatia) and El Djem (Tunisia) (see Figure 1). All of these roman amphitheatres host with a seasonal continuity several concerts of international rock and pop artists, periodic festivals, lyric operas, theatre plays and ballets (Ianniello, 2017).

Figure 1. In order: Arena di Verona, Arena of Nimes, Arena of Arles, Pula Arena and El Djem Arena (Ianniello, 2017).

Recently an original spectacle focused on the sound and vision has been "The gladiator in concert", a live experience staged at the Colosseum and Circo Massimo in Rome where, during the film showing, an orchestra and the choir have been performed the film's soundtracks live. However, ancient theatres are not the only heritage sites where the possibility to perform sound events were considered. Examples are the multisensory study carried out (Bastürk, Carafa & Maffei, 2010) using Virtual Reality aimed to design the best layout for the transformation of the Church of S. Maria Maggiore della Pietrasanta in Naples (Italy) in an Auditorium for Concert Music, or those (Iannace, 2016) on the use of the historical courtyards of the Royal Palace of Caserta and of the complex of Belvedere di San Leucio for musical performance (see Figure 2).

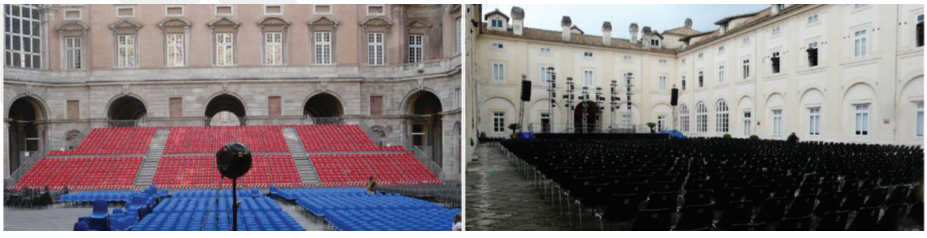


Figure 2. View of the courtyard in the Royal Palace of the Caserta (left) and of the small courtyard of the Belvedere of San Leucio (right) both prepared for a pop concert (Iannace, 2016).

Historical heritage sites as restorative areas

Acoustic measurements and evaluations of the qualitative aspects carried out on 11 cloisters and 7 historical courtyards in the city centre of Naples (Fernández, Pascale, Masullo, Maffei & Puyana, 2014) (Maffei, Masullo & Oliviero, 2017) have showed as these sites have a high potential of reused as pocket of quiet, as the differences between the sound levels inside and outside these sites, in almost all the cases were higher than 10 dB. More recently a further study (Maffei, Toma & Masullo, 2018) on 6 more cloisters (n.3) and courtyards (n.3) (see Figure 3) demonstrated the capabilities of restorativeness of these sites, putting in evidence their benefit on the sense of Being Away and on the sense of Fascination of the sites with greenery, historical cultural elements and fountains.

Figure 3. In order: Cloister of Saints Marcellino e Festo, Cloister of Sant'Andrea delle Dame, Cloister of Accademia delle Belle Arti, Palazzo Marigliano, Palazzo Venezia, Palazzo Filomarino (Maffei, Toma & Masullo, 2018).

Conclusion

The sound is an important factor of the daily life and can play a key role in reuse of cultural heritage both for creative activities and for restorative purposes. It has positive effects on human wellbeing, prosperity and quality of cultural heritage sites and on social inclusion of residents and visitors.

References

ICOMOS. (1964). *The Venice Charter 1964*. IInd International Congress of Architects and Technicians of Historic Monuments, Venezia, Italy.

De la Torre, M. (2002). *Assessing the Values of Cultural Heritage: Research Report*. Los Angeles, CA: Getty Conservation Institute.

Ariffin, A. B., Zahari, M. S. M., & Radzi, S. M. (2017). Adaptive reuse of historical buildings and local residents' actual visitation. *Journal of Tourism, Hospitality & Culinary Arts*, *9*(2), 35-46.

Can, I., & Heath, T. (2016). In-between spaces and social interaction: a morphological analysis of Izmir using space syntax. *Journal of Housing and the Built Environment*, *31* (1), 31-49. doi:10.1007/s10901-015-9442-9

Baroncini, C., Iannotti, A., Mattei, E., & Zazzini, P. (2004). *Studio per il riutilizzo del chiostro di S. Francesco alle scale di Ancona come sito polifunzionale per eventi musicali*. Paper presented at 31st AIA National Convention, Venezia, Italy.

Ianniello, C. (2017). Modern shows in Roman amphitheatres. *Acoustics in Practice*, *6*, 13-22.

Bastürk, S., Carafa, R., & Maffei, L. (2010). The Validation of Architectural and Acoustic Projects to Transform Ecclesiastical Architecture in Auditoria for Concert Music. *Proceedings of Euroregio 2010, EAA Congress on Sound and Vibration.*

Iannace, G. (2016). The use of historical courtyards for musical performances. *Building Acustics*, *23*(3-4), 207-222. doi: 10.1177/1351010X16678219

Fernández, D., Pascale, A., Masullo, M., Maffei, L., & Puyana, V. (2014). *The value of the cloisters in Naples' historical city centre as quiet and restorative places*. Paper presented at 45º Congreso Español de Acústica - 8º Cong. Ibérico de Acústica, Murcia, Spain.

Maffei, L., Masullo, M., & Oliviero, A. (2017). *Quiet areas inside historical city centers*. Paper presented at Internoise 2017, Hong Kong, China.

Maffei, L., Toma, R. A., & Masullo, M. (2018). *Objective and subjective assessment of pockets of quiet inside historical urban areas*. Paper presented at Internoise 2018, Chicago, Illinois.

Urban Conservation in Ankara is Sustainable ? Implementations in Ulus and Haci Bayram Mosque Environs Since 30 Years

Prof. Dr. Mehmet Tunçer[1]

[1]*Department of Urban and Regional Planning , Çankaya University, Ankara, Turkey, mtuncer@cankaya.edu.tr*

Abstract: Urban conservation as a core component of sustainable urban development. But can urban conservation be sustainable, or is this not a matter of preserving the past, whereas sustainability today is more concerned with planning, that is, with activities connected to the future? So what does sustainability in urban conservation and urban development really mean?
The purpose of this paper is to evaluate the Ankara, "Haci Bayram Mosque and Augustus Temple Environmental Arrangement and Regeneration Projects" in the context of "Sustainable Historic Environment Protection" within Ulus Historical City Center.
As a retrospective method; "Conservation-oriented Plans", "Environmental Regeneration and Gentrification Studies" and new-historical artifacts (New – Old Ankara Houses) and repairs will be examine, mostly that are contrary to the Turkish Laws, Regulations and International Principles of conservation and restoration since in the last 30 years.

Keywords: ulus; historical center; sustainable; urban; conservation; haci bayram; restoration; renewal.

Introduction:

Ulus is a quarter in Ankara, Turkey and is located at the center of the capital city. It was once the heart of old Ankara. In early years of Ankara as the capital city of the Turkish Republic, in 1928, German architect Hermann Jansen designed the surrounding area of Hacıbayram Veli Mosque as a triangle shaped square. However, Jansen's design had never been put into effect and in following planning and implementation studies, the area in front of the mosque was expanded in an undefined form ending up as a car park. (Bademli 1992) Hacıbayram Veli Mosque and its environs is an important cultural focus of Ankara with religious purposes (worshipping, funerals, visits before pilgrimage, shrine visits) and tourist visits (August Temple and archaeological area). In sum, it is the window of the city (Bademli 1992, 25).

The planning works for the preservation of the historical urban sites of Ankara and the Ulus Historical City Center were important.

"Haci Bayram and Augustus Temple Conservation Plan", arrangements of square and landscaping studies will be examined in detail. The Square landscaping project, the Hacibayram Conservation-oriented development plan prepared in 1985-86. And subsequent implementations, organization model and public participation model, were examples that could be set as examples throughout the country.

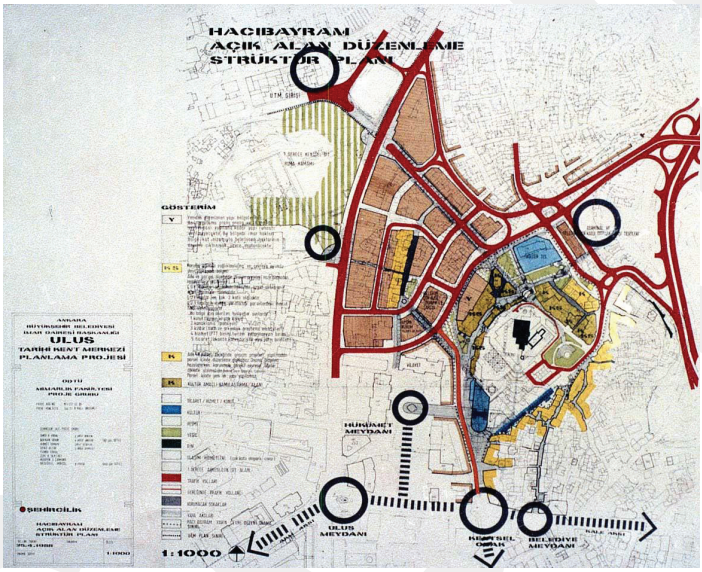


Figure 1. Hacıbayram Open Space Renewal Structure Plan (Source: Funda Erkal)

Hacıbayram Veli Mosque and its environs came into agenda with the Ulus Historical Center Planning competition of Ankara Greater Municipality in 1986. The arrangement of the rectangular square in front of the Mosque and August Temple including the area used as car park and dolmus stop and the area that covers the road surrounding Hacıbayram Veli Mosque and the wall was included in the competition within the framework of "Buildings and Building Groups for Environmental Renewal" (Project Competition on Ulus Historical Center 1986).

Renovation of the book marketplace around Hacibayram, repair of some of the old Ankara Houses, along with the Arrangement of the Square, was an important protection of the Mayor Murat Karayalçın period between 1990-1994.

Figure 2. Arrangement of the Haci Bayram Square Destroyed and Renewed at Mayor Melih Gokcek Period

During the Hacıbayram Environmental Renewal Project preparation stage, for the protection of historical and architectural value of the area, the cooperation of experts from different disciplines was required. In addition to planners, architects, landscape architects, industrial designers also worked side by side for the preparation of this project. Archaeologists and restorers were asked for their advice. Moreover, Greater Municipality formed "Law Group" for the solution of ownership problems through barter model rather than using the traditional expropriation metod. (Tuncer, M., 2001)

From 1994 until the end of 2017, In the period of Mayor Melih Gökçek, the practices in the former Ankara, Ulus and Hacibayram Historical City, unplanned and not an "Conservation Aimed Plan of Ulus Historical Center", were implemented in the scope of

not scientific and not respect the protection of all international principles, regulations and conventions.

In 2005, Ulus Historical City Center Conservation Improvement Plan (1992-METU) was canceled and a plan for "Non-Protection (Renewal Aimed)" was prepared, covering a much wider area. In the following period, these plan decisions were very discussed and the matter of the lawsuit was taken and cancellation decisions were taken.

The Ulus Historical City Center Conservation Plans, which was canceled by the Court in 2012, has been reviewed and prepared again. However, this plan was also a matter of trial and cancellation decisions were taken.

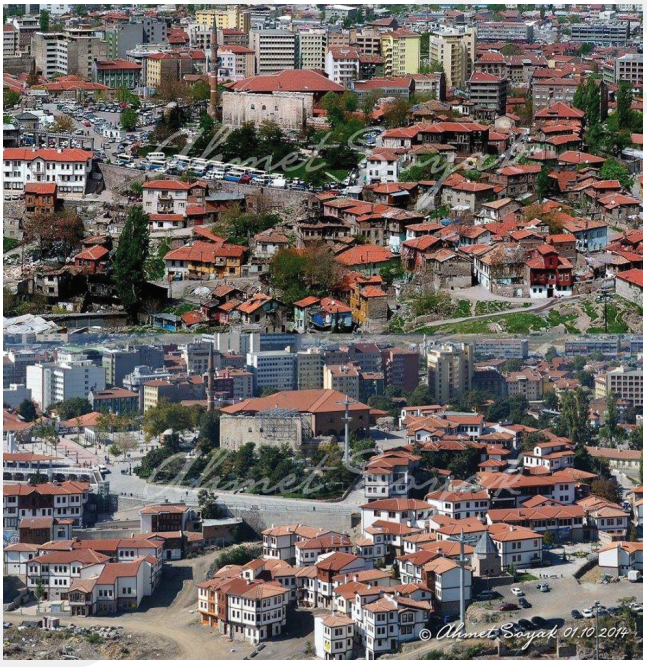


Figure 3. The Old Ankara Houses Are Renewed With Concrete Structures and Rebuilt As Replicas with More Than 3 Flats Around The Mosque Which Are Not Sustainable Conservation Samples (Photographs: Ahmet Soyak)

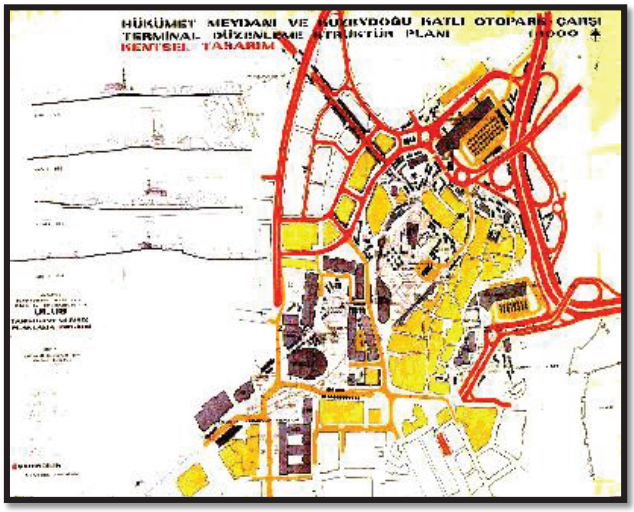


Figure 4. Ulus Government Square and Haci Bayram & Augustus Temple Square Arrangement and Traffic Plan of 1992 Conservation Plan

Conclusion

1/1000 scale "Ulus Historical City Center Conservation and Improvement Plan" was prepared with the unique planning concept based on the administration of conservation, utilization, repair and structuring processes.

Ulus Plan does not display accustomed conservation (development) planning (or spatial planning) approaches that adopt passive (yes-no) attitudes and determine long-term physical/spatial objectives, resulting situations, solutions or designs. Quite differently, it puts forward policies, fundamentals and strategies to be followed actively (including participation, negotiation and process management) (Erkal, Kıral, Günay 2005, 42).

Aim of this paper, to evaluate the Ulus Plans and implementations around Haci Bayram Mosque. It will be a retrospective evaluation of "Sustainable Preservation of Historical Environments" since 1986-2018. In the last 30 years, conservation planning and implementation studies in Ulus Historical City Center and Hacibayram Environment will be discussed in line with "Sustainability of Historic Areas Principles".

The “Concept of Sustainability” will be evaluated in the context of "Preservation of Historical Environments" and it will be assessed in terms of "Gentrification" and "Urban Transformation Concepts", which are "Conservation" or "Disintegration Restoration" of the point reached in the "Planning and Design of Historical Environment" in Old Ankara, Ulus and Hacibayram The extent to which "sustainability" can be reconciled is debatable.

References

Bademli R., (1992), Ulus Tarihi Kent Planlama Çalısmaları, Koruyucu Kent Yenilemesi ve Yerel Yönetimler, Türk Alman Seminerleri 13-14 Aralık 1991, TMMOB Mimarlar Odası, Ankara.,

Erkal F, Kıral Ö., Günay B., (2005), Ulus Tarihi Kent Merkezi Koruma Islah Imar Planı. 1986-2006 Koruma Planından Yenileme Planına, Planlama Dergisi, TMMOB Sehir Plancıları Odası, Ankara, 2005/4

Friedrich I., “Urban Conservation As A Core Component Of Sustainable Urban Development” City & Time 5 (1): 5. [online] url: http://www.ct.ceci-br.org.

Tuncer, M., 2017, “Historical Heritage Conservation From Past to Today- Cases; Ankara, Patara, Urfa Edessa, Perge, Diyarbakır, Mardin”, Gazi Kitapevi Pub., Ank. ISBN 978-605-344-522-7,

Tuncer, M., 2001, “Development of Historical City Center of Ankara (Angora) (14.-20th Centuries)”, Ministry of Culture Pub. / 2603, Series of Cultural Works No : 292.

Tuncer, M., 2000, “Historical Environment Conservation Policies Case: Ankara”, Ministry of Culture Pub. / 2520, Series of Cultural Works No: 281.

Tuncer, M., 1995, Ankara University, Faculty Of Political Sciences, Department Of Public Administration And Politics, On Subject About "Urban And Environmental Sciences” , Phd. Thesis On “Sustainable Urban Conservation Policies, Cases : Ankara, Sanliurfa, Bergama”.

Project Competition on Ulus Historical Center, 1986, Greater Municipality of Ankara.

Ankara Ulus Historical City Center Urban Conservation Plan (2014)

Ankara 4. Administrative Court, File No: 2007/1411, Expertaise Report.

Sağıroğlu, O., Aksulu, B., I., A Proposal for Sustainable Urban Conservation and Rehabilitation of Ulucanlar District, Ankara, Gazi University Journal of Science GU J Sci, 24(3):593-604 (2011) www.gujs.org

Tunçer, M., 2013, “Ankara Tarihi Kent Merkezi Yenileme Alanı Koruma Planı, Niteliği Ve İptaline İlişkin Gerekçeler”, VEKAM Ankara Araştırmaları Dergisi (Journal of Ankara Studies), Cilt 1, Sayı 2, Aralık 2013, s. 10-34.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainable Conservation of Cultural Landscape and Changing Values Around Hacıbayram Mosque and Augustus Temple

Mehmet Tunçer[1] , Öznur Aytekin[2]

[1]*Department of City and Regional Planning, Çankaya University, Ankara, Turkey, mtuncer@cankaya.edu.tr*

[2]*Department of City and Regional Planning, Çankaya University, Ankara, Turkey, oznur.aytekin@hotmail.com*

Abstract: Urban transformation is the overall strategy and action set out to improve the physical, economic, social and environmental conditions of an urban space with comprehensive and integrated approaches, taking into account urban issues and needs.

Urban design and transformation is that of understanding or application in the multi-dimensionality of the projected core reason of the actors present in the urban renewal applications.

In Ankara, Ulus Historic Center, since the past ten years, Urban Regeneration and Urban Renewal expressions and applications affect the content and the legal platform of protection of cultural heritage areas. Through this development, conservation based improvement approach that evaluated in "Urban Revitalization" and the Renewal approach that prefered for cultural heritage areas which become dilapidated urban tissues interfere with each other.

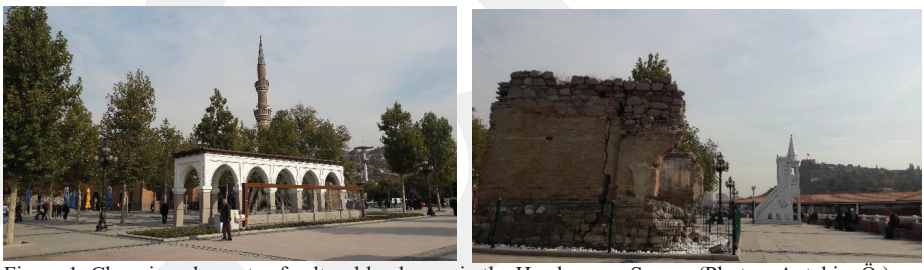


Figure 1. Changing elements of cultural landscape in the Hacıbayram Square (Photos: Aytekin, Ö.).

Historical and cultural memory loss has occurred with applications such as demolition of facade structures facing the Hacıbayram Mosque, enlargement of the last community place of the glass, construction of women parth underneath, construction of multi-storey car park by digging the mound, and filling the periphery with false historical artifacts.

The purpose of this paper is to evaluate the Ankara, *"Sustainable Conservation of Cultural Landscape And Changing Values Around Hacıbayram Mosque And Augustus Temple"* in the context of "Sustainable Historic Environment Protection" around Ulus Historical Center.

Keywords: Sustainable Cultural Landscape; Destruction; Haci Bayram; Augustus Temple; Restoration; Renewal

Introduction

Ankara is a city with a result of thousands of years of accumulation. Archaeological finds in and around the city and the mounds are indications that we are on a rich history of cultural layers. The ruins of the monumental structures used in Augustus Mabedi, Roman Bath, Ankara Castle and the Antique Theater (Odeon) and Castle Walls, which have reached to the sun, are the indications of Ankara's Roman (and later Byzantine) identity.

In 2004 and later, amendments in legislation of conservation became the starting point of the conservation and protection applications.

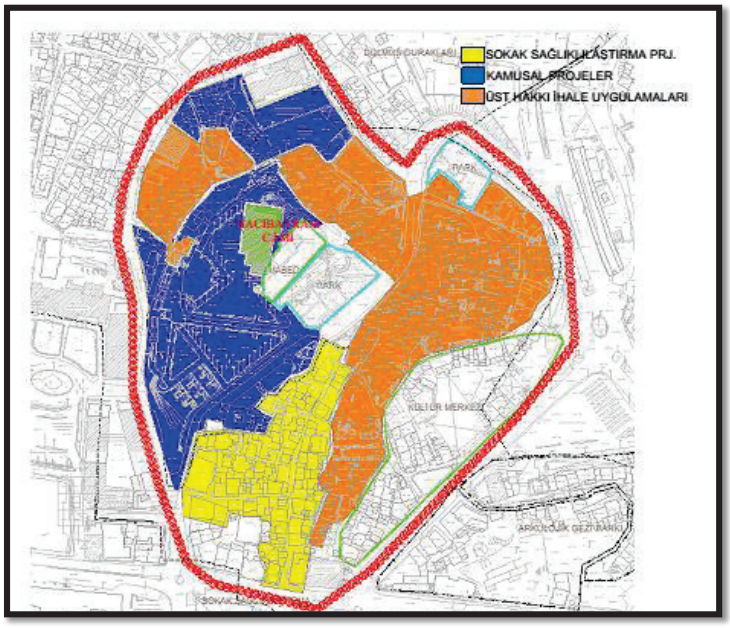


Figure 2. Project areas around Hacıbayram and Augustus Temple (Source: Aytekin, Ö., 2017?).

In this paper the main aim is to evaluate these applications' problems and conclusions over the first application areas in Ankara, Hamamönü and Hacıbayram Cultural Heritage Areas; to determine the criteria and proposals for sustaining the success and development in sustainable conservation and sustenance and to set the success level of different application methods on different conservation areas.

Figure 3. Changing urban facades and scenery (Archieve).

Augustus Temple

The most important feature of Augustus Temple is; shortly before the death of Emperor Augustus, the four important documents left to the priests of the Vesta Temple in charge of the family in ancient Rome came only to the present day, which was also transmitted to the walls of this temple. Even the original document in Rome was lost and this document was found in three different parts of Anatolia.

We think that this area pool is misplaced. If the area had a historic city dwelling, if there was a temple 2.5 meters away, we would not want the pool to be built. We think that the insulation problems that may arise in the future will harm the historical texture.

Hacıbayram Mosque

Hacı Bayram-i Veli is one of the great Turkish thought system that was founded in Khorasan, that is, Sufi philosophy rising in Angora. They accepted Hacı Bayram-i Veli as the spiritual guardian of the city.

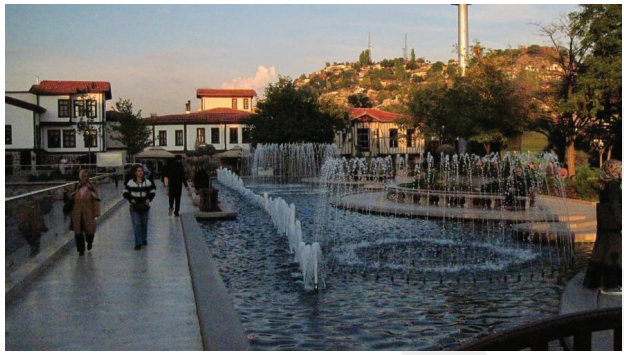


Figure 4. New pool and sitting places showing changing elements around Augustus Mosque.

The Haci Bayram Complex with its Hacıbayram-i Veli Mosque and the end of a mosque is also located in a high position west of the Augustus (Ogüst) Temple. The first construction is 1427-1428. However, with today's vision 17-18. century features. The main structure originally planned as a small mosque was inadequate due to the population increase in Ankara, especially its immediate vicinity,

Repairs, new-historical artifacts made around Hacıbayram cause the gradual deterioration of the original state of the historical circle and memory loss.

The nation has been declared a "Renewal Area" in order to realize sensational and profitable projects. It is an approach that adopts to break down and rebuild, not scientific protection. Hamamönü and Hacıbayram around the "New" "Historical Edifices" is made ..!

"Hacıbayram Veli Mosque Restoration and Environmental Regeneration Project" was accepted by Ankara Regional Directorate of Preservation of Cultural and Natural Assets Decree of 26.02.2010 and numbered 4897.

Ankara Regeneration Area With the Decision No. 649 dated 07.12.2010 of the Regional Board for Conservation of Cultural and Natural Assets; The "Restoration Projects" have been approved for the Hacıbayram Veli Mosque (original part).

However, these restoration projects were the subject of litigation, and the unique architecture of Hacıbayram Camis and the environment "Cultural Landscape"

Arrangements From Hacıbayram And Destruction Of Cultural Landscape

Hacıbayram Surroundings; the Hacıbayram Preservation Development Plan (1984) is a region where the city has spent a great deal of effort and money to organize and repair the National History Center Contest (1986) and the Hacıbayram Square Regulation Project since the 1990s. The bookstore market has been demolished and rebuilt twice, and the challenge management has been done twice with new concepts.

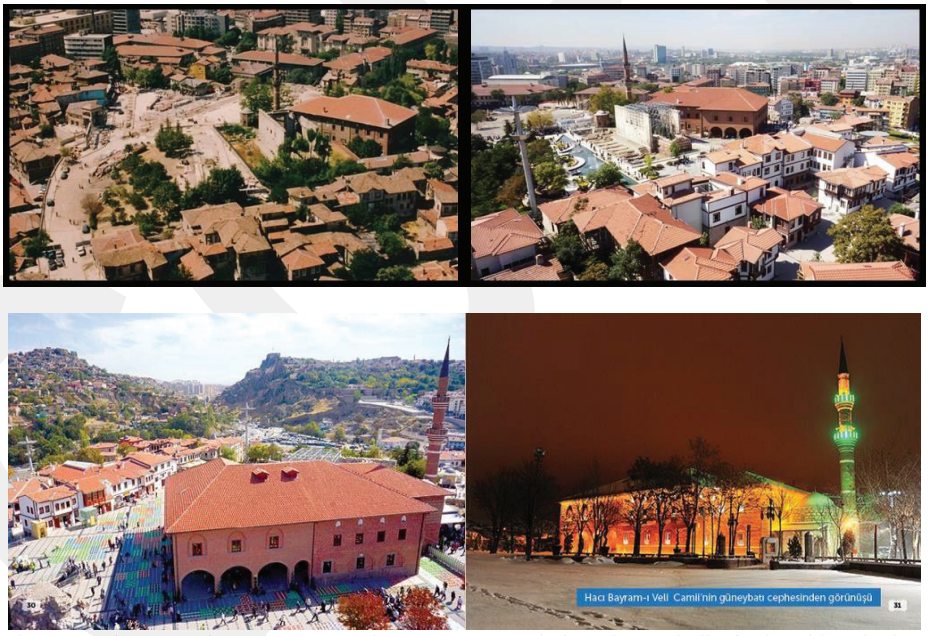


Figure 5. The case of Hacıbayram and Augustus Temple has changed all of urban historical assets and cultural landscape.

In recent years, the Hacıbayram Mosque and its surroundings have almost been rebuilt. However, the practices have not only destroyed the Phrygian Mound, the 1st Degree Archaeological Site, but also damaged the Temple of Augustus and its environs.

In addition, the Hacı Bayram-i Veli Mosque, a modest and scaled mosque, escaped the scale with the scale of the Women's Building made of alta with scaled magnification and attachments of almost two orders of magnitude.

Hacıbayram Environment has been rehabilitated as a healthy and livable environment with the street regulations and infrastructure works done in the environment. However, with the old Ankara House-style "New-Historical Buildings " made with reinforced concrete and timber framing system, the conservation phenomenon here has become contradicting with the Venice Charter principles.

The city's readability is being weakened by constantly changing and changing city images, and a sense of perception and evaluation is created in the society. In urban people who constantly witness such changes, it is possible that memory-memory associations are weakened and eventually the memory of the city is completely lost. Among the urbanists, the feeling of not belonging to the city, not possessing the city is developing. As a result, it is becoming difficult to save the historical-cultural identity of the city that has been destroyed, or to protect those that can be obtained.

Conclusion

To understand, evaluate and protect the value of historical sites studies on cultural landscapes are increasing and gaining importance. Cultural landscape research, evaluation and protection of cultural properties in the future.

Ulus Historical City Center and Haci Bayram Mosque with the most important cultural landscaping features of Ankara constitute the main material of the paper.

The “Concept of Sustainability” need to be evaluated in the context of "Urban Cultural Landscape” and it will be assessed in terms of "Urban Design" and "Urban Transformation Concepts". The Case of Hacıbayram and Augustus Temple has changed all of urban historical assets and cultural landscape since beginning of the Republic.

Open, semi-open and closed spaces where cultural landscape values can be examined (history tissue-related structures, paths, squares, green spaces, and other physical elements)

The social and cultural characteristics of the place. Documents related to the field of the present day will be examined and the history evaluation of maps, plans, photographs, drawings and drawings, and changes in landscaping during different historical periods.

References

Aytekin, Ö., (2017), "Tarihi Çevrede Koruma Ve Yaklaşımlar Hacı Bayram Örneği" ,

Çankaya Üniversitesi, Kentsel Tasarım Ve Dönüşüm Yüksek Lisans Programı, KENT 560 Urban Conservation and Renewal Course Homework

Günay, B., "1/1000 ölçekli Ulus Tarihi Kent Merkezi Koruma Islah İmar Planı'na İlişkin Açıklamalar", http://www.arkitera.com/v1/gundem/ulus/yazi3.htm

Kurtdaş, E., Sönmez, N., Nizamoğlu, S., (2007), "Şehir Plancıları Odası'na Sunulan Rapor" Mimarlık, (1952), Sayı: 5-6, s. 29-31, pp. 38-40.

Tunçer, M., (2001), "Ankara (Angora) Şehri Merkez Gelişimi (14. - 20. Yy)", Kültür Bakanlığı Yayınları, Kültür Eserleri, Dizisi No : 292.

Tunçer, M., (2009), Cumhuriyet'in Mimari Mirası Sempozyumu, "Cumhuriyet'in "Mimari Mirası"nın Planlama Aracılığı İle Korunması: Ankara Örneği", TMMOB Mimarlar Odası,

Tunçer, M., (2011), "Ulus Hali Ve Yakın Çevresi (Suluhan - Modern Çarşı - İbadullah Camisi) / Koruma – Geliştirme – Kentsel Dönüşümüne İlişkin Görüş Ve Öneriler", Tarihte Ankara Uluslararası Sempozyumu, A.Ü.DTFC

Tunçer, M., (2012), "20. Yüzyıl Başlarında Tahtakale, Karaoğlan Çarşısı Ve Taşhan'dan Ulus Merkezi'ne Dönüşüm", Ankara Mahalleleri, Yayınlanmamış Makale.

"50 Yıllık Yaşantımız 1923 - 1933", (1976), Cilt I, Milliyet Yayınları, Milliyet Ofset Tesisleri,

TMMOB Şehir Plancıları Odası; "Ankara Ulus Tarihi Kent Merkezi Korunmasına İlişkin Yapılan Çalışmalar", (Rapor)

01.11.2006 Tarihinde Yapılan Toplantıda Sunulan "Ankara Tarihi Kent Yenileme Alanı Projesi"'ne İlişkin Orta Doğu Teknik Üniversitesi Mimarlık Fakültesi Görüşü.

25887 sayı ve 26 'Temmuz 2005 tarihli Resmi Gazete'de yayınlanan "Koruma Amaçlı imar Planları ve Çevre Düzenleme Projelerinin Hazırlanması, Gösterimi. Uygulaması, Denetimi ve Müelliflerine İlişkin Usul ve Esaslarına Ait Yönetmelik".

Yenileme Alanı Kültür ve Tabiat Varlıklarını Koruma Bölge Müdürlüğü'nün 17.05.2007 tarih ve 25 sayılı kararı.

Ankara 10. İdare Mahkemesinin 23.07.2008 tarih ve E: 2007/885, K: 2008/2258 sayılı kararı.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Evaluation of environmental factors in office environments with green intent in terms of user satisfaction: indoor air quality

Çetin Tünger[1*], Zeynep Öktem[2], Ayça Turgay[3]

[1*]*Interior Architecture, Çankaya University, Ankara, Turkey, cetintunger@cankaya.edu.tr*
[2]*Interior of Interior Architecture and Environmental Design, Bilkent University, Ankara, Turkey, zeynep.oktem@bilkent.edu.tr*
[3]*Interior of Interior Architecture and Environmental Design, Bilkent University, Ankara, Turkey, ayca.turgay@bilkent.edu.tr*

Abstract: This paper is a part of a larger study that aims to find out if office environments with green intent fulfill the user satisfaction criteria in terms of lighting, thermal comfort and indoor air quality (IAQ) as factors determining indoor environmental quality. This part of the research focuses on indoor air quality (IAQ). In light of the statistical analyses of data collected through a questionnaire from a sample of 23 Kanal D employees working in Doğan Media Center, several findings were deduced. In parallel with the literature, females were found to be less satisfied with IAQ. Unexpectedly, no significant correlations were found between the evaluation of present conditions and user satisfaction, except for freshness and dust. The presence of the atrium was evaluated as a factor influencing the satisfaction from inconstancy.

Keywords: indoor air quality; green building; occupant satisfaction

Introduction

Indoor air quality (IAQ) is defined as "the nature of air inside a building that affects the health and well-being of building occupants" by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE 62.1- 2007. A poor indoor air quality can cause many health problems including headaches, eye and nose irritation, nausea, dizziness and even more serious health problems like asthma, cancer, reproductive and developmental problems (U.S. Green Building Council, 2009, p. 436). It does not only affect the health and well-being of the occupants but also their productivity and comfort levels.

Maximized indoor air quality can be considered as a contribution to sustainability mainly because it reduces absenteeism, and increases occupant productivity (U.S. Green Building Council, 2009, p. 436). Consequently, for the same workload, less metabolic energy is needed to be consumed by employees, also leading to a decrease in the electrical energy used for the whole facility. Furthermore, female occupants constitute a risk group, such that they tend to be affected by low IAQ more than male occupants in office environments (Mendell, 1993; Wargocki

et al., 1999). In other words, "the potential cost to society of poor indoor air quality is high" (European Commission Joint Research Centre, 1996).

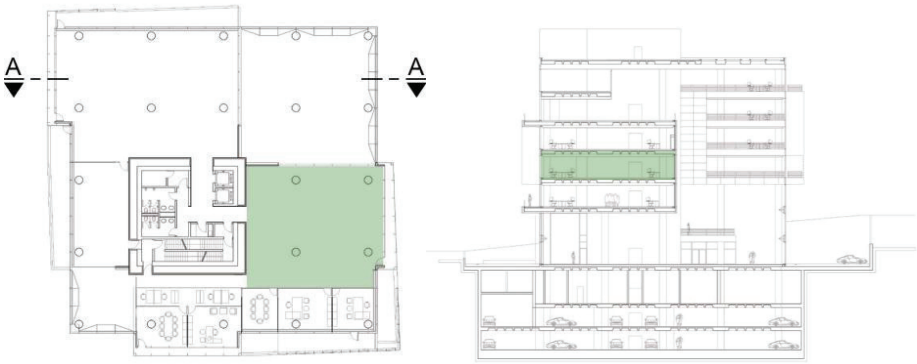
Many sources put emphasis on the relationship between establishing sustainability and providing a high indoor environmental quality (Abbaszadeh et. al., 2006; European Commission Joint Research Centre, 1996; U.S. Green Building Council, 2009). According to these sources, energy saving in HVAC (heating, ventilation, and air conditioning) systems should be less prioritized if it results in a decrease in IAQ. That is why most of the guidelines on sustainability promote occupant satisfaction as well as energy saving, hence the term "people-friendly green design" (U.S. Green Building Council, 2009).

The factors affecting the IAQ are stated as "sources of pollutants or odors; design, maintenance and operation of building ventilation systems; moisture and humidity; and occupant perceptions and susceptibilities" (U.S. Environmental Protection Agency, 1997). These factors will be elaborated in this section as a guide for the research as well.

Methods

The data collection for this study was done through a field research in a generic office environment. The office environment that was analyzed in this study is located on the second floor of Doğan Media Center on Eskişehir Road in Ankara (See Figure 1). The building was designed with a green attitude, but has no certificates or awards concerning sustainability., Doğan Media claims that they monitor and implement the latest technologies in their buildings to ensure sustainability in their administrative buildings (Occupational Health and Safety, 2014). The offices are equipped with new generation cooling devices in line with EU norms that use eco-friendly gases. Besides, the insulation technology used in the buildings has led to a decline in natural gas consumption for heating purposes, and a drop in electricity consumption for cooling, resulting in a reduction in overall CO2 consumption (Occupational Health and Safety, 2014).

Several factors that could potentially affect IAQ either positively or negatively were identified in the site visit to Kanal D office, based on the literature survey (Appleby, 1990; Wargocki et al., 1999; CSIRO, 2007). The factors that could potentially enhance the IAQ were determined as greenery (1), ventilation inlets (2) and outlets (3), and the exit door to the balcony (4). The studio equipment (5), computers (6), printers and photocopiers (7), and the carpet (8) were determined as the factors having the potential of negatively affecting IAQ (See Figure 2).



(a) (b)

Figure 1. Plan (a) and section (b) of Doğan Media Center indicating the location of the analyzed open-office space.

The sample (N=23) consisted of 18 male and 5 female Kanal D employees. The mean age was 33.42 (SD=7.02). The participants' working experience in this office environment was found to be 4.41 years in average with a standard deviation of 3.52 years. None of the participants were found to have an illness that could affect their evaluation of IAQ. 36% of the participants indicated that they knew about the sustainable systems used in the building. Observation of the office environment and IAQ measurements (humidity) were done, and participants were posed a self- administered questionnaire with seven-point likert scale including the factors: freshness, amount of odor, amount of dust, airflow, inconstancy, control over artificial ventilation systems, and humidity. Questionnaire asked the evaluation of present condition and user satisfaction for each factor.

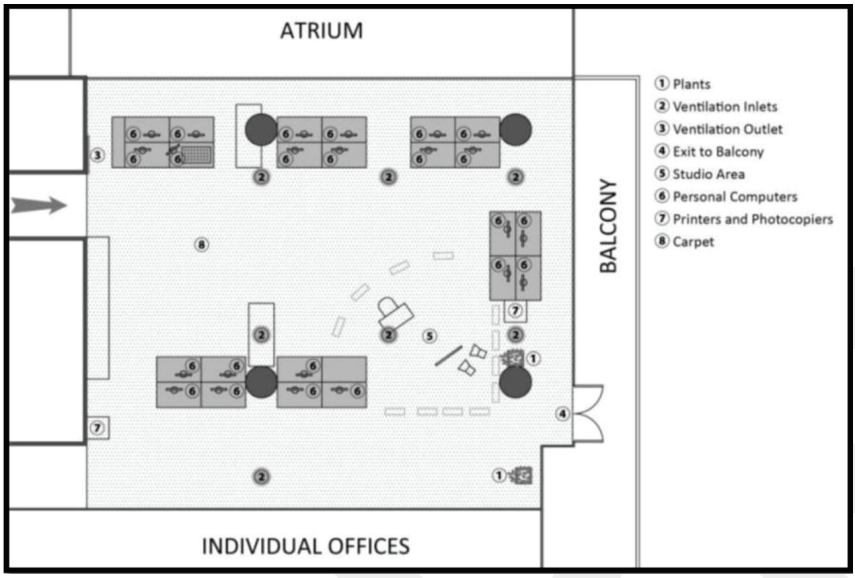


Figure 2. Plan of Kanal D office indicating the factors having the potential to affect IAQ.

Thereafter, regression analysis was made to understand if there is a relationship (positively or negatively) between the present condition of a factor and to what degree users are pleased with that factor. However, optimum values of some factors showed variance in the seven point Likert scale (eg. 7 for freshness, 4 for humidity, 1 for amount of dust). In order to eliminate this inconsistency among the scales, all the criteria were converted to a four-point unidirectional scale, representing the best condition as four out of four, and the worst condition as one out of four for each of them.

Findings and Discussion

Results showed that the average of all of physical condition evaluation scores (M=2.37 SD=1.00) is slightly more than the average of all of user satisfaction scores (M=2.22, SD=0.85). From the results, it can be said that, both evaluation of physical condition and user satisfaction with IAQ is slightly positive, since both scores are beyond the midpoint (two out of four). Moreover, females' scores (M=2.06, SD=1.00) are lower than males' scores (M=2.46, SD=0.99) in overall. This finding matches with the literature that mentions females tend to be

affected by low IAQ more than male occupants in office environments (Mendell, 1993; Wargocki et al., 1999).

While the score of "the amount of odor" (M=2.65, SD=0.98) is the highest in evaluation of physical conditions, the score of "airflow" (M=2.47, SD=1.16) is the highest in user satisfaction (See Table 1). Although DMC is located next to gas stations, the use of ventilation system and lack of operable windows might prevent smell of gas to penetrate inside the building. Besides, the data indicates that employees are satisfied with velocity of the air coming from the ventilation system.

Nevertheless, while the score of "freshness" (M=1.87, SD=0.87) is the lowest in evaluation of physical conditions, the score of "the amount of dust" (M=1.52, SD=0.73) is the lowest in user satisfaction. Employees' comments contribute to dissatisfaction with the amount of dust. Employees mentioned that floor is covered with carpet and they could see the dust particles when the sunlight gets inside.

Table 1. Mean scores of factors affecting the IAQ and the correlation values between them

Factor	**Mean of Evaluation of Physical Condition (SD)**	**Mean of User Satisfaction (SD)**	**Correlation**	
			R value	**p value**
Freshness	1.87 (0.87)	2.04 (1.02)	0.621	0.002**
Odor	2.65 (0.98)	2.39 (0.78)	0.422	0.045*
Dust	2.52 (1.04)	1.52 (0.73)	-0.135	0.54
Airflow	2.13 (1.06)	2.48 (0.79)	-0.296	0.17
Inconstancy	2.39 (0.72)	2.35 (0.57)	-0.014	0.95
Ventilation	2.57 (0.99)	2.04 (0.88)	0.075	0.74
Humidity	2.48 (1.16)	2.26 (0.86)	-0.039	0.86

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Data collected from questionnaire was statistically analyzed and implied that only two of factors have a correlation: freshness (R=0.621, p=0.002) and odor (R=0.422, p=0.045). Besides, correlations of different factors were also conducted, and it is found that there is a

significant positively correlation between satisfaction with the control over ventilation systems and freshness. This may refer that as the employees use the ventilation system, they feel more fresh the environment. In addition to this, there is a significant positively correlation between the satisfaction scores of humidity and odor. This may refer that humidity in the environment may cause occurrence of odor in the office. Aside from correlations, it is found that participants with desks near the atrium were less satisfied with inconstancy of indoor air than those who work distant to the atrium.

Conclusion

This research aims to find out if office environments with green intent fulfill the user satisfaction criteria in terms of indoor air quality (IAQ). In the literature, it was found that in terms of IAQ, user satisfaction was the most prioritized criterion for sustainability. Therefore, it was investigated if DMC, as a building with green intent, fulfilled the user satisfaction criteria. These criteria were determined as freshness, amount of odor, amount of dust, airflow, inconstancy, and control over artificial ventilation systems, humidity (Wargocki et al., 1999; Baird, Leaman, & Thompson, 2012).

Results showed that employees' overall satisfaction with the IAQ in DMC is slightly positive. Females are, in parallel with the literature, revealed lower scores compared to males. However, satisfaction with the dust is the lowest among all factors due to use of carpet. Unexpectedly, no significant correlation was found between the evaluation present conditions and user satisfaction except for freshness and odor.

Limitation of the studies could be discarded by conducting a larger sample size, using measurement devices for IAQ to obtain more objective data for the evaluation of physical conditions, repeating the study in an office building with a sustainability certificate, and in a more generic office environment (without atrium and studio).

As a result, this study can be regarded as a preliminary stage for formulating the relationship between sustainable design and user satisfaction in terms of IAQ. However, in order to arrive at a conclusion regarding if DMC qualifies in terms of user satisfaction, the interrelationships between the IAQ criteria and the importance of each criterion for the overall IAQ should be revealed through further studies. Also, together with the findings of other parts of the main study (i.e. lighting and thermal comfort), the performance of sustainable office buildings in terms of their ability to satisfy their occupants can be determined.

References

Abbaszadeh, S., Zagreus, Leah, Lehrer, D., & Huizenga, C. (2006). Occupant satisfaction with indoor environmental quality in green buildings. eScholarship, University of California.

Appleby, P. (1990). Indoor air quality, and ventilation requirements. In S. R. Curwell, C. G. March, & R. Venables (Eds.). Buildings and health: The Rosehaugh guide to the design, construction, use and management of buildings. (edition, pp. 167-193). London: RIBA.

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), & American National Standards Institute. (2007). Ventilation for acceptable indoor air quality. Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers.

Baird, G., Leaman, A., & Thompson, J. (May 01, 2012). A comparison of the performance of sustainable buildings with conventional buildings from the point of view of the users. Architectural Science Review, 55(2), 135-144.

CSIRO.(2008). Indoor environment quality and occupant productivity in the CH2 Building: Post-occupancy summary. Melbourne, Highett VIC: Paevere, P., & Brown, S.

European Commission Joint Research Centre. (1996). Indoor air quality and its impact on man: Indoor air quality and the use of energy in buildings. Luxembourg: Office for Official Publications of the European Communities.

Mendell, M. J. (1993). Non-specific symptoms in office workers: A review and summary of the epidemiologic literature. *Indoor Air, 3*(4), 227-36.

Occupational Health and Safety. (2014). Retrieved on April 17, 2014 from http://www.doganholding.com.tr/en/corporate-responsibility/occupational-health-and-safety.aspx

U.S. Environmental Protection Agency. (1997). An office building occupant's guide to indoor air quality. Washington, DC: U.S. Environmental Protection Agency, Indoor Environments Division, Office of Air and Radiation.

U.S. Green Building Council. (2009). Green building design and construction: LEED reference guide for green building design and construction. Washington: U.S. Green Building Council.

Wargocki, P., Wyon, D. P., Baik, Y. K., Clausen G., & Fanger, P.O. (1999). Perceived air quality, sick building syndrome (SBS) symptoms and productivity in an office with two different pollution loads. Indoor Air, 9, 165-179.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Environmental sustainability of being the leading building producer in Europe: developing valuable agricultural land for building construction in Turkey

Ali Türel

Department of City and Regional Planning, Çankaya University Ankara/TURKEY

aliturel@cankaya.edu.tr

Abstract: Turkey has been the leading building producer in Europe, particularly since the year 2010. Both housing and commercial buildings are produced in great numbers, which requires developing much land for construction. Valuable agricultural land in many settlements are included within planned areas without complying with the conditions set by the Soil Conservation and Land Use Act. Natural environment is under the risk of losing its valuable and nonrenewable features under the conditions of the construction maximization oriented national economic development approach. Existing legislation is designed to pursue weak sustainable land development policy in Turkey. Valuable agricultural land is used for non-agricultural purposes. In this paper, conversion of a top quality agricultural land for urban development in Kırcami district of Antalya is evaluated by taking into consideration economic returns of using that land for agriculture or urban development.

Introduction

Turkey has been the leading building producer in Europe, particularly since the year 2010. Both housing and commercial buildings are produced in great numbers, which requires developing much land for construction. Municipalities are empowered with the rights of preparing and approving land development plans, and some ministries are also enabled to prepare and approve plans.

Multi-headed planning system has been instrumental in planning large areas of land in short periods of time. Valuable agricultural land in many settlements are included within planned areas without complying with the conditions set by the Soil Conservation and Land Use Act. Generous incentives, in the forms of allocating forest land, natural preservation areas and top quality agricultural land, are provided by the acts on tourism development, transport and energy projects. Natural environment is under the risk of losing its valuable and nonrenewable features under the conditions of the construction maximization oriented national economic development approach.

Theoretical Framework

Worldwide accepted definition of the sustainability was introduced in the report published by the Word Commission on Environment in 1987, sponsored by the United

Nations. The report was named after the chairperson of the Commission Gro Harlem Brundtland. A development is considered sustainable if it "meets the needs of the present without compromising the ability of future generations to meet their own needs". The sustainability movement grew out of the conservation and preservation movements of the nineteenth century and the environmental movement of the twentieth century (Thiele, 2013).

Brundtland Commission described sustainability having three co-equal parts of elements: economy, environment and equity. This conceptualization also rejects the notion that there could be pairwise trade-off between these three elements of sustainability. Six definitions have been put forward to include principal aspects of sustainability as follows (Portney, 2015).

- Carrying capacity
- Sustainable use of biological resources
- Sustainable agriculture
- Sustainable energy
- Sustainable society and economy
- Sustainable development

There has been discussion on sustainability criteria within the context of the substitutability of natural capital and physical capital (Anderson, 2014). Advocates of **weak sustainability** suggest that physical and natural capital are *substitutes*; therefore, the loss of natural capital in development activities will be made up by the accumulation of physical capital. There will be gradual decrease in natural capital in time and the lost amount is replaced by physical capital, so that total capital stock will be maintained.

Advocates of **strong sustainability** criterion suggest that natural and physical capital are *complements,* not substitutes. They indicate that it would be too dangerous to assume that physical capital can take the place of natural capital. Strong sustainability criterion requires natural capital depreciation to be zero or negative so that aggregate level of natural capital will be maintained.

Sustainability assessment criteria have been introduced by taking into consideration likely effects of investment decisions on natural environment (Gibson, 2017). Criteria for the permitted conditions of development of natural capital have been determined. For certain types of natural capital, strong sustainability criterion is in effect, and for the establishment of some physical capital *weak sustainability* principle is adopted. Sustainability assessment

should include social and economic sustainability effects that include equity impacts of investment projects.

Pero, et al. (2017) indicated that sustainability in construction industry includes the technical pillar that reflects the quality of the building structure. Governmental regulations and national laws have been introduced as technical requirements for the construction of "low energy", "zero carbon" or "green" buildings. However, their research has shown that not all construction companies undertake their business in a fully-sustainable behavior.

In a study on the assessment of new housing development projects for sustainability in Baltic States, environmental sustainability is found out as the most significant consideration (Tupenaite, et al., 2017).

Sustainability concerns in land development for building and establishing certain facilities in Turkey

Building residential and commercial structures requires developing land and converting it from its existing use to a new function. Sustainability should be a very important concern in land development.

Soil Preservation and Land Use Act in Turkey (its article 13) does not allow using defined categories of top quality agricultural land for non-agricultural purposes. However, for investments on defense projects, in disaster hit areas, for mining, petroleum and natural gas extraction, and also for plans and investments for which *public interest* decision is taken by the related ministry, the Ministry of Agriculture can give permission for development.

Forest areas that are registered in public ownership may not be transferred to private property, but Tourism Promotion Act enables the Ministry of Culture and Tourism to lease forest areas to private developers for up to 50 years to build hotels and holiday villages.

It can be said that existing legislation is designed to pursue *weak sustainable* land development policy in Turkey. An important consequence of the weak sustainability approach would be biodiversity loss, particularly if such interventions cover areas to cause disintegration of natural habitat.

Case study on the development of valuable agricultural land in Antalya

Kırcami is an agricultural area on the eastern development corridor of Antalya. Its total size is about 1600 hectares, all covered by top quality agricultural land. There has been a long process to use Kırcami area for urban development, as explained by Demirbaş Topcu (2015) in her Ph.D. thesis.

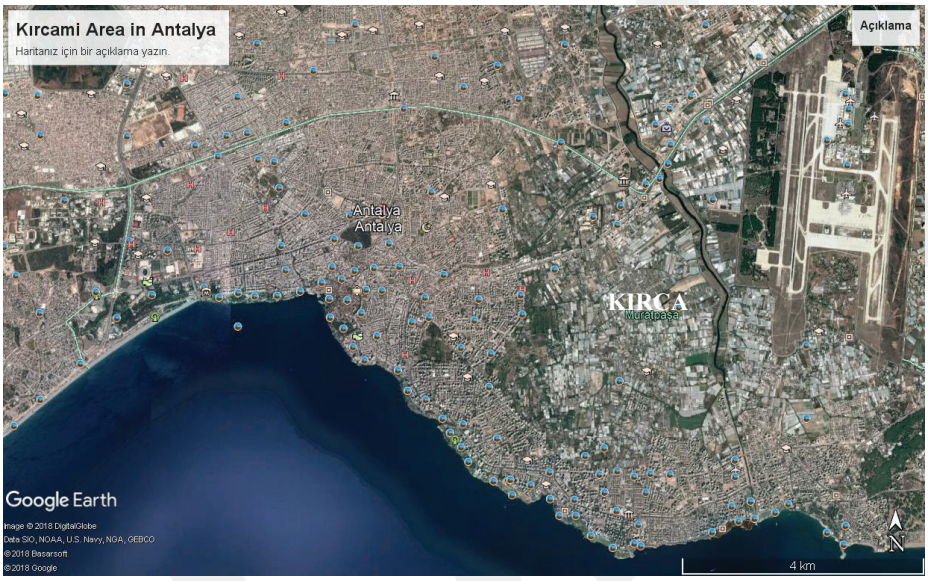


Figure 1.

In the urban master development plans for Antalya in the 1980s, land use of the Kırcami area was defined as *agricultural settlement area*. *Public interest* decision for non-agricultural development was taken by the related ministries in the 2001-2009 period, and in 2014, Kırcami Area was planned as *business and residential area* at 0.80 FAR

In the economic evaluation of such a sustainability problem discounted *cash flow* method is used (Anderson, 2014). For this purpose, initial and future costs and benefits of using land in agriculture and in its alternative use (non-agricultural use) are discounted to the initial year and *net present values* are calculated by subtracting present value of benefits from the present value of costs.

$$NPV = -K_0 + \frac{\sum_{t=1}^{n}(R_t - C_t)}{(1+i)^t}$$

NPV = Net present value, K_0 = Initial year invesment, R_t = Annual revenue, C_t = Annual cost, i = Time preference rate, t = Year.

Net present value of a top quality land in agricultural use in Kırcami is compared below with an alternative of using it for a housing project at the development density that is defined by the current development plan of that area.

Calculation is made for one-hectare land, which will have 6000 m2 net plot area after subdivision. It can be developed at 0,80 FAR, and 4800 m2 will be building area on the plot, and 32 dwelling units with 150 m2 gross floor area each can be produced on that land.

Total revenue of selling 32 dwellings at an estimated 600.000 TL each, will be:
600.000 x 32 = 19.200.000 TL.
Total floor area of buildings with permitted additions at the basement will be 6.240 m2, and at 2.000 TL/m2 unit construction cost, total construction cost of the building will be: 2000 x 6.240 = 12.480.000 TL.

The difference between the revenue and construction cost: 19.200.000 TL - 12.480.000 TL = 6.720.000 TL, which is the cost of land to the project, and unit land price becomes 672 TL/m2. This land price will be compared with the value of land when used for agriculture.

Most land in Kırcami area is used for greenhouses, and tomato is one of the most profitable products to produce. Total net profit of producing tomato in conventional methods is calculated as 150.000 TL per hectare.

Net Present Values of 150.000 TL net annual profit at four different real interest rates, which is also equal to the price of one-hectare agricultural land in Kırcami:
At 2 per cent per year will be: NPV = 150.000/0,02 = 7.500.000 TL
At 3 per cent per year will be: NPV = 150.000/0.03 = 5.000.000 TL

Unit land price at 2 per cent interest rate will be 750 TL/m2 and at 3 per cent 500 TL/m2.

It appears that at up to 2 per cent real interest rate, it would be more profitable using Kırcami land for agriculture rather than for building housing. If land is used at higher levels of agricultural productivity, agricultural value of land would be much higher.

Concluding Remarks:

Weak sustainability approach is adopted in Turkey. Development projects and great amounts of building construction are the main reasons for adopting this policy. Valuable agricultural land is used for non-agricultural purposes.

In spite of the possibility of equally profitable use of land in agriculture, most land owners prefer development of their land for the construction of housing or commercial buildings. The main reason of this choice is that they receive cash or produced housing (number of flats) when construction is completed in return to releasing their land for development, rather than using it in agriculture over the years. It requires introducing new policies to keep valuable land in agricultural production.

References

Anderson, D. A. (2014) - Environmental Economics and Natural Resource Management (Fourth edition), Routledge.

Apanavičienė, R., Daugėlienė, A., Baltramonaitis, T., Vida Maliene, V. (2015) – "Sustainability Aspects of Real Estate Development: Lithuanian Case Study of Sports and Entertainment Arenas", Sustainability, Vol *7*, pp 6497-6522; doi:10.3390/su7066497.

Basiago, A. D. (1999) – "Economic, social, and environmental sustainability in development theory and urban planning practice", The Environmentalist Vol. 19, pp 145-161.

Brueckner, J. K. (2011) – Lectures on Urban Economics, The MIT Press.

Demirbaş Topcu, E. D. (2015) - The Growing Problem Between Urban Expansion and Sustainability of Agricultural Lands, Kırcami Example in Antalya, Ph.D Thesis Submitted to the Graduate School of Natural And Applied Sciences of Middle East Technical University, Ankara, Turkey.

Garcia, E. J. and Vale, B. (2017) – Unravelling Sustainability and Resilience in the Built Environment, Routledge.

Gibson, R. B. (2017) – Sustainability Assessment, Routledge.

Pero, M., Moretto, A., Bottani, E., Barbara Bigliardi, B. (2017) – "Environmental Collaboration for Sustainability in the Construction Industry: An Exploratory Study in Italy", Sustainability, Vol. 9(1), 125; doi:10.3390/su9010125

Portney, K. E. (2015) – Sustainability, MIT Press Essential Knowledge Series. Cambridge, Massachusetts, The MIT Press. eBook.

Thiele, L. P. (2013) - Sustainability, Polity Press.

Tupenaite, L., Lill, I., 2, Geipele, I., Naimaviciene, J. (2017) - Ranking of Sustainability Indicators for Assessment of the New Housing Development Projects: Case of the Baltic States, Resources, Vol. 6, 55; doi:10.3390.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

The Social Role of Architectural Types: Cultural Sustainability in Architecture and the Possibility of Convention

Zeynep Çiğdem Uysal Ürey[1]

[1]*Department of Architecture, Çankaya University, Ankara, Turkey, zeynepuysal@cankaya.edu.tr*

Abstract: This study will look at the issue of cultural sustainability in architecture from the perspective of architectural types and will attempt to question the cognitive viability of using types in the creation of a sustainable cultural milieu. The study will conduct a multi-disciplinary and cross-comparative discourse analysis on the subject areas of cultural sustainability, cultural schemas and architectural types, in an attempt to find out the social and cognitive role of architectural types with regard to cultural sustainability. Examining these subject areas comparatively, the study will respectively investigate the role of cultural schemas in cultural sustainability, the correlation of architectural types and cultural schemas, and the social and cognitive role of architectural types in the formation of cultural sustainability. Consequently, the study will question if the use of architectural types has a cognitive basis in the creation of a sustainable cultural milieu.

Keywords: cultural sustainability; cultural schemas; architectural types

Introduction

The cognitive function of cultural knowledge in the interpretation of new information accumulated a considerable research interest. As a formative aspect of this cultural knowledge on the other hand, the cognitive function of architectural types and their role both in the interpretation and production of architectural products, and also in the formation of a sustainable built environment still seems to be an area that needs further attention. This study will delve upon the cognitive role of architectural types in the creation of a sustainable built environment and discuss if types have the possibility of sustaining a cultural milieu today.

Methods

With the aforementioned objective, the study will conduct a multi-disciplinary and cross-comparative discourse analysis respectively on the subject areas of cultural sustainability, cultural schemas, and architectural types to examine the cognitive role of architectural types in the creation of a sustainable cultural milieu.

Findings and Discussion

The inclusion of cultural sustainability as the forth pillar of sustainable development is a recent phenomenon with its unique dimensions of importance (Soini & Birkeland, 2014, p. 213). Mentioned previously under the third pillar of social sustainability, the concept of

cultural sustainability itself was first brought up in 1995 by the World Commission on Culture and Development (WCCD) and was defined as the "inter and intra generational access to cultural resources" (Axelsson et al., 2013). Although the definition of the concept still remains to be vague, it broadly talks about the preservation of cultural values, ideas, practices and artefacts for the sustainability of a society's cultural existence.

Within these discussions, culture is taken as an asset in its own right and seen as the "meaning content of human communities, which are expressed through their symbolic patterns, norms and rules" (Hylland-Eriksen, 2001). Being a very multifaceted concept itself, "culture" has seen many shifts of meaning throughout history, yet it can be defined in a more inclusive manner today as:

> "The system of shared knowledge, ideas, skills, beliefs, customs, behaviors and values, which humans acquire to cope with their world, to transmit from generation to generation by learning and express in the material systems of artifacts and the built environment". (Lawrence-Zuniga, 1997, p. 49)

In this definition and else, the most important aspect of the term is that it is shared by a society, transferred from generation to generation and loaded with that society's value systems. It becomes through these shared meanings, concepts and images that culture enables people to 'make sense' of things around them, let them communicate and formulate ideas. As Stuart Hall suggests, it is this load of cultural information that constructs and sustains the meaning in a society (Hall, 1997, p. 4, 18).

Studies in cognitive theory suggest that people carry this load of cultural information and operate on it through their cognition by way of their cultural schemas, which are a subset of their bigger store of cognitive schemas (Johnson, 1987, p. 19). It is an acknowledged theory today that our knowledge is held by our minds by way of our cognitive schemas, which are basically defined as the mental frameworks that represent our knowledge of objects, situations, events and actions (Wertsch, 1985, p. 154). They organize our knowledge and control the reception, storage, retrieval and production of information (D'Andrade, 1992, p. 28). Cultural schemas on the other hand are a subset of cognitive schemas and they are specifically defined as the "presupposed, taken-for-granted models of the world that are widely shared by the members of a society and that play an enormous role in their understanding of that world and their behaviour in it" (Holland & Quinn, 1987, p. 4).

The use of our store of cultural schemas is of seminal value for the continuation of our daily lives within a cultural community and to interpret the meanings that are offered to us by that community through different cultural means (D'Andrade, 1992, p. 34). Cultural schemas

are seen as one of the three interactive components of a culture, next to the other two, which are their public expressions and the resultant behaviours (Medin, Unsworth & Hirschfield, 2007, p. 618). People form cultural schemas when they experience public cultural artefacts, such as buildings etc., and they produce new public cultural artefacts when they express their own cultural schemas (Shore, 1996). Thus, having the necessary cultural schemas becomes indispensable in constructing a meaningful relationship with the architecture and built environment that we inhabit.

As the research on design cognition shows, architectural types are seen as a part of this store of cultural schemas. Being the cultural attributes that are shared by a society, types behave like cultural schemas on the cognitive level, assisting both the interpretation of incoming architectural information and also the production of new designs (Oxman, 1990, p. 2-8). In architectural theory, type is defined both as an abstract conceptual form, and also as a cognitive facility, which functions as the context for systemic action based on categorization (Habraken, 1985, p. 40). In a more comprehensive manner, type is defined as:

> "…the concept which describes a group of objects characterized by the same formal structure. It is neither a definite spatial diagram not the average of a serial list. It is fundamentally based on the possibility of grouping objects by certain inherent structural similarities. It might even be said that type means thinking in groups." (Moneo, 1978, p. 23)

As stated by Petruccioli, the process of elimination that leaves only the common elements that belong to that group makes type "a schema and a collective product that is shared both by the architects and the community they serve to." (Petruciolli, 1998, p. 11). As Quatremere de Quincy also states, type is "neither a concrete image of something that can be copied directly, nor it is a definite form, but it is a schema or the outline of a form, which acts as the abstract structure used for spatial articulation" (cited in Argan, 1996, p. 240, 244). As Argan indicates, architectural type appears in this sense as a 'schema of spatial articulation', which has been shaped as a 'response to a totality of practical and ideological demands' of a society (Argan, 1996, p. 246).

In the interpretation of architectural products, types act as the initial cultural schemas that control the mapping and understanding of new information. Using them as the preliminary frames of reference, our minds compare and match the new information into the existing schematic structure of types in order to understand it with the least information processing effort (Tesar, 1991, p. 166). As Shore describes, they act as nonlinguistic cultural schemas of a society, by working as the visual image models of a culture (Shore, 1996, p. 56-

65). As cultural schemas help us to communicate over shared images and ideas in a society, types enable us in this sense to make sense of the built environment around us based on the shared cultural information that we have.

Conclusion

The results of the discourse analysis show that architectural types work as the cognitive counterparts of architectural culture and in culturally stable and locally isolated environments their use in architectural design could be an effective cognitive tool to form cultural continuity therein and to keep a sustainable cultural milieu. As Tesar notes, types offer cultural sustainability by keeping the degree of change from getting out of hand and hold the promise to reunite the world of social meaning and the world of architecture in a way that depends on the 'sharing of images'. (Tesar, 1991, p. 165).

References

Argan, G. C. (1996). On the typology of architecture. In K. Nesbitt (Ed.), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995* (pp. 240-248). New York: Princeton Architectural Press.

Axelsson, R., Angelstam, P., Degerman, E., Teitelbaum, S., Andersson, K., Elbakidze, M. & Drotz, M. K. (2013). "Social and Cultural Sustainability: Criteria, Indicators, Verifier Variables for Measurement and Maps for Visualization to Support Planning". *AMBIO*. 42 (2): 215–228. doi:10.1007/s13280-012-0376-0.

D'Andrade, R. (1992). Schemas and motivation. In R. D'andrade & C. Strauss (Eds.), *Human motives and cultural models*. Cambridge: Cambridge University Press.

Habraken, N. J. (1985). *The appearance of the form: four essays on the position designing takes place between people and things*. Cambridge, MA: Awater Press.

Hall, S. (1997). *Representation: cultural representation and signifying practices*. London: Sage Publications.

Holland, D. & Quinn, N. (1987). Culture and cognition. In D. Holland & N. Quinn (Ed.s), *Cultural models of language and thought*. Cambridge: Cambridge University Press.

Hylland-Eriksen, T. (2001). *Small Places – Large Issues*. London: Pluto Press.

Johnson, M. (1987). *The body in the mind: The bodily basis of meaning, imagination and reason*. Chicago: University of Chicago Press.

Lawrence-Zuniga, D. L. (1997). Studying culture and history in exotic places and at home. In G. Moore & R. W. Marans (Ed.s), *Advances in environment, behavior, and design*, volume 4. New York: Plenum Press.

Moneo, R. (1978). On typology. *Oppositions*, 13:23.

Oxman, R. E. (1990). Prior knowledge in design: a dynamic knowledge-based model of design and creativity. *Design studies*, 2(1), 17–28.

Petrucciolli, A. (1998). *Typological process and design theory*, MA: Aga Khan Program for Islamic Architecture.

Shore, B. (1996). *Culture in mind: cognition, culture and the problem of meaning*. Oxford: Oxford University Press.

Soini, K. & Birkland, I. (2014). "Exploring the scientific discourse on cultural sustainability". *Geoforum*. 51: 213–223.

Tesar, P. (1991). The other side of types. In G. Rockcastle (Ed.), *Type and the impossibility of convention*. Minnesota: University of Minnesota.

Wertsch, J. (Ed.). (1985). *Culture, communication and cognition: Vyogotskian perspectives*. Cambridge: Cambridge University Press.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

User Perception and Orientation in the Museum Designed by Re-Functioning: Erimtan Archeology and Art Museum Example

Şükran Büşra ÜMÜTLÜ[1]

[1]*İnterior Architecture and Environment Design, TOBB Economy Technology University, Ankara, Turkey, sumutlu@etu.edu.tr*

Abstract: Throughout history, constructs continue to exist for human using. It is seen that the structures which were not abandoned without continuing these qualities of life, or those which are not striving to keep up after the period in which they were constructed, have lost their lives by succumbing to the conditions over time. For this reason, the designers are aiming to maintain the living conditions of the structures and to re-function in order to provide more efficient space for the user and to protect the historical value and heritage that the structure carries. Re-functionalized spaces go through a design transformation and function as a space fiction. The purpose of this study is to analyze the user perception and orientation of this fiction by observing on the spot and to transmit the results of this observation graphically and literally through the Erimtan Museum which is located in these places.

Keywords: Re-Functioning; Conservation of urban heritage; Restructuring; İnterior Orientation; Museums

Introduction

To briefly describe the re-enactment of the scope of this work and to address the regeneration of the structure, and in this title, especially in this context, the orientation of the museum to the museum, taking into account the spatial arrangement of the museum space. When we look at the sources that refer to the orientation of museum spaces and interior space, we can see that it has been studied in a very wide range. Combining this coverage with re-functioning and restricting it to the Erimtan Museum is a distinctive feature of this work.

Methods

The study is based on qualitative observation as a method. This reconstructed museum has been linked with design and construction, and the routes it has observed in the museum during the day of the visit, which it has kept for a day, have been observed.

Findings and Discussion

First, the concept of perception in the space has been investigated. The study examines the perception and orientation in museum spaces. For this reason, the concept of re-functioning has been researched and it has been examined what kind of situations it covers and what it aims. Factors affecting direction of museum spaces were examined; It is seen that Plan Editing and Affect, Effect of Art Works, Impact of Individual Differences, Influence of Sign Systems

(Akgün,2011). When the last section is reached, the Erimtan Archeology Museum located in Ankara, which was created by re-functioning, was dealt with.

The museum's visitors on a Saturday were examined, photographed, and schematized taking into account the constant and variable exhibition portions and the design of the spatial fiction, the drawings and the focus on the orientation.

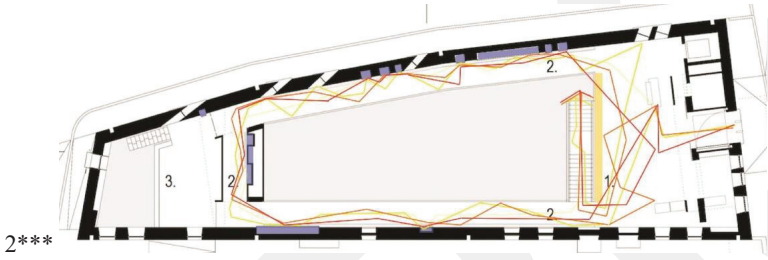


Figure 1.

Visitors' floor-to-floor orientation is shown by the frequency of use with colors.

4. to 1. Less to More.

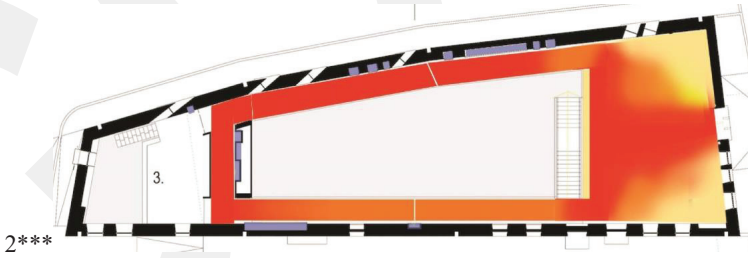


Figure 2.

The density of the orientation areas on the ground floor is transferred with dark colors. When we look at the orientation areas, not only the exhibition spaces but also architectural

openings are attracting interest from the visitors. The 2 *** plan schematically shows the most viewed and attracted and less monitored areas.

Conclusion

Restructuring is necessary for building sustainability and conservation of cultural heritage. One of the reasons for the retrofitting of old structures is to transfer both the old and the new to the future, and to ensure the continuity of the environmental silhouette in the position of this structure. In addition to designing these spaces for different functions, it is also important for which function and how they are designed. Mirrors and exhibition spaces, interior fixture, lighting quality; accurate detection and orientation. In this way, not only the correct orientation but also the correct perception are provided for the visitor. Considering the behavior of the users, we can see that more works are realized as the areas where the fixed exhibitions are more integrated with the space frame. With this work, we realize that the focus is not only visually focused, but also auditory and kinesthetic.

References

Akgün, E. (2011). Müzelerde Mekan Kurgusunun Algı ve Yön Bulmadaki Etkisinin incelenmesi . İstanbul Teknik Üniversitesi, İstanbul.

Altan, İ. 1993. Mimarlıkta Mekan Kavramı. İstanbul Üniversitesi Psikoloji Çalışmaları Dergisi, 19(1):78-88

Aslan, V. 2015. İç mekanda Algı. İnönü Üniversitesi Sanat ve Tasarım Dergisi, 2007(4):35-45

Aydıntan, E. 2001. Yüzey Kaplama Malzemelerinin İç Mekan Algısına Anlamsal Boyutta Etkisi Üzerine Deneysel Bir Çalışma. Karadeniz Teknik Üniversitesi, Mimarlık Anabilim Dalı, Yüksek Lisans Tezi, Trabzon.

Balık, D., 2009. Çağdas Sanat Müzelerinde Yeni Mekan Deneyimi, İTÜ Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, İstanbul

Dommelen. D.B.V. 1971. Designing and Decorating Interiors. John Wiley & Sons Inc, 282 pp

Garip, E. (2003). Mimari Mekanlarda İçeride Olma Deneyimi Yön Bulma ve Oryantasyon. İstanbul Teknik Üniversitesi, İstanbul

Göler, S. 2009. Biçim, Renk, Malzeme, Doku ve Işığın Mekân Algısına Etkisi. Yayınlanmamış Yüksek Lisans Tezi. Mimar Sinan G.S.Ü. Fen Bilimleri Enstitüsü, İstanbul.

Güney, D. 2013. Endüstriyel Miras Yapılarının Yeniden İşlevlendirilme Süreci ve İstanbul Tuz Ambarı Örneği. Beykent Üniversitesi Fen ve Mühendislik Bilimleri Dergisi, 6(2):31-58

Hasol, D. 1990. Ansiklopedik Mimarlık Sözlüğü, Yem Yayın, İstanbul.

Hillier, B., 1996. Space is the Machine, Cambridge University Press

Kahvecioğlu, H. L., 1998. Mimarlıkta İmaj: Mekansal İmajın Olusumu ve Yapısı Üzerine Bir Model, İTÜ Fen Bilimleri Enstitüsü, Doktora Tezi, İstanbul

Kalınkara, V. 2001. Konutta İç Dekorasyon. Teknik Yayınevi, Mühendislik Mimarlık Yayınları.

Lord, G. D., Lord, B., 1999. The Manual of Museum Planning, The Stationary Office, London

Murakoshi, S., Kawai, M., 2000. Use of Knowledge and Heuristics for Wayfindingin an Artificial Environment, Environment and Behavior, 32, s. 756

O'Neill, J. M., 1991. Evaluation of Conceptual Model of Architectural Legibility, Environment and Behavior, 23, no.3

Özen, A. 2006. Mimari Sanal Gerçeklik Ortamlarında Algı Psikolojisi. Bilgi Teknolojileri Kongresi IV, Akademik Bilişim 2006, Denizli, ab.org.tr/ab06/bildiri/81.doc.

Passini, R., Arthur, P., 1992. Wayfinding- People, Signs and Architecture, National Library of Canada Cataloguing in Publication

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Collaborative and participative actions in design practices

Rosanna Veneziano[1*]

[1*]*Department of Architecture and Industrial Design, Aversa, Italy,*
rosanna.veneziano@unicampania.it

Abstract: In the last years, Design, in all its forms, operates with social issues, providing solutions to complex and changing demands that come from places, questions that have been (and are still) conditioned by significant social, economic, environmental modifications occurred in last millennium.

By the analysis of new forms of social organization and new ways of sharing knowledge, Design discipline has gone beyond its specialized nature, contaminating other areas, expanding its limits, letting grow the community contributing to the project. The research and social projects have been developed to enforce strategies and actions aimed to have a social impact for specific territories. The network of actors involved in the co-design process was involved in developing design ideas, sharing and validating the process steps, and above all, in a view of sharing a common goal.

The paper reports the design panorama related to co-design process, to social innovation, to social design practices and to the territorial benefits linked to experience bottom up.

Keywords: social design; co-design; social innovation

Introduction

In the past few years design culture has undergone a deep evolution, affected by the cultural economic and social transformation of our world. The growing activism of design in identifying new narrative languages puts at the heart of the project the definition of solutions to specific problems as well as, more importantly, the creation of collective spaces, strategies and actions. The alternative scenarios devised to respond to the criticalities of our time are inclusive environments in which to develop projects and reflections about the fields of action of design.

The evolution of the designer's role is a very much debated issue in the current scientific discourse, new skills and actions are being introduced, also thanks to the strengthening of participatory design methods and open production systems. E. Manzini tackles the dilemma concerning the designer's contribution in the framework of diffuse design in which non-expert people are able to design, create enterprises, implement strategies, and produce. At a first glance, the designer's role might appear to be limited and lessened, but in fact it is implemented by the ability to manage, to facilitate, and to direct complex design processes. "Everybody is endowed with the ability to design, but not everybody is a competent designer and a few become professional designers. (…) the two poles of diffuse design and expert design, where diffuse design is put into play by non-experts, with their natural designing capacity, while design

experts are people trained to operate professionally as designers, and who put themselves forward as design professionals" (Manzini, 2015).

It is probably not necessary to set limits to the action of the designer, who has acquired the ability to adjust skills to the contexts in which he is working and to implement the skills needed for managing the creative process.

The contexts in which projects related to social issues develop give life to different interpretations of the discipline of design as design for social innovation, social design, design activism – each with its peculiarities and specific features. They are different narrations about how to view the world of objects, which ask questions on the critical aspects of our time and are able to design scenarios in which inclusion, participation, sharing and sustainability are only a few of the key words and where the assessment of the social impact of the solutions adopted is a significant part of the project (Manzini, 2014).

Open design methodologies

The application of shared design methodologies is closely related to two terms - collaboration and participation, which, despite being often used as synonyms, in fact describe two different intentions relating involvement in the creative process that includes designers as well as other subjects.

The process that led from participation to collaboration has been experimented with over the years through the definition of design approaches, of their relative instruments and their application to different design areas.

Olander states that participation may be understood as the more well prepared and scripted engagement. An engagement where participants usually commit, with various degrees of resistance, to become part of a research project, whereas collaboration implies more of a mutual engagement and reciprocal curiosity that caters for multiple concerns. Collaborative engagements entail an on going negotiation of what partners are collaborating about, as well as of how collaboration can take place (Olander, 2016).

The different degrees of involvement of communities in the process on issues of specific interest, and the necessary mediations between partners require a complex management. This job, however, is carried out in the awareness that such participatory actions are also a vehicle for the knowledge, promotion and growth of territories.

Starting from the co-design methodology that entails tangible design outcomes at every step (Sanders & Stappers, 2014) as well as the involvement of institutions, communities, experts and users included in the creative process, participatory design processes are multiplying today: in them collaboration, rather than participation in the process, is meant as a complex engagement subject to continuous mediations. The collaboration of participants entails a stronger sense of belonging to the project and a greater satisfaction in taking part in devising shared solutions.

Thus participatory design approaches have been specially effective in the field of public services, in health care, mobility and citizenship management – areas in which products, services and strategies have been defined through the interpretation of experiences, needs, purposes and visions of the future.

Participatory design is about involving the people who will be affected by design outcomes in the design process from start to finish. Co-design, or co-creation, describes a process by which collective creativity is leveraged to arrive at design solutions. Now, a more ecological, networked approach is emerging. Designers no longer see themselves at the top or centre of the creative process, but at the edge of complex, adaptive systems in which diverse participants interact with constantly changing ideas, events and forces (Slavin, 2016).

Experimentations regarding the building of the relational and physical environment in which participatory design activities develop has led to choosing spaces meant as safe places in which to set up peer-to-peer, rather than hierarchical relations. Hence the need, on the one hand, to develop a common language that may facilitate dialogue provided with rules, codes and communicative artefacts and, on the other hand, to imagine a space with specific features in which to arrange meetings, conversations and workshops.

As McMillan and Chavis (McMillan, 1996) describe in their texts, the psychological factors that consolidate the sense of community are Belonging, Power, and Amiability: Belonging is viewed as inclusion into a group; Power is considered as the influence of the community, which, as it grows, has an impact at several levels – real, symbolic, and imaginary – and causes the growth of personal value and self-esteem; finally, Amiability is meant as the pleasantness of relations with members of the community and with other communities.

Conclusion

The reflections above highlight the effectiveness of shared design paths in terms of participation, affection and involvement, as well as the effectiveness of actions that bring together the realities of any given territory in the learning process and in the test of projects.

The experience on the participatory design field, exchange with communities, the social commitment of designer is able to greater knowledge of the local contexts. The design research path has thus been enriched by new elements, namely those linked to the experience of the individuals involved in the design activity. Design sharing paths aim at experimenting with research activities in the territories, sharing and conveying ethical and sustainable values, and working in the social sector that should be involved in a mutual exchange of competences and experiences.

References

Manzini, E. (2015). *Design, when Everybody Designs. An Introduction to Design for Social Innovation*. Cambridge MA: MIT Press.

Manzini, E. (2014). Making things happen: Social innovation and design. *Design Issues* (30), pp. 57-66.

McMillan, D. (1996). Sense of community. *Journal of community psychology*, 24, (4,3) pp. 315-325.

Olander, S. (2016). From participation to collaboration: open innovation as place making. In *Open design for E-very-Things proceedings Cumulus* Conference, Cumulus Working Papers 33/16, pp. 291-296. Hong Kong Design Institute 22-24 November, 2016.

Sanders, E. B-N, Stappers, P. J. (2014). Probes, toolkits and prototypes: three approaches to making in codesigning. *International Journal of CoCreation in Design and the Arts* 10 (1). Pp. 5-14. http://dx.doi.org/10.1080/15710882.2 014.888183.

Slavin, K. (2016). Design as Participation: a consideration of design as a form of participation in complex adaptive systems. *Journal of Design and Science*, Retrieved from http://jods.mitpress.mit.edu/pub/design-as-participation.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Crisis of creative class: Hamburg and Naples right to the creative city

Federica Vingelli[1*], Giuseppe Guida[2]

[1] *Architecture department, Federico II University of Naples, Italy, fe.vingelli@gmail.com*
[2] *Architecture department, University of study of Campania "Luigi Vanvitelli", Aversa, Italy, giuseppe.guida2@unicampania.it*

Abstract: During the transition to the post-Fordist period the creative city has meant the research of new solutions to the urban issue, in order to project cities into a global network in which competition has a central role in producing of culture, tourism and attracting international financial and human resources. After about twenty years since the birth of the definition of "creative class", doubts have slowly emerged on the positive effects that these flows have generated on the geographies of spatial justice. The paper retraces the strategic steps that the city of Hamburg and Naples have crossed to affirm their role as creative cities and reconstructs the differences between the institutional level and the urban social movements involved in the struggle for a new right to the city and, that are able to influence creative urban policies and places.

Keywords: creative city; urban social movements; cultural sustainability.

> Creativity becomes an action divorced from its end; it becomes equivalent to innovation, no matter of what, no matter why, no matter with what result, constructive or destructive"; What is more creative than imagining that the creation of a better society? determining the direction of society, including of course the shaping of cities and the activities that go on within them ? So the right to the creative city is a right of all people to the production of a different society, a different city: a creative city that support inhabitants and give them the possibility to participate in the decisions that determine one's own life as an exercise of creativity, because no one could aspirate for creativity without, at least, minimum life's need satisfied
>
> The Right to the Creative City – talk - Peter Marcuse . September 19, 2011

Introduction

The crisis of the Fordist city and the reorganization of global production models (Harvey, 2013) has paved the way for the experimentation of new urban forms and dynamics, among these the creative city (Landry, Bianchini 1995) has meant the research of new solutions to the urban issue, in order to project cities into a global network in which competition has a central role in producing of culture, tourism and attracting international financial and human resources. After about twenty years since the birth of the definition of "creative class" (Florida, 2002), doubts have slowly emerged on the positive effects that these flows have generated on the geographies of cities spatial justice (Soja, 2009). Starting from

this background, the paper retraces the strategic steps that the city of Hamburg and Naples have crossed to affirm their role as a creative cities and reconstructs the differences between the institutional level and the urban social movements involved in the struggle for a new right to the city (Lefebvre, 1996 et al.). The study has its starting point in a previous research on the relations between international tourism and institutional programs of urban development in Hamburg, during which a dualism emerged with the aims, values, actions of local communities, that are now examinated also by explorations on the field in Hamburg places of radical participation (Paba, 2002) and interviews with privileged actors, after tracing, through the scientific literature on the subject, the profile of the crisis of the creative city as a post industrial myth.

The crisis of the myth of creative city

Globalization and growth of a neoliberal ideology in urban policies following the Third Industrial Revolution (Castells, 2014) has led to a new entrepreneurial (Harvey, 1990) development strategy of cities that, no longer able to draw on the central state funds, compete for the attraction of international financial and human resources typical of late capitalism (Russo 2011). According to Florida (2003), human capital was the creative class: the engine of a new economy based on exploitation of cultural production, art and innovation. On the one hand, many authors have advanced doubts on the causal link between the presence of the creative class and economic growth (Scott 2006), and many critics also invest the effects of urban and economic policies (Peck 2005) by the cities aspiring to be creative capitals: the social polarization of cultural workers, as well as gentrification of spaces are, in fact, topics not explored by Florida in tracing the effects of this new model of city but nowadays they emerge as fundamental questions of the struggle of Urban Social Movements (Fainstein, Fainstein 1985). The early USMs were highly politicized and with a deep anti-government orientation (Clarke and Mayer 1986): in the seventies and eighties they mainly focused on themes of division of labour, mechanisms of production and distribution of the wealth and have built nets of local actors against the logic of the city-enterprise, both in Europe and in the USA. The restructuring and globalization of the urban social composition, and the possibilities offered by the reorganization of local institutions (Ponzini, Rossi, 2010) governance led new actors, typically not involved in political struggles, to join the urban social movements, carrying a renewed position on urban policies, spaces, and on the field of cultural production: these are students, creatives, artists and those who should be the main

subjects of creative city's policies. From a passive condition theorized by Florida (being attracted by cities offering the best conditions to practice their creative professions) these metropolitan actors are today real active subjects, not only in opposing hegemonic projects, and therefore changing the urban meaning (Castells, 1983) but also able to modify places and orientate urban policies, as will be shown in the study case of Hamburg.

Figure 1. International festival for urban explorations in Hamburg on inclusive housing (das-gaengeviertel.info, 2016).

Study case: Hamburg right to the city

During the transition to the Post-Fordist city, Hamburg has experienced, as port and productive city, a profound reorganization that has affected both places and ways of production as well as the governance and geographies of the decision. Starting from the 70s, in fact, the emergence of containerization (Delponte, 2009), new navigation and transshipment techniques makes obsolete and no longer sufficient the historic port spaces and warehouses that, in Hamburg, were located along the north bank of the Elbe River. These

abandoned spaces become the engine of regeneration in the transition process to the contemporary city: places where the coherent strategic city planning brings together international transformation investments, big events and exhibitions, as well as tourism and culture production activities: in the Hamburg by Mayor von Dohnànyi, in fact, emerges the idea of the city as an economic subject in competition with others for the attraction of creative capitals and people, focusing on the market of culture, science and technology (Colombo, Navy 2016). First local opposition movements against the concept of city-enterprise (Harvey 1987) already appear during this period by actions of a strong group of squatters mainly located in the district of Altona, between the Rote Flora and Hafenstrasse: areas intimately connected the redesign of the waterfront and the forms of the city-corporation. They are still today at the center of the public debate and gathered under the name of "Recht auf Stadt" (right to the city). This is a network of actors, especially non-institutional, focused on defending citizens and migrants rights and quality of life against the logic and effects of gentrification (Smith, 2005) in town. Starting from 2000, and in line with the strategic document *Metropolis Hamburg growing city*, Hamburg urban marketing looks to sub-cultural production (Borén, Young, 2013) as one of the promotional tools for the city brand: today, for example, Rote Flora can be found on tourist guides and suggested as a characteristic place to visit. The urban social movements in opposition to the capitalization of the local sub-culture reacted using the same techniques of "guerrilla marketing", communication and events and, in 2009, supported the birth of the Gängeviertel (Novy, Colomb, 2013), whose logo is now widespread throughout the city and is a reference point for inhabitants, students, artists. In August 2009 self-organized groups of political activists, artists and interested planners and architects, just those who Florida had initially defined as the creative class, occupied an entire block in the center of Hamburg giving rise to the Gängeviertel, among the new and elegant glass buildings such as the Google headquarters or other international societies. Creatives entered the buildings during the initial phases of a speculative operation in order to stop it and to create laboratories, activities and spaces for creative people struggling in the name of the *right to the creative city,* and, in fact, convinced the administration to reacquire the buildings to public assets, in order to experiment with the activities of this new creative community. Instances of opposition to the creative model are now also present in the city's institutional forces that sit in the parliament of Hamburg: the environmentalist and left-wing party "Linksfraction", for example, reports an increase in the production of waste and atmospheric pollution due to the growing number of low cost airlines in the city airport, as well as cruise

ships in the port, and notices a lack of control on mass tourism devices such as air b & B (Jersch, 2016) and, through public discussions and party actions, works for tourism reorientation from a purely economic theme to a common city interest .

Figure 2. Gängeviertel in the core of the business center of Hamburg (elaboration of a Google Earth image 2018).

Study case: the former Asilo Filangieri in Naples

The city of Naples is the capital of a metropolitan area of more than 3 million inhabitants and It is, to date, experiencing the contradictions between the post 2008 crisis economic and social effects and an increasing globalization and turistization . Since the election of the new mayor in 2011, culture and tourism have become key words for new urban development strategies together with openings towards the citizens participation to city decisions. This has paved the way for numerous experiments of innovative management of "commons" (Piscopo, Buonanno, 2017), including the former Asilo Filangieri (Micciarelli, 2014) in the Historic center. This experience started in 2012 with the occupation of an abandoned public building by students and creatives, and it becomes an opportunity to elaborate not only creative activities but a real open space where a shared management practice of a public space is consolidating and is dedicated to culture as a civic use: the public building is no longer assigned to a private subject, but open to all those who work in the field of art, culture and entertainment (City of Naples, 2012) that, through a public assembly, share the projects and cohabitate spaces. the process of designing this new regime for the use of commons involved

the Municipality in designing more than 10 official measures and several months of public work tables with citizens.

Conclusion

An increasing number of creative cities are developing integrated visions that manage to hold urban development (Chalkley, Essex 1999) strategies together with environmental sustainability objectives. These strategies try to make the possibilities offered by the global market and European policies interact with local needs: good policies results, for example, concern European programs or big international events that are used to regenerate suffering parts of cities, but the field of experimentation of new social geographies and multilevel co-decision practices is still only superficially explored (Carta 2011). Although regeneration was, in fact, one of the main driving force of creative city formation, it seems to have been more interested in increasing the cities attractiveness rather than the social inclusion (Ponzini, Rossi 2010) of inhabitants. They ask for their need to be admitted to the creative city's governance agenda and have consequently organized themselves into counter-creativity networks, still showing capability of generating culture and innovation that had been the manifesto of creative city and can be one of the ways out of the crisis of the creative class.

Acknowledgments: Authors are grateful for the effective contribution to the research to Prof. Daniela Lepore and Prof. Alessandro Sgobbo of the Department of Architecture of the University Federico II of Naples and the Prof. Dirk Schubert of the University of HafenCity.

References

Borén, T., & Young, C. (2013). Getting creative with the 'creative city'? Towards new perspectives on creativity in urban policy. International Journal of Urban and Regional Research, 37(5), 1799-1815.

Brenner, N., Marcuse, P., & Mayer, M. (Eds.). (2012). Cities for people, not for profit: Critical urban theory and the right to the city. Routledge.

Carta, M. (2011). Città Creativa 3.0. Rigenerazione urbana e politiche di valorizzazione delle armature culturali.

Castells, M. (1983). The city and the grassroots: a cross-cultural theory of urban social movements (No. 7). Univ of California Press.

Castells, M. (2014). Technopoles of the world: The making of 21st century industrial complexes. Routledge.

Chalkley, B., & Essex, S. (1999). Urban development through hosting international events: a history of the Olympic Games. Planning perspectives, 14(4), 369-394.

City of Naples, (2012) Delibera di Giunta n. 400 del 25/05/2012
Claire Colomb, Johannes Navy. Protest and resistance in the tourist city -2016
Colomb, C., & Novy, J. (Eds.). (2016). Protest and resistance in the tourist city. Routledge.
Delponte, I. (2009). Evoluzione degli spazi portuali e strumenti di pianificazione. Aracne.
Fainstein, S.S. and N.I. Fainstein (1985) Economic restructuring and the rise of urban social movements. Urban Affairs Review 21.2, 187–206
Florida, R. (2002). The rise of the creative class. The Washington Monthly, 34(5), 15-25.
Florida, R. (2003). Cities and the creative class. City & community, 2(1), 3-19.
Jersch, S. (2016). Interview with the member of the Hamburg Parliament for the DIE LINKE parliamentary group, Hamburg, 05/2016.
Landry, C., & Bianchini, F. (1995). The creative city (vol.12) Demos.
Harvey, D. (2013). Il capitalismo contro il diritto alla città: neoliberalismo, urbanizzazione, resistenze. Ombre corte.
Harvey, D. (2012). Rebel cities: From the right to the city to the urban revolution. Verso Books.
Harvey, D. (1990). Flexible accumulation through urbanization reflections on" post-modernism" in the american city. Perspecta, 251-272.
Lefebvre, H. (1996). The right to the city. Writings on cities, 63181.
Micciarelli, G. (2014). I beni comuni e la partecipazione democratica. Da un 'altro modo di possedere'ad un 'altro modo di governare'. Jura Gentium *XI, 58.*
Mitchell, D. (2003). The right to the city: Social justice and the fight for public space. Guilford Press.
Novy, J., & Colomb, C. (2013). Struggling for the right to the (creative) city in Berlin and Hamburg: new urban social movements, new 'spaces of hope'?. International Journal of Urban and Regional Research, 37(5),
Smith, N. (2005). The new urban frontier: Gentrification and the revanchist city. routledge.
Paba, G. (2002). Movimenti urbani e partecipazione 'radicale'. Reti di città e esperienze di partecipazione in Toscana: schedatura e interpretazione critica, (22), 23.
Peck, J. (2005). " Struggling with the Creative Class", International Journal of Urban and Regional Research, Volume 29.4, December 2005, pp. 740–770
Piscopo, C., & Buonanno, D. (2017). ARCHITETTURA E BENI COMUNI. LA PROSPETTIVA DEGLI USI CIVICI. TECHNE: Journal of Technology for Architecture & Environment, 14.
Ponzini, D., & Rossi, U. (2010). Becoming a creative city: The entrepreneurial mayor, network politics and the promise of an urban renaissance. Urban Studies, 47(5), 1037-1057.
Russo, M. (2011). Città–Mosaico. Il progetto contemporaneo oltre la settorialità, Napoli, Clean Edizioni.
Soja, E. (2009).The city and spatial justice. Justice spatiale/Spatial justice, 1, 1-5.
(Ponzini, Rossi, 2010

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

A bio-based grown material for living buildings

Antonella Violano[1*], Salvatore Del Prete[2]

[1*]*DADI, University of Campania "L. Vanvitelli", Aversa (CE), Italy, antonella.violano@unicampania.it*
[2]*Service Biotech s.r.l., Naples, Italy, info@sericebiotech.com*

Abstract: The idea of formal and functional integration between architecture and surrounding environment is exceeded to the achievement of material biodynamic integration. Technological innovation carry out a real revolution in building-environment relations. The contribution illustrates the results of an experimental research to produce grown bio-based thermal insulation, carried out in collaboration with industrial partners. The research takes conceptual inspiration from the study of a grown material, Ecovative, a biomaterial made with hemp or tremulous poplar straw and mycelia. The DADI research group is experimenting alternative use of different straws. The results of the experimentation have registered a highly adaptive response of the final material, fully in line with the Regenerative Design and Eco-social Design approaches, which emphasize the recovered dialectic connection between nature/environment/wellbeing and human beings.

Keywords: technological innovation; bio-based materials; regenerative architecture

Introduction

The more ambitious performances goals, the higher levels of needs, the more restrictive legal regulations define the parameters which size all human transformations (material or immaterial) in twenty-first century. In architecture field, the Wright idea of the building as an organic shape, based on natural relations and proportions, is evolving in a newer idea of a "living organism", based on the replication of natural dynamics. As the others scientific disciplines, the architecture is evolving in sector characterized by an in-depth research, experimentation, but especially by a mutual contamination with several models of: biology, physic, genetic. The metaphorical-biological approach by Philip Steadman (Steadman, 1988) is aimed to the research of coherence in each part of a whole. This concept can be interpreted as a criterion and a method to re-think the architecture, also in a metabolic and biological way. Thereby the idea of formal and functional integration between the architectural object and its surrounding environment (fundamental principle of bioclimatic architecture) is exceeded, until the achievement of material biodynamic integration. Therefore, technological innovation carry out a real revolution in building-environment relations. These are not based on the symbiotic behaviour of matter but on the co-evolutive one, that expresses the "cradle to cradle" approach. In so doing, the building itself lives and integrates, in a smart way, with ecological cycles in which it's inserted. The wise intersection between biology and technology allows to conceive a bio-inspired building organism, with an own constructive DNA. It is not only characterized

by an own shape, orientation and glass ratio and a specific performances supply, but also by the ability to live as an autonomous organism. The bio-design constitutes an added value compared with the current eco-oriented design, because it operates on a double level: the artificial imitation of natural processes and the integration of biological dynamics in systems, materials and components. The contribution illustrates the results of an experimental research to produce grown bio-based thermal insulation, carried out in collaboration with industrial partners (Service Biotech s.r.l.; SAIPAN srl; Nafco Italia srl), founder and providers of raw materials for the experimental phase.

Method and phases of experimentation

The research takes conceptual inspiration from the study of a grown material, Ecovative, a biomaterial made with hemp or tremulous poplar straw and mycelia. The DADI research group is experimenting with the alternative use of different straw (hemp - as a benchmark - Burley and Virginia tobacco, barley, durum and soft wheat) in order to test their hygroscopic, thermal, materic and functional performance.

The choice of alternative raw materials was dictated by two different considerations. From the ecological point of view, the "pro-sumer" approach (Bresso, 1993) prefers the use of processing waste from local production, re-inserted as input in a new production process with zero environmental impact, minimum embodied energy and negligible carbon footprint. From the organic-functional point of view, the growth of mycelium and the speed of proliferation of hyphae depends on the different amount of lignin present in the straw used. The fundamental elements of the production process are, in fact, the mycelia of the pleutorus on millet, which is the biotic component of the cultivated material, a self-assembling biological binder, as natural gap filling glue. The experimentation was divided into six phases, as shown in Figure 1.

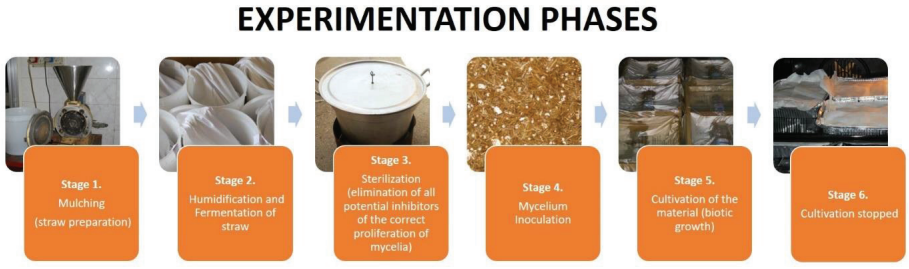


Figure 1. The six phases of experimentation (Source: A. Violano and D. Di Fonzo).

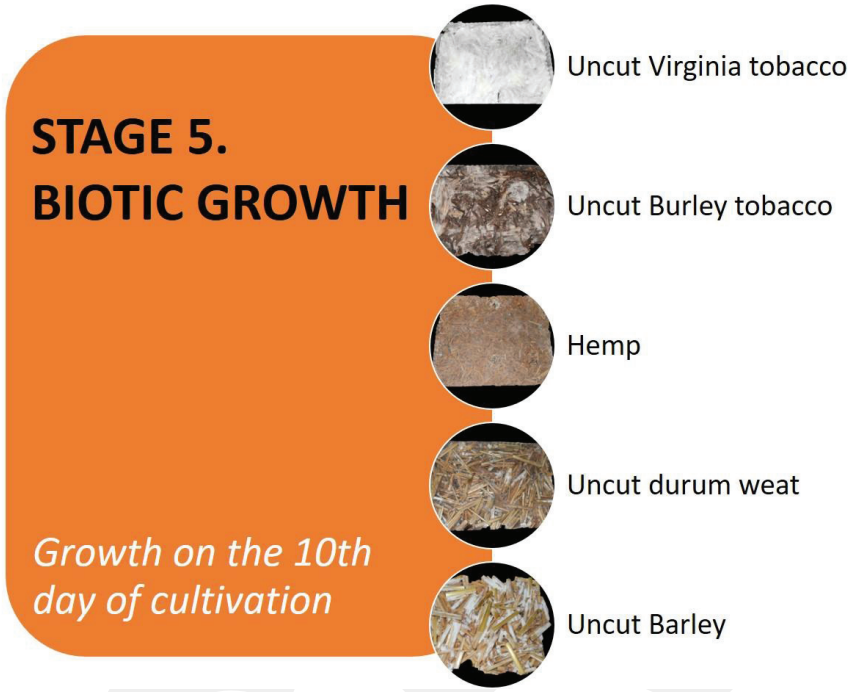


Figure 2. *M*ycelium growth on the 10th day of cultivation in samples (Source: A. Violano and D. Di Fonzo).

The last two stages (V. Cultivation of the material - biotic growth; VI. Cultivation stopped) are the most crucial in the production process. In fact, during the fifth phase, considerably different results can be recorded in relation to the temperature of the samples and the humidity of the compounds (water absorbed and/or retained by the fibres). After only a few days, the active biotic presence was already appreciable. (Fig. 2)

In the sixth phase, the level of biotolerability of the final product is defined, because in this phase there is the block of proliferation of hyphae and sporulation of the mycelia.

In collaboration with Service Biotech, the proliferative characteristics of seven different samples were analyzed.

Evaluation and discussion of the relevance of the final phase

The vegetative hyphae are the main part of the Mycelium and are basically composed of tubes whose individual cells absorb nutrients and reproduce asexually. The aerial hyphae are specialized hyphae which act as support to the spores (Fig.3-4) and extend upwards with respect to the mycelium.

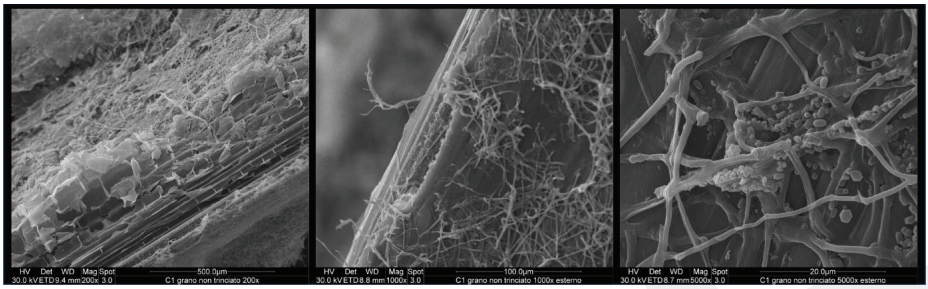


Figure 3. External mycelium proliferation on uncut wheat sample. A i.e. Mycelium; B Aerial Hyphae; C basal Hyphae. (Source: A. Violano and S. Del Prete)

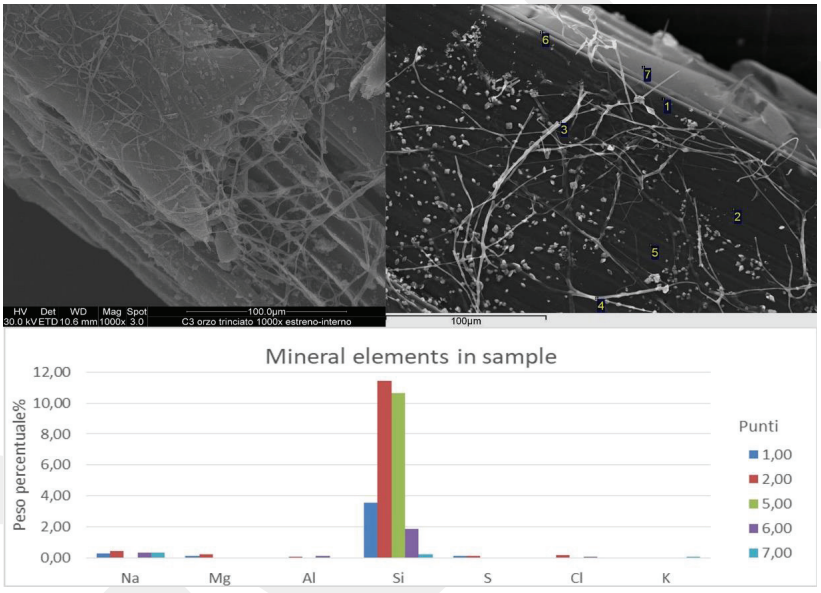


Figure 4. A Hyphae and spores on cut burley sample; B graphic expression of mineral elements of figure C; C expressions of Mineral elements in that sample; (calculated with EDX Tecnique) (Source: A. Violano and S. Del Prete)

The sixth stage is crucial to ensure the biological stability of the final product. Before sterilizing, it must be known:

- Contamination charge;
- Thermal death time, i.e. the lowest temperature required to break down the biological charge, depending on the sterilization method used;
- Time required to kill all the micro-organisms present, which varies in relation to the contaminating charge and the thermal conductivity of the material to be treated.

Heat is considered the safest, quickest and cheapest means for any material that is not thermolabile. The sterilization time decreases with increasing temperature.

The heat can be used essentially in two ways: dry (incineration and Pasteur Hot Air Oven) and moist (boiling, flowing steam and autoclave - saturated steam). In both cases, the biocidal action of heat derives from the oxidation of cellular constituents with irreversible denaturation of enzymes and protein structures. The sensitivity of the heat varies according to its content in H2O: the higher level of H2O gives more sensitive reaction of the microorganisms to the heat.

In this experimentation, the standstill of the cultivation was done with dry heat, but the best method is the exposure to flowing steam. It is possible using an unclosed autoclave (Koch's or Merke's pot), applied for Tyndalization (30' 1 time/day for 3-4 days), with saturated steam, dry, under pressure and the base cycle is 121° C for 15' at 1 atmosphere.

This procedure guarantees the stagnation of the sporogenic structures and hyphae, blocked at the peak of the biomaterial growth process. In this way, the excessive presence of spores in DADI-made samples becomes clear. In fact, the process of steam sterilization, flowing and/or saturated, is the technique that best guarantees the elimination of the sporogenic forms that characterize the mycelium: at low temperatures, a better management of the biomaterial is guaranteed. We exclude the use of sterilizing/fixing chemical agents in the treatment of biomaterials, such as chlorhexidine, which fixes the fruit, but does not have an antisporiginal action.

Management of mycelium growth times and regulation of temperature and vapour pressure, optimal for sporogenous proliferation between 18°C and 32°C with a relative humidity of 65% (without air movements) are other important parameters. Therefore, increasing the temperature and/or humidity or reducing it will not allow the proliferation of the spores, a fast bath in chlorhexidine and/or gluteraldehyde (1%) for no more than 3 minutes would help to fix the sample, favouring its stasis and inactivating its probable contaminating action.

Conclusion

The value of this experimentation consists, therefore, in capturing the bio-evolutionary dynamics of this living raw material in order to design, with biological awareness, the components of the "mesh" to connect, combine, "cultivate", weave the bio-wefts in order to develop surfaces and volumes that can be parameterized in relation to the different performance requirements, with functions and performance characteristics for the construction sector.

(Violano, 2018) The results of the experimentation have registered a highly adaptive response of the final material, fully in line with the Regenerative Design (Attia, 2018) and Eco-social Design approaches, emphasizing the dialectic connection between nature/environment/wellbeing and human beings (Birkeland, 2002). If the entire design cycle follows the "Cradle to Cradle" approach (McDonough&Braungart, 2010), the synergistic relationship between the building and its surroundings increases, not only because of the balanced exchange of material and energy in and out of the building organism, but also thanks to the genesis and epigenesis of its materials. The material based on biology assumes, in fact, the behaviour of a real living being that interacts, adapts, evolves, protects and gets the maximum benefit from changing conditions. Thus conceived, the regenerative building uses the energy of the sun and uses the resources of the soil, produces oxygen and sequestration CO2, closes the water and waste cycle, breathes, adapts to different seasons, is built with natural materials (recycled and / or processing waste) which in turn will be recyclable and / or totally re-integrable into the natural life cycle at the end of their useful economic life.

The research on experimental innovative materials in biotechnology and engineering field suggests cutting-edge performances in terms of connected standard uses and appropriate functions. Therefore, will be the synthetic biology to design and realize new living materials, systems and components made up of algae, mushrooms and bacteria? Certainly, new scenarios are going to develop. Actually, according to most of people, they appear as utopias, but they are boosted by the engine of innovation and sustained by the "Environmental Friendly Behaviour" principle.

Acknowledgments: A.V. is the author of the paragraphs: Introduction; Method and phases of experimentation; Conclusion. S. DP. is the author of: Evaluation and discussion of the relevance of the final phase. Conceptualization, Methodology, Writing-Review & Editing, Supervision, A.V.; Investigation, Writing-Original Draft Preparation A.V. and S.DP.; Data Curation, S. DP. The DADI Research Group is composed by A. Violano (Coordinator), M. Cannaviello, D. Di Fonzo, L. Melchiorre, F. Verde, that carry out their work within the nZEB research group (http://www.architettura.unina2.it/ITA/ricerca/gruppo_ricerca.asp?gruppo=1).
Thanks to D. Di Fonzo for the collaboration in the preparation of samples.

References

Attia, S. (2018), Regenerative and Positive Impact Architecture, SpringerBriefs in Energy. Springer, Cham, SWZ

Bresso, M. (1993), Per un'economia ecologica, La Nuova Italia Scientifica, Roma, IT, pp. 43-58, 75-82

Birkeland, J.(2002), Design for Sustainability: A Sourcebook of Integrated Ecological Solutions, Earthscan Pubblications Ltd, London, UK

McDonough, W. and Braungart, M. (2010), Cradle to cradle: remaking the way we make things, MacMillan, London, UK

Oxman, N. (2012). Programming Matter: Architectural Design, Special Issue: Material Computation: Higher Integration in Mophogenetic Design. Volume 82, Issue 2, pages 88-95, March/April. Guest edited by Achim Menges.

Reed, B. (2009), The Integrative Design Guide to Green Building: Redefining the Practice of Sustainability, John Wiley&Sons Ed., New Jersey, USA

Steadman, P. (1988), L'evoluzione del design. L'analisi biologica in architettura e nelle arti applicate, tr. it. Liguori Editore, Napoli, IT

Violano A. (2018). Oltre la Materia: la sperimentazione di bio-based grown materials dai miceli, *TECHNE* n.16/2018 (in press)

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Ideology of Sustainable Architecture: A Critique

Onur Lami Yalman[1]

[1]*MArch Student in Department of Architecture, Middle East Technical University, Ankara, Turkey, yalman_lami@hotmail.com*

Abstract: The general consensus on Sustainable Architecture is that, it is *the* cure for the ecological crisis. However, neither sustainability, nor architecture exists in a vacuum, free of any connection to political struggle. Therefore, a thorough research must be conducted in order to uncover the roots of sustainability, and its relations to architecture. The objective of this paper is to form a critique of sustainable architecture, and propose an emancipatory ecological architectural praxis. Current understanding of nature can be defined as a bourgeois ideology shaped by Kantian dualism, directly influencing the mainstream definition of 'Sustainable Development' in the Brundtland Report, released in 1987. This ideology of nature brings with it a misguided sense of development which locates technology at its core. The *belief* that technology will solve all of the world's problems is a mere treatment of the symptom, whereas the real causes remain untouched. The paper analyses the problem of sustainability from three distinct points of view: Marxist, Eco-Socialist and Green Capitalist perspectives. As a result of this analysis, the paper aims to propose a radical and holistic approach to sustainable architecture, which is essential in forming a sustainable architectural praxis.

Keywords: eco-socialism; green economy; ideology; Marxism; sustainable architecture

Introduction

A suitable introduction to the topic of sustainability would be by explaining the idea of "mastery over nature", instilled by many scholars since the age of enlightenment. Whether it is radical ecology or green capitalism, the main concept they centre around is nature. In order to further the understanding of sustainability, we must understand what nature is in the first place.

There is a conceptual dualism predominant in the mainstream understanding of nature. The word *environment* is the perfect example of this dualist understanding. The word comes from French and the literal translation would be *surroundings.* Thus, places the human beings in the centre, creating the duality between humans and nature, *us* and *them.* This dualist approach to nature can be traced back to Kant in Western societies. As put by Neil Smith, "The contemporary bourgeois ideology of nature is built upon these philosophical dichotomies promoted by Kant" (Smith, 1984, p.12). The term sustainability builds itself on this objectified view of nature, glorifying science and technology, claiming that they provide the only way out of the ecological crisis. This paper aims to propose another understanding of nature, one which would allow us to define sustainable architecture in another light. To quote Güven Arif Sargın (2000):

> By moving away from the official perception of nature, one should […] locate the meanings of emancipatory nature in spatial practices. […] The emancipatory transformation of environment and its spatial practices in everyday life are now believed to generate a sphere of autonomous action within the constraints of the present system. (p.43)

Methods

In order to elaborate the meanings attributed to sustainability, three different paradigms will be analysed: Liberal, Eco-socialist and Marxist paradigms. By analysing these paradigms, their implications for sustainable architecture will be derived. After the ideological nature of sustainability is established, the basis for an emancipatory spatial praxis will be provided.

Findings and Discussion

Definition of sustainability presents itself as a problem. A green future is mandatory for our survival. However, the question of how this will be achieved causes disagreement among people. Companies are producing *green* goods. Architects are encouraged to build sustainably. The question is, if we were to convert to green without changing our methods of production and consumption, would it work? If we make all cars electric without changing their driving habits (i.e. sub-urban lifestyles, dependency on automobiles etc.) does that work towards a green solution. What about architecture? Building a sustainable mega-structure, an inherently unsustainable typology, really mean anything? Sustainable luxury villas, green shopping malls, so on and so forth. Can all this work without changing our habits? Assuming the answer negatory, can this alteration of our production and consumption give way to a sustainable emancipatory praxis in architecture?

Three distinct perspectives catch the eye in the topic of sustainability and ecology. The first one is the liberal sustainability perspective, which is also the dominant paradigm of contemporary political economy. A change is necessary, either gradual or sudden. The liberal approach goes for the gradual change route. According to this view, any step taken towards sustainability is a positive step. These small steps seem to be in harmony with capitalist interests and tend to commodify sustainability itself. For instance, the sustainable luxury villa is a step towards profit, rather than ecological concerns. With the urgency of the ecological crisis, the other two paradigms go for a more radical route.

As a natural response, Ecosocialists and Marxists locate themselves on the opposite pole of green liberal paradigm. However, this does not mean there is a complete harmony between the each other. Ecosocialism defined by Michael Löwy (2005), the founder of Ecosocialism is:

> [Ecosocialism] is a current of ecological thought and action that appropriates the fundamental gains of Marxism while shaking off its productivist dross. For ecosocialists, the market's profit logic, and the logic of bureaucratic authoritarianism within the late departed actually existing socialism, are incompatible with the need to safeguard the natural environment. (p.18)

John Bellamy Foster (2017) inspects Eco-socialism in two stages. First-stage Eco-socialists accept Marx's contributions to ecology up to one point, while finding it partial and criticizing the productivist approaches they entailed. Second-stage Eco-socialists (Marxists) on the other hand, emphasize the methodologic importance of Marx's value and commoditization theories in developing a critical approach to ecology. In other words, orthodox Marxist ecologists refuse the Eco-socialists' attempt to redefine Marx's views on nature. As a result, they diverge into two different paradigms.

Foster (2017) also criticizes Neil Smith's claim of nature as an extension of the bourgeois ideology, based on dualism. For Neil Smith, this ideology of nature, therefore dualism must be opposed in order to form an argument against capitalist production of nature. This opposition to dualism is thus called 'monism' by Foster. As a result, we encounter a rift among the leftist ecological perspectives. Foster accuses Smith for being reductionist and idealist, hence, conflicting historical materialist ecology. What is required however, is neither dualism, nor monism, but dialectics, to acknowledge that natural processes can sustain without human input, while human-nature interactions have the capacity to transform one another. With this dialectic approach, one can easily argue the autonomy of nature from the social.

Conclusion

Advanced technology produced by capitalism has produced results against the labourers, peasants, merchants, for the majority of the society at every stage (Değirmenci, 2015). Founders of the Rhizome Collective and advocates of radical sustainability Scott Kellogg and Stacy Pettigrew (2008) explain the situation as following:

> [A] sustainable development program might propose installing a series of solar panels in a rural village. But solar panels only have about a 25-year life span, provided they are not damaged sooner, and after this period the panels are useless. Typically, these projects don't consider whether or not the village will have the technical expertise, access to tools or manufacturing, or money necessary to repair or replace the panels. Without these resources the village finds itself in a position of dependency. (p. xii)

Based on this example, it can be said that sustainable technologies have become extensive commodities that are consumed and not recycled, and the term sustainability have become an exploitation device under capitalism. This results in a commoditized sustainable architecture, which advocates sustainability for profit's sake, rather than sustainability for ecology's sake.

Capitalism inherently is incapable of ecologic sustainability. The need of capitalism for rapidly consumed, non-renewable, non-recyclable goods contradict with sustainability. It is apparent that any attempt to force capitalism to be sustainable deepens the crisis of capitalism (Engert et al., 2011). In order for sustainability and architecture to resist commoditization; an alternative to capitalist mode of production must be implemented. Otherwise, the architects' reaction to the ecological crisis will be a part of the problem and not the solution.

Acknowledgments: I would like to thank the dean of our department and my master's degree thesis advisor Prof. Dr. Güven Arif Sargın in guiding me through the study of the same topic.

References

Değirmenci, E. (2015, Novenber). Fikret Başkaya ile Söyleşi: Yeşil Kapitalizm ve Çıkış. *Birikim, 319,* 89-96.

Engert, K., Balta, E., & Doğan, A. E. (2011). Bu Sayıda: Ekolojik Krize Yanıtlar. *Praksis, 1*(25), 5-10.

Foster, J. B., Clark, B. (2017, August). Marksizm ve Ekolojinin Diyalektiği. *Monthly Review, 3,* 15-33.

Kellogg, S. T., Pettigrew, S., & Martinez, J. (2008). *Toolbox for Sustainable City Living: A do-it-ourselves Guide*. Cambridge, MA: South End Press.

Löwy, M. (2005). What is Ecosocialism? (E. Canepa, Trans.). *Capitalism Nature Socialism*, 16(2), 15-24. doi:10.1080/10455750500108237

Smith, N. (1984). *Uneven Development: Nature, Capital, and the Production of Space*. New York, NY: Blackwell.Sargın, G. A. (2000). *Nature as Space: (Re)understanding Nature and Natural Environments*. Ankara: METU Faculty of Architecture Press.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Sustainability of Rural Identity: Learning from Kıyıkışlacık's Self-Generated Experience[1]

Damla Yeşilbağ[1]

[1] *Department of City and Regional Planning, Çankaya University, Ankara, Turkey, damlayesilbag@cankaya.edu.tr*

Abstract: Sustainability of rural settlements highly depends on the unique rural identity which is created through their development process. In fact, rural identities are considered to be threatening by the increasing attention of touristic activities to these authentic settlements. As a result, it is crucial to take sustainability of rural identity into consideration in rural planning activities. However, indigenous formation of rural settlements creates their own dynamics and sustainability parameters vary accordingly. This paper aims to analyze a rural settlement – Kıyıkışlacık Village of Milas, Muğla – and understand the unique codes of continuity by its own experiences.

Keywords: rural identity; sustainability of rural settlements; Kıyıkışlacık

Introduction

Rural settlements have been attracting attention of citizens and tourism investors due to their natural and historic values as well as their authenticity[2]. However, touristic interests threaten rural settlements by uncontrolled implementations and overuse of their capacity which end up with irreversible loss of values (ICOMOS, 2001). As a result, conservation of natural, historical, social values and sustainability of the "identity" of rural settlements become essential considerations in rural planning practices.

Defining Rural Settlements & Rural Identity

Due to the interdisciplinary scope of rural studies, definition of "rural settlements" have various bases. Although population, economic activities and built environment are the common concepts, definitions varies in different countries. Such as, Canadian Legacy defines settlements having population under 10.000 as rural while U.S. as many other countries defines it over urban

[1] This study bases on an ongoing thesis named "Archeological Sites and Rural Settlements: Strategies, Policies and Guidelines for the Integrated Conservation of Iasos-Kıyıkışlacık (Muğla)" which is supervised by Assoc. Prof. Dr. Ufuk Serin in the graduate program of Conservation of Cultural Heritage at METU.

[2] The term "rural tourism" is a developing concept which have been experincing all over the world as well as Turkey. Various concepts are shaped through the unique values of different rural settlements. For instance, villages in Cappadocia region distinguish by geomorphological formations such as cave houses while Greek villages of Aegean coast attract attention by their cultural heritage. Likewise, nature sport opportunities directs people to Blacksea villages.

areas instead of specifying population (Hallstrom, Hvenegaard, Stonechild, & Dipa, 2017). In Turkey, settlements with population under 2000 are defined as villages. Yet more, the definition of village in legislation includes statements such as having common properties like mosque, school, pasture and people living in compact or sprawled houses with their fields, orchards and vineyards (Köy Kanunu, 1924). Even though the definition has a consideration of a lifestyle, population criteria is debatable. Instead of giving quantitative limitations, following basic common features should be emphasized in defining a rural settlement:

- A direct relationship with natural setting
- Existence of economic activities directly supplied by nature such as agriculture, animal husbandry fishery, forestry etc.
- A community with a shared knowledge

Although the given criteria are the common features of rural settlements, each and every settlement have its own "rural identity" which is formed indigenously by the unique relationship between nature and human beings (Asrav, 2015). The term rural identity refers to the results of this togetherness of a specific geography (topography, geological and geomorphological structure) and community as a built environment with tangible and intangible values.

Consequently, a rural identity is quite local and place-specific so that reading its codes is significant for the continuity of a rural settlement. For such a unique formation, generalized parameters of sustainability can be insufficient. This paper aims to experience the dynamics of sustainability in a rural settlement by analyzing its own process of establishment.

Methods

Aiming to analyze the continuity of a rural identity with the sustainability perspective, a case study is examined. In the case selection, the most important criterion was picking a site which corresponds the definition of "rural" in terms of features that was previously stated. Another crucial point was being a continuous settlement in terms of features consisting its rural identity such as economic activities and uninterrupted relationship with nature. With such a consideration, Kıyıkışlacık Village is selected as a conserved, continuous rural settlement (see Figure 1).

Kıyıkışlacık as a Continuous Settlement

Kıyıkışlacık Village is a small rural settlement within the boundaries of Milas province of Muğla. Due to being located South-Aegean costs, main sources that the nature provides is olive trees and fishery. The coastal village is 30 km's away from the nearest urban settlement Milas. The population of Kıyıkışlacık is 1650[3].

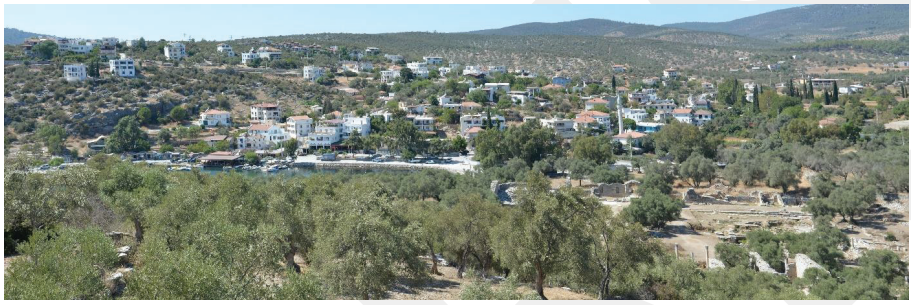


Figure 1. Current Settlement of Kıyıkışlacık
(Damla Yeşilbağ, September 2016)

The traces of the first settlement at Kıyıkışlacık dates back to Neolithic Period (Berti, 1993). Remains of the ancient city Iasos, which had its political and socio-economic existence more than 3000 years, still stands at the promontory that was separated by a narrow isthmus once (Serin, 2004). The modern village Kıyıkışlacık was settled on mainland which had hosted the Roman Necropolis of Iasos. Small amount of archeological remains belonging to necropolis can be experienced in today's settlement. By being an attraction point to touristic investors, secondary housing areas started to be constructed at the surrounding areas of village. As a result of such processes, today's Kıyıkışlacık Village has a heterogeneous structure consisting of these three different tissues (see Figure 2).

[3] This information bases on the population data of TUİK in 2017.

Figure 2. Aerial Photograph of Kıyıkışlacık
(Kayıhan Babacan's personal archive)

For the selected case, both primary and secondary researches are handled. Firstly, a secondary research was made in order to analyse and evaluate the historical development and socio-economic structure. Travelogues, excavation reports and published works of scholars are the basic sources regarding Kıyıkışlacık. Likewise, data related to ownership, maps and plans were provided by Milas Municipality. Following the literature research, a site survey was practiced to collect the data of built environment and socio-cultural assets. Data collection was handled in two different methods. Data of built-environment was collected through survey sheets and maps whereas socio-cultural structure was investigated through interviews with locals.

By analyzing the data provided by literature survey and collected data, main factors effecting the sustainability of Kıyıkışlacık are identified. In this identification process, local vales providing the continuity of rural identity are focused instead of existing parameters of sustainability.

Findings and Discussion

Analyzing and evaluating Kıyıkışlacık experience, continuity of 3 basic components of rural identity are designated as essentials of the sustainability:

Nature: Physical environment is the fundamental component of a rural setting by providing basic needs of a human being such as food and shelter. In fact, site selection for settlements depends on the advantageous geographical conditions. In Kıyıkışlacık case, the reasons why Iasos was located on the site were the protected peninsula in terms of military defense, fertile mainland and sea providing great opportunities for food (Benoit, 2011)[4]. Likewise, the mainland is still meeting the economic needs of settlement by being capable of olive production. Such a continuity in relationship with land clearly supported the sustainability of rural identity. However, the mass secondary housing projects started to take place on the fertile lands surrounding the settlement with an increasing interest of tourism. As a result, conserving the fertility of land and supporting the agricultural production with a well-thought site selection for touristic activities must be taken into consideration in planning processes.

Community: Existence of an active population is another basic element of the continuity of any settlement. By using the term "active", the relation with land and nature is emphasized. Importance of this relationship is experienced during the non-resident periods of Kıyıkışlacık[5]. Interviews show that, existing local community in Kıyıkışlacık root back to first families that arrived at ruined Necropolis of Iasos. However, young population leave the village for meeting the needs of education and employment. As a result, analyzing the reasons of migration should be clarified and policies aiming to prevent migration or support living in the settlement should be enhanced.

Built Environment: Being settled inside the chamber tombs on the mainland belonging to Roman Necropolis of Iasos at the beginning, a man-made structure had acted as a connector between different periods. Even using these chamber tombs as service units today proves the significance of built environment (see Figure 3). Likely, remains of ancient city Iasos is critical in terms of serving as a great source of building material at the first periods and serving as an alternative economic activity during excavations and touristic visits. In fact, with a great interaction with excavation team, locals are highly informed about the archeological site and remains. By having

[4] A surface survey that was held between 1988-2011 provides valuable information about the territorial history. According to the findings of Archeological Survey of the Gulf of Mandalya, the land was continuously cultivated and numerous rural settlements were formed on such fertile geography. Remains of tools used in agricultural activities, farms and water systems are great evidences of nature supporting the rural identity of the territory.

[5] After the demolition of Iasos, Greek families guarded the site for many years. Even such existence of locals was important due to being settled on chamber tombs remaining at mainland and a local lifestyle was contiued. However, population exchange between 1924-1929 caused an dereliction of the site and "rural life" was interrupted until families working a nearby farm were inducted to Kıyıkışlacık.

such powerful interaction with built environment, adopting and conserving the cultural heritage has created a strong connection with settlement. Thus, conservation of cultural heritage is fundamental in the continuity of Kıyıkışlacık settlement.

Figure 3. Remains of Necropolis in current settlement
(Damla Yeşilbağ, September 2016)

It can be concluded that sustainability of given components is needed in continuity of rural identity. However, the togetherness of these components are highly indigenous and dynamics of this togetherness differs in case by case. Due to this locality, each and every rural settlement should be analyzed through their own experiences of continuity and codes of sustainability should be generated accordingly.

References

Asrav, E. Ç. (2015). *Place and Community Driven Conservation and Empowerment in Historical Rural Landscapes: Principles and Strategies for Taşkale Village, Turkey*. Middle East Technical University.

Benoit, R. P. (2011). Mandalya Körfezi: Yüzey Araştırması Sonuçları ve Yeni Perspektifler. *Journal of Archeology & Art*, *139*.

Berti, F. (1993). Arslantepe, Hierapolis, Iasos, Kyme: Türkiye'deki İtalyan Kazıları. In F. Berti & E. Özbayoğlu (Eds.) (pp. 119–142). Ankara: Ankara İtalyan Kültür Heyeti.

Hallstrom, L. K., Hvenegaard, G. T., Stonechild, J. L., & Dipa, N. J. (2017). Rural sustainability plans in Canada: An analysis of structure, content and influence. *Journal of Rural Studies*, *56*, 132–142. https://doi.org/10.1016/J.JRURSTUD.2017.09.008

ICOMOS. (2001). *Heritage at Risk from Tourism*. Retrieved from https://www.icomos.org/risk/2001/tourism.htm

Köy Kanunu (1924, 18 March). Resmi Gazete (Sayı: 68). Retrieved from http://www.mevzuat.gov.tr/MevzuatMetin/1.3.442.pdf

Serin, U. (2004). *Early Christian and Byzantine Churches at Iasos in Caria: An Architectural Survey*. Rome: Citta Del Vaticano.

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Use-share service cases from Turkey: The impact of cultural traits

Can Uçkan Yüksel[1*], Cigdem Kaya Pazarbasi[2]

[1]*Industrial Design Department, Istanbul Technical University, Istanbul, Turkey, cuckan@gmail.com*
[2] *Industrial Design Department, Istanbul Technical University, Istanbul, Turkey, kayac@itu.edu.tr*

Abstract: Sharing is one of the basic behaviours of human being that is still active in several fields of life since the Stone ages. It's a habitual act that is learnt at childhood and blended traditionally in Turkish culture as well. Many sharing rituals have still been practiced in Turkish society in many different forms. In this study, we aimed to bring two sharing product service cases into light and indicate as examples of how the cultural traits in Turkey played role in these systems. By designing a more systematic service with the help of digital technologies, Library of Stuff (LoS) and BebeDonusum (Baby Stuff Freecycle) initiatives have ensured that habit and core spirit of sharing is alive even in the big cities. We have tried to point out the main motivations under these systems in different contexts and the reflections of these systemic differences to the outcomes.

Keywords: Sharing services; cultural influence; local traditions; service design

Introduction

Sustainability is a growing issue on the unsolved problems list in developing and underdeveloped countries as well which creates a ground for bigger social and environmental problems. Because the traditional economic systems have counter discourses for social and environmental sustainability problems and alternative daily life practices proliferated. Among these, product service systems have sustainability potential for the existing industrial, economic and societal organizations and for proposing a platform of sustainable change (Ehrenfeld, 2001; Manzini, 2006). Ceschin (2014) attributes the low levels of PSS examples versus accelerating unsustainability alerts in every constitution of community to their "radical innovation" motives and that's why they face regulative, industrial and cultural barriers.

In the last decade, sharing service systems in different fields (washing machines or cars, to hand tools and baby prams, etc.) started to proliferate with different motivations and platforms. As Hamari (2016) explains, there are some cases constructed from top-down to recede from "throw-away society" and its problem where some cases have grassroots approach with its societal benefits for the community.

Our selected cases of Library of Stuff and BebeDonusum recycle group have explicit similarities with other sharing system examples globally. Yet, they have differences at digitalization, application, use stages of the systems based on the local context that they are rooted from.

Methods

Firstly, two sharing practice platforms - LoS (Library of Stuff) and BebeDonusum- have been analysed in depth as product sharing case examples from Turkey via desk research. Several interviews were done with the founders of these sharing initiatives. The web site of LoS was analysed from web-archive to see the changes through the years. A brief questionnaire was applied to more than 25 participants of BebeDonusum to understand their motivations of participation to the closed mail group. This part of the study supported the interview outcomes with the interview with the founder of the platform.

The two initiatives were critically analysed and compared with their international examples from perspectives of design of the systems, motivations of foundations, stakeholders, use of platforms, and the barriers and opportunities in Turkey's context.

The structure of the interviews with the founders of both initiatives was to understand the question below:

- What are the motivations that changed accustomed sharing behaviours into sharing services?
- What are the barriers for use-sharing services to spread?

Findings and Discussion

The interviews showed that LoS has many similarities with the international examples of "Library of Things" initiatives. It is founded with similar reasons of environmental and economic sustainability. As for almost of all LoT (Library of Things) centres in the globe, the main motivation is to increase efficiency by lengthening the use phase of products which stay idle and unused. It is open to everyone, who wants to share and borrow "things" for only "use phase". In the Turkish case, as the LoS started up as a closed web-site structure- participants were to explain their interest of participation to the co-founders (admins of the website at the same time).

The social interaction takes place in LoT centers in other locations?, where the unused items are stocked for use-sharing at a local hub with a fulltime working staff. At those locations??, the users can meet and exchange knowledge about the use of tools for the DIY projects they pursue. In LoS, the items are not gathered at a local hub, borrower lends the item directly from the owner which involves f2f (face to face communication). The lack of a physical centre puts "web-site of LoS" (design of the interfaces, web site, substructure, etc.) into a

critical role for establishment of use-sharing and creating a network of participants around the idea.

There are some unique sharing examples of Turkish culture that LoS benefits from. Turkish small cities and rural villages have so many daily routines based upon use-sharing practices. Co-founders of LoS, prepared some reminder cards about these practices and shared them via online social channels such as twitter& Facebook page of LoS.

Figure 1. Some social media reminder cards explaining traditional practices of "sharing"

It was a clever idea to use social media effectively to reach many new people to participate the network of sharing because these sharing practices struggle to find a place in changing lifestyles of younger generations in big cities.

The main motivations of BebeDonusum are just like all Freecycle groups: economic and environmental. It is very sustainable to use 2nd hand products at that phase of life because the needs change rapidly. The founder's motivation to form this closed group was also to lengthen the use phase of the very short term used baby products to increase economic and environmental sustainability. BebeDonusum is a closed mail group open for all mothers around Turkey and promotes recycling and use-sharing of baby stuff (clothing, toys, prams, cribs, variable accessories, etc.). The scope of the mail group is not limited to a neighbourhood or just Istanbul as it has 408 members from all over Turkey. Within the 4 years 768 sharing event has been done via web.

Some closed mail group rules are valid, like lenders can post an item announcement with specific subject and headings. Demand posts are opened with another subject and heading so that readers can understand whether the item is wanted or is to be lend.

Conclusion

Collaborative consumption practices are benefiting "building a strong community" with the aim of decreasing the excess consumption. Both of the sharing platforms in our cases have been constructed with almost the same motivation of sharing underused items piling up in homes and putting them in use cycle again by other people. It helps reducing the excess consumption. From the environmental point of view, it will help to conserve natural resources and energy spent for production. Economically, the members won't pay for new products every time they need one, especially the ones they use randomly.

The low number of participants to local freecycle groups shows that using 2nd hand items, "using instead of buying" attitude is not very popular. Environmentally consciousness is not guiding consumption choices in Turkey, neither. But, both of the initiatives, LoS & BebeDonusum, could have created remarkable communities. Library of Stuff and BebeDonusum initiatives both rely on the solid background of sharing habit in Turkish culture. They both use that cultural assets and redesign it with the enabling power of the internet. They both understood their user groups and their characteristics and used the right media channels with right messages to reach their target groups.

Interviews and comparison of the number of items to be shared to the wanted items showed that it is difficult to express one's needs and ask for them in Turkish culture. From the lack of people posting the needs versus the ones who are lending what they own, it is understood that asking for a thing to share is found more difficult.

Briceno & Stagl (2004) analyzed the consumption in its social context and revealed that collaborative consumption patterns have a positive impact on social relations in the community. With the events and sharing actions took place in both cases, the reciprocal trust grew stronger between the participants. By the time, a community gathered around the website of LoS, cofounders organized swapping events to create social interaction between the participants which helps to build trust relations. At BebeDonusum platform, the beneficial outcomes haven't been limited to the products, but also new mothers or even mothers to be were benefiting the experiences of mothers of toddlers. Asking for and giving advices between mothers about

shared products are another characteristic of the mail group. Information exchange between mothers has sincerity, reciprocity which establishes a trustful common ground at the first place.

References

Briceno, T. & Stagl, S. (2004). Examining the Social Aspect of Sustainable Consumption. International Workshop Driving Forces of and Barriers to Sustainable Consumption, Leeds, UK.

Ceschin, F. (2014) Sustainable product-service systems: Between strategic design and transition studies. Springer. (https://link.springer.com/book/10.1007/978-3-319-03795-0)

Ehrenfeld., J., (2001). Designing 'Sustainable' Product/Service Systems. In: Ecodesign 2001,Tokyo, December 15.

Hamari, J. et al. (2016). The Sharing economy: Why people Participate in Collaborative Consumption. Journal of the association of information science and technology, 67(9):2047–2059

Manzini, E. (2006). "Design for sustainability. How to design sustainable solutions." Milano, Blog de E. Manzini, 2006, INDACO, Politecnico di Milano http://www. sustainable-everyday.net

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

Social & cultural sustainability: street art in Naples

Ornella Zerlenga[1]

[1]*Department of Architecture and Industrial design, University of Campania "Luigi Vanvitelli", Aversa, Italy, ornella.zerlenga@unicampania.it*

Abstract: Street art is a form of creative expression that has recently become more widespread, with different attitudes and impacts depending on the contexts where it can be found. In Italy, it has established itself above all in the suburban neighborhoods of the major metropolitan cities with significant social and, sometimes, economic impacts. In this perspective, this paper analyzes what is currently happening in several Neapolitan neighborhoods. Thanks to the initiatives of a number of associations, several public residential building complexes, that are suffering from both physical and social degradation, are re-capturing identities thanks to the powerful social charge of the murals that are not only on the buildings but also in the underground.

Keywords: drawing; street art; Naples.

Introduction

This contribution presents the most contemporary experiences of street art in Naples (Italy), whose works have been realized both in the ancient city center and in suburban neighborhoods. The purpose of the contribution is to demonstrate that this artistic activity is a fundamental action for the social and economic redevelopment of places.

Street art in Naples (Italy)

World-class and national street artists have recently been involved in social projects in Naples. In the centre of the city, Jorit Agoch painted an evocative mural, in reference to the icon of the patron of the city, *San Gennaro* (Fig. 1). Located at the entrance of the popular Forcella neighbourhood in Via Duomo, a few steps from the Cathedral, with a symbol of the Bishop San Gennaro (the yellow miter), the face has a lay inspiration. In an interview, Agoch stated that the face was that of his friend, a young worker in the neighbourhood called Gennaro.

The Neapolitan artist Roxy in the Box is well-known throughout the city for using narrative stencils that feature famous art characters (*Chatting*, in the Quartieri Spagnoli) and star system (*Vascio Art*, in the streets of the historic centre) to activate sharing and reciprocity processes with the inhabitants of the popular neighbourhoods. Roxy's language is popular with blazing colours, real-life human figures and Neapolitan scenes. *From PoPolari to PoPolani* is the motto of *Vascio Art*. The art project makes use of the Dolce & Gabbana

media event that was held in Naples (2017) and along the street level flats portrays the stylists and the actresses as models (Fig. 2).

In April 2016, on the occasion of the *San Vincenzo* festivity, the *Resis-ti amo* mural was inaugurated at the '*Rione Sanità'*, promoted by the San Gennaro Foundation and the City of Naples. The work painted on the facade of the seventeenth-century basilica has as its theme the resistance and it portrays a woman and a man who support each other. The mural was painted by sophisticated street artist Francisco Bosoletti (Fig. 3).

In the degraded neighbourhood of Materdei, drawn on the back of a building in Salita San Raffaele, there is a 15-metre high mural, representing the myth of the mermaid *Parthenope*. The work, always a gift from Bosoletti, was realized with the approval of the local residents to support the initiative *Materdei. Per R_esistere ci vuole pure la bellezza*. The highly refined picture represents a fine-looking, proud, thoughtful woman, who is half-fish and half-bird, wrapped in leaves and feathers (Fig. 4).

Bosoletti signed another two works in Materdei for the *Il Giardino Liberato* project. Residents of the neighbourhood, having occupied and cleaned up the garden of the former convent of the Teresian Sisters, transformed it into a cultural centre. The symbol of spontaneous change is represented by two beautiful images: *La donna del giardino*, on the wooden doors of the exterior of the convent (Fig. 5); *Le ombre di Napoli*, in the former convent (Fig. 6).

In Materdei, another urban work of art for the spontaneous re-acclimatization of abandoned sites is signed by Blu on the walls of what was originally the monastery of Sant'Eframo Nuovo, transformed into a prison mental asylum and since 2015, a city space managed by the association *Ex OPG Occupato Je so' pazzo*. Like *Il Giardino liberato* project, since 2016, the *EX OPG Occupato* has been recognized by the local administration as a common asset for the socio-cultural services of the neighbourhood. The name *Je so' pazzo* refers to the stories of those who lived here segregated, undergoing therapeutic treatments at the limit of human rights. Blu, one of the top 10 street artists in the world whose works appear on the walls of the main metropolitan suburbs, represented this with an angry image that recounts of enclosure, containment and liberation (Fig. 7).

To the east of the city, in the peripheral neighbourhood of Ponticelli, on the front of a 20-metre social housing building, there is the mural by Agoch entitled *Ael, Tutt'egual song'e criature*, inspired by the song by *Avitabile* (Fig. 8). Painted during the last *Giornata Internazionale dei Rom, Sinti e Caminanti* to raise awareness about ethnic-religious

integration, it depicts the face of a dark skinned young Rom girl (Ael) with the beauty of a sixteenth-century portrait, looking into the eyes of those who she observes. On the lower edge, there are the symbols of integration between culture and tradition. On her face, there are two signs that represent both the signature of the artist as well as the symbol of equality between different ethnicities.

Agoch painted a more impressive portrait in the nearby San Giovanni neighbourhood: the contemporary Neapolitan legend, Diego Armando Maradona (Fig. 9). At the bottom of the mural, there are the words *Dios umano*; on his cheeks, there are the usual two signs that the player defined as the symbol of belonging to «one single human tribe». With the aim of redeveloping the neighbourhood, the artistic project at Ponticelli was promoted by *INWARD, Osservatorio sulla creatività urbana* (supported by the Rotary Club, National Anti-Discrimination Office, Ceres); while the project in San Giovanni was funded by private organisations as well as the municipal office for logistic and organizational support.

To the west of the city, in 2009 Simon Jung and Paul & Hanno Schweizer painted, with spray cans, a giant goldfinch in Scampia, which has almost disappeared. The artists realised *The Cardillo of Scampia* project with the inhabitants of the area (Fig. 10). The bird is depicted free and in flight with its wings open. This is the opposite of the real and illegal image of the goldfinch in a cage, a victim of local poaching. The image that represented the project shows three boys riding the bird (sitting on the parapet) in the symbolic act of heading towards new destinations.

Another intervention in the western suburbs concerns the metropolitan lines (the municipal *Line 1* and the interprovincial *North-East*). The *Line 1* runs from Piazza Garibaldi to Piscinola-Scampia, along which there are the five 'Stations of Art' that have inaugurated a new philosophy of conceiving railway architecture, proposing the stations as an opportunity for urban regeneration. In these five stations, the names of the artists are significant and consistent with the financial resources allocated, however, on the outskirts of the so-called 'Viaduct Stations', there are spontaneous artistic events sponsored by the current municipal administration. These works were attended by street artists Corrado Teso, Orazio Aiello, Gianluca Raro and Marco Matta (Fig. 11).

Conclusion

The examples show how the concept of street art has changed (11). Neighbourhood and/or local administration initiatives continue to promote these projects, with it no longer

being considered as defacing walls but rather as a form of decoration to promote the sense of belonging to peripheral and degraded places, activating forms of redevelopment, while also stimulating cultural tourism. The artistic language of the mural has therefore changed: from a violent and abstract sign in search of a new narrative aesthetic that, without denying the ideological matrix of social denunciation, proposes the image of beauty in places where there would be none. In addition, these images are not open to the physical environment but adapt to architectures and roadside visuals to favour a conceptual synthesis between the memory of the places and new looks over the city.

Paradoxically, the increasing presence in urban communities and world-wide success has led street art to the major auction houses as theft of mobile works (such as those of Bansky), commissioned by art collectors. The growing interest in street art has also extended to the organization of media events. For example, for the presentation of Donatello's horse's head at the National Archaeological Museum of Naples (April 2017), the organisers invited David Diavù Vecchiato, who painted in anamorphoses on the steps leading to the museum entrance, a horse's head (Fig. 12). In this sense, one wonders whether the identity of street art or spontaneity is failing.

Figure 1-12. The street art in Naples.

References

Camorrino, A. (2016). *Vedi Napoli e poi muori. La Street Art dal punto di vista della sociologia della cultura*. In: G. Punziano, ed., Società, Economia, Spazio a Napoli. GSSI Social Sciences, working paper 28.

Di Martino, F., il Gridas (2010). *Sulle tracce di Felice Pignataro*. Napoli: Marotta & Cafiero, p. 96.

Zerlenga, O. (2017), *Imaging Naples Today. The urban-scale construction of the visual image*. In Proceedings of International and Interdisciplinary Conferenxce IMMAGINI? Image and Imagination between Representation, Communication, Education and Psychology, Brixen, Italy. 27-28 November 2017, MDPI, mdpi.com/journal/proceedings. pp. 13. Proceedings 1(9), 922.

Forte, F., Lauda, L., & Zerlenga, O. (2018), *Disegno e periferia come bene comune*. In EGA 2018, XVII Congreso Internacional de Expresion Grafica Arquitectonica, Universidad de Alicante, "De trazos, huellas e improntas: aequitectura, ideacion, representation y difusion", a cura di Carlos L. Marcos et alii. 30, 31-05-2018, 01-06-2018. Valencia: Universidad de Alicante, 2018, tomo II, pp. 1247-1256.

Cirafici, A., Zerlenga, O. (2012). *Rappresentare i flussi culturali*. In 14° Congreso Internacional Expresion Grafica Arquitectonica. Valladolid: Secretariado de Publicaciones de la Universidad de Valladolid, pp. 1027-1032.

GCRIS

WORKSHOPS

WORKSHOP # 1

Title:

Academic Research Design in Planning Studies: Migration and Sustainable Communities

Organizers:

Dr. Zerrin Ezgi KAHRAMAN, Assoc. Prof.
Çankaya University, Department of Urban Planning

Feriye Nazda GÜNGÖRDÜ, Res. Asst.
Çankaya University, Department of Urban Planning

Description:

Workshop aims to overview the steps of a good academic research process and social research methods for graduate students, early career researchers and junior experts in the field of planning, through focusing on five topics: research problem, research design, literature review, data collection and analysis. The workshop is designed for 2 hours in which theoretical discussions will be followed by brainstorming and idea generation activities on group/team basis. For each research step introduced above, organizers will give 10-minutes mini-lecture to be followed by idea generation process again around 10-minutes in groups consisting of 4-5 persons. Rather than lecturing, the workshop aims to make participants think of a research problem (that is pre-defined by organizers) and develop a research approach basing on group discussions. Pre-defined topics may be as quality of life or socio-spatial effects of migration on urban policy processes to be narrowed down by participants basing on their own research approaches. Organizers will not introduce a fully structured research design, instead, they will channel participants' ideas and suggestions. During interactive discussions, participants are expected to think of the research problem with its all (possible) dimensions of research. After inner group discussions, they are expected to briefly introduce their ideas that they will stick to for other steps of research design. In overall, participants are expected to formulate a consistent research design in a given topic with its proper research questions, hypothesis, data collection and data analysis methods.

WORKSHOP # 2

Title:

Building Performance Simulation: How Useful Is It?

Organizer:

Dr. Gülsu ULUKAVAK HARPUTLUGİL, Assoc. Prof.
Çankaya University, Department of Architecture

Description:

The definition of sustainability varies depend on the sector that related. In the building sector, mainly it covers "high performance building" requirements. Thus to achieve sustainable design, performance assessment during design process becomes evident. In order to assess design decisions and subsequently the building performance during the design process, building performance modelling/simulation tools become gradually more important. In the improvement studies of building performance simulation, the sustainability assessment in the early phases of design is the main focus of the many research studies nowadays.
The objective of the workshop is to reveal the current status of simulation in sustainable building design and to define components and effective areas of building performance simulations. The question of "why and how useful is performance simulation?" is going to be discussed.
The workshop aims to give a general information about building performance simulation tools and make participants be aware of the tools as an effective method to comprehend performance based approach, to design and promote high performance buildings in a cost effective and environmentally responsive way by simulations.
The workshop covers a theoretical background related to introduce the basic concepts of performance evaluation in buildings, provide practical information of performance simulations, and explain the common methods for building energy performance simulation from simplified methods to complex ones. The participants interactively join the workshop by discussions, and simulation applications.

WORKSHOP # 3

Title:

Future Search Conference

Organizer:

Dr. Antonella VIOLANO, Assoc. Prof.
University of Campania Luigi Vanvitelli, Department of Architecture and Industrial Design

Description:

The projection into the future is a core principle in order to organize and define the behaviour of man, which is by his nature impatient with the limits, projected into the absolute and avid for knowledge. As Ulysses by Dante, he needs to broaden their horizons, to reach what is unknown and to go beyond the emotionless certainties. The designer has in addition (or particularly) the creative component that empowers to see and live future scenarios still unrealized, but already alive and real in his mind. The reserves of resilience from which to draw to feed these scenarios are in the nature and its generous capacity to reintroduce in its life cycle the dialogical and sensitive human-made processes. According to the ecocentric approach, the scientific paradigm emphasizes the epistemological integrity implied within ecology, and ecological metaphysical reality. Therefore, the architecture with consumerism, pollution and parasitic development calls into question its design and construction processes. The Regenerative Design proposes buildings in harmony with nature, which have limited ecological footprints, and the eco-social approach claims that there is a dialectical connection between nature and humans.
If the whole design process follows the approach "Cradle to Cradle" (C2C), the synergic relationship between the building and its surrounding increases, not only through an energy and environmental balance in which the total energy consumption of the building in its whole life cycle is equated and, in some cases, exceeded by the energy produced from the building itself. Thanks to its materials (biotic and processed-biotic materials: bio-based materials) the building takes on the behaviour of a real living thing interacts, adapts, evolves, it protects and takes full advantage of context. It uses the sun's energy and uses the resources of the soil, produces oxygen and sequesters CO2, closes the cycle of water and waste, breathes, suits several seasons, is built from recycled materials which will be recyclable at the end of their useful life (C2C).
Future Search Conference approach involves the "technician community" searching desirable future of the built environment, taking into account the regenerative and resilient architecture design approach.
“FUTURE SEARCH CONFERENCE” is based on methods and principles developed and set forth by Marvin Weisbord, Sandra Janoff and numerous other professionals who, over many years of research and practice have contributed to the understanding of large group dynamics and systems theory.

WORKSHOP # 4

Title:

Resilient Building Design

Organizers:

Dr. Susan ROAF, Prof.
Heriot-Watt University, School of Energy, Geoscience, Infrastructure and Society

Dr. Fergus NICOL, Prof.
Oxford Brookes University, Faculty of Technology, Design and Environment, School of Architecture

Description:

Our buildings are our final protection the elements but in a world where temperatures are soaring, weather events becoming more extreme, economies falter under local and international threats, energy supplies prove ever more challenging and cultures and expectations are continually evolving, the design of the buildings must become increasingly important for our security and well-being. At the heart of adapting to the warming climate and more extreme weather events is the issue of what constitutes Thermal Comfort. The two workshop leaders will start by describing the thermal environments that are occupied in homes and buildings around the world, and look at how they are tolerated and provide comfort. Then the issue of how to design affordable, comfortable and safe micro-climates even during extreme weather events will be explored in the rest of the workshop.
This workshop aims to flag the problems of poor climatic design in modern architecture, look at its implications and show how such problems arose and are growing as we moved through ideas of energy efficiency and sufficiency and onto sustainability over the last three decades. A range of strategies will be presented to equip designers with the knowhow necessary to build climate-safe buildings that provide resilient comfort for an unpredictable future.

WORKSHOP # 5

Title:

Sustainability and Resilience: how do we relate these concepts in planning debate and practices?

Organizers:

Dr. Adriana GALDERISI, Assoc. Prof.
University of Campania Luigi Vanvitelli, Department of Architecture and Industrial Design

Dr. Elisavet THOIDOU, Assoc. Prof.
Aristotle University of Thessaloniki, School of Spatial Planning and Development

Dr. Angela COLUCCI
President of REsilienceLAB

Description:

The Workshop is intended as a 90 minutes seminar focused on the theoretical and operational relationships between two concepts largely widespread nowadays in planning debate and practice: sustainability and resilience.
In the last decade, numerous documents on sustainable development (UN, 2012; UNDP, 2015) have remarked the need for ensuring cities become more sustainable and meanwhile more resilient in the face of the numerous challenges they have to cope with (climate change, environmental decay, etc.). At the same time resilience strategies are being increasingly developed in various cities worldwide.
Nevertheless, the relationships between these two concepts are still blurred, ranging from resilience intended as a precondition for sustainability to an equivalence between the two terms. Moreover, the ways to combine the theoretical approaches developed in the two fields (sustainability science and resilience theory) as well as for blending these concepts into planning practice are still scarcely investigated.
Hence, in order to better investigate these concepts and their relationships, the workshop will be structured into three main parts: a brief introduction on the two concepts of Sustainability and Resilience provided by the workshop organizer. Then, according to the key question provided in the title, two invited speakers will address the relationships between the two concepts, by embracing respectively a theoretical and an operational perspective. A final debate among speakers and attendants will close the workshop.

WORKSHOP # 6

Title:

Multisensorial Perception and Cultural Heritage Sites

Organizers:

Dr. Luigi MAFFEI, Prof.
University of Campania Luigi Vanvitelli, Department of Architecture and Industrial Design

Dr. Aslı ÖZÇEVİK BİLEN, Assoc. Prof.
Anadolu University, Department of Architecture

Dr. Papatya Nur DÖKMECİ YÖRÜKOĞLU, Asst. Prof.
Çankaya University, Department of Interior Design

Description:

It is well known that cultural heritage can be classified according to its tangible or intangible nature. In this workshop, a new field "multi sensorial heritage" including all dimensions of the human sensation (sound, light, smell, microclimate, touch, etc.) will be explored in specific cultural heritage sites in Ankara.

WORKSHOP # 7

Title:

Urban art as Social & Cultural Sustainability

Organizers:

Dr. Ornella ZERLENGA, Prof.
University of Campania Luigi Vanvitelli, Department of Architecture and Industrial Design

Dr. Fabiana FORTE, Assoc. Prof.
University of Campania Luigi Vanvitelli, Department of Architecture and Industrial Design

Description:

The subject of study is developed in multidisciplinary form. From the point of view of graphics analysis and expression, the languages and techniques of putting murals in the cities and suburbs will be examined. The intent is to study: the relationship between surfaces and volumes; shape and the image displayed to highlight its geometric representation methodologies; the aesthetic languages used by street artists in relation to the poetics of urban regeneration. From the point of view of urban economics, it is particularly interesting to check the different impacts that street art is having in these realities (as for example, in New York or London, where the impacts also on the real estate market has long been verified), where urban regeneration processes find in this new form of graphic communication a mode of intervention in the pursuing of physical, social and economic sustainability, in alternative to the public administration intervention (still too inert). In this perspective the workshop analyzes what is happening in some peripheral districts of cities as, for example, Naples, with particular reference to the Ponticelli and Scampia-Marianella districts, 8th Municipality. This neighbourhood has a large territorial extension and nowadays represents the gateway to the city from the north. Over recent years, there has been an intense growth of street art in Scampia. The results have been investigated through visits as well as interviews with the street artists involved in the urban requalification and the art project for the Underground Line n. 1 stations.

WORKSHOP # 8

Title:

Building with Earth

Organizers:

Arch. Camilo HOLGUIN
Arquitectura Nativa

Dr. Ayça ÖZMEN
Çankaya University, Department of Architecture

Description:

Approximately half of the world population still lives in earthen houses, but the knowledge of building techniques with earth is disappearing rapidly because of globalization and industrialization. In this workshop, principles of building with earth will be introduced to participants through analyzing and implementing.
Workshop will be conducted by Architect Camilo Holguin, founder of an architectural office in Barichara, Colombia specialized in sustainable and traditional architecture. For 15 years, he has been working to preserve the built and non-built heritage of Barichara by pursuing the same construction techniques used for more than 300 years and by building with locals. In this way, new generations not only maintain traditional building techniques learned from their fathers and grandfathers but also do not have to migrate to big cities to look for jobs. Barichara, a small village in the Colombian Andes, has been keeping the same type of construction techniques since it was founded in 1705 by the Spaniards. It is one of the few places in the world where use of rammed earth, wattle and dub, stone and clay tiles in construction are still alive. With these features, Barichara was declared a Colombian Heritage site in 1978.
The workshop will start with a short presentation about earth construction, supported by few case studies from Colombia and around the world. Afterwards, implementation process will start with numerous analyses such as granulometry, senses, cohesion and humidity. After these experiments, participants will experience to build a rammed earth wall in real scale. Workshop will be completed by painting with earth colors obtained from different samples.

GCRIS

SUPPORTING ORGANIZATIONS

GRID
ARCHITECTURE, PLANNING AND DESIGN JOURNAL
MİMARLIK, PLANLAMA VE TASARIM DERGİSİ

SID Società Italiana di Design
Italian Design Society
identità culturale e scientifica del design italiano
scientific and cultural identity of Italian design

SITdA
Società Italiana della Tecnologia dell'Architettura

LENS
the Learning Network on Sustainability

GRID "Architecture, Planning and Design Journal"

GRID Architecture, Planning and Design Journal is a peer-reviewed open access international e-journal published by Çankaya University Faculty of Architecture. The journal publishes national and international articles of scientific research within the fields of regional planning, city planning, urban design, architecture, interior architecture, landscape architecture and industrial design. In this respect, the journal welcomes original scientific research, education-based studies, book reviews and articles covering current debates in the professional fields. In addition to the standard publication policy regarding articles, thematic issues based on current debates could be ranked within the scope of the journal. GRID is published twice a year in English and Turkish.

There are no submission fees for this journal. This journal is an open access journal providing online access on publication. Anybody can view, download (as PDF) and check the metrics of the articles via the website of the journal. Should you have any questions, please contact grid@cankaya.edu.tr.

GRID

SID "Società Italiana Design",

The Italian Design Society aims to develop and disseminate the culture of design, the progress of studies in this field, their valorisation in the scientific, educational, academic, social and civil fields, the sharing and dissemination of research outcomes and the debate among the scholars of the discipline.

The activities of the association are therefore aimed at:

- Promote the study and research activities on design in all its articulations, both nationally and internationally, also encouraging forms of coordination between those carrying out research, both basic and applied, at university centers, research institutions and public and private institutions;
- Collaborate with national, European and non-European bodies, responsible for the promotion, guidance and funding of scientific, basic and applied research;
- Discussing the criteria for defining the scientific quality of design research in all its articulations;
- Promote, also in collaboration with similar bodies and associations, the contacts between scientific research in the field of design and the social, professional and productive reality in the national and international sphere, also in relation to the Made in Italy culture;
- Face and discuss training in the field of design in the general aspects of orientation, also considering its close relationship with research; its definition and extension as a discipline, also in relation to other complementary knowledge; its institutional collocation within public and private training courses;
- To encourage the dissemination and deepening of design knowledge through the care of publications, the organization of workshops, seminars and congresses, as well as the annual conference, the awarding of scholarships to research by its members, the establishment of direct awards to the progress of the discipline, enhancing the plurality of theoretical and methodological approaches, as well as the professional practices that characterize design;
- Promote the establishment of scientific-cultural networks, in particular by encouraging forms of collaboration with other design associations, bodies, institutions and scientific societies.

SITdA "Società Italiana della Tecnologia dell'Architettura"

SIT*d*A was founded in 2007 to make a broad and inclusive network of university professors and experts in the field of Architectural Technology with the aim of linking universities, professions and institutions; implementing high profile research policies; settling a culture of internationalization in the disciplinary sector; spreading the research; promoting a multidisciplinary and a trans-disciplinary approach of Architectural Technology; contributing to regulatory processes; assisting institutions in the control and assessment of building quality; cooperating with the national education system in training; acting as a cultural reference; enhancing excellence.

GCRIS

BEYOND ALL LIMITS 2018: International Congress on Sustainability in Architecture, Planning, and Design, 17-19 October 2018, Ankara, Turkey

LeNS "The Learning Network On Sustainability"

A New "Design Hope": The Open And Distributed Lens, The Learning Network On Sustainability

Carlo Vezzoli[*], Cenk Basbolat[2]

[1]*Design Department, Politecnico di Milano, Milano, Italy, carlo.vezzoli@polimi.it*
[2]*Design Department, Politecnico di Milano, Milano, Italy, cenk.basbolat@polimi.it*

Abstract: It is agreed by the most that sustainable development requires a radical change. Furthermore, it is widely recognised an increased role of design for sustainability; hence the role of HEIs in design have a key role to play in developing and diffusing the related knowledge-base and know-how. In this framework, the LeNS - Learning Network on Sustainability, was founded aiming at the promotion of a new generation of designers, via a new generation of design researchers and educators - adopting a learning-by–sharing, multipolar, and open access ethos. This paper presents the LeNS network, its vision, its tools, how it has evolved over time, and the projects that supported its incredible diffusion world-wide.

Keywords: distributed research and education; design for sustainability (DfS); learning network; learning resources; open educational resources (OER)

A. Introduction

Sustainable Development and Design Role

The concept of sustainable development has entered the international scene since the beginning of the 90s. Almost three decades have passed and nowadays it is widely accepted that the goal is now to get back down below the limits without severe damage to the earth and humanity. For example, by the middle of the 21st century, 5 billion people in 60 countries may be faced with water scarcity (Burek et al., 2016). Each year, 7 million people prematurely die due to air pollution (WHO, 2018). The number 815 million undernourished people as of 2016 is indicating a critical state of food insecurity in the world (FAO, 2017).

Most of the authors agreed that we are "beyond all limits" and close to the collapse of the eco-system (Klein, 2015; UN, 2015; Network, G. F. 2018) which calls for a system discontinuity, i.e. an urgent radical change, and to act in preventive terms and not after the damage have been created.

It is far obvious, and it is recognised that this calls for an active role of the designers, to envision and design radically new sustainable solutions for all. In other words, since the '70

design for sustainability (DfS) has emerged and increased its role as a promising field for achieving a radical system change (Vezzoli, 2018).

The Learning Network on Sustainability (LeNS)

The LeNS is an open and multipolar network of Higher Education Institutions (HEIs) to foster and speed up research and curricula development on DfS. It was founded in 2007, with the launch of an EU Funded project (LeNS, 2007-2010, Asia Link programme) under the circumstances that the DfS discipline was too slowly diffused (and many times without the right conceptual and operative tools) in design HEIs, unable to support formation of a new generation of designers.

The LeNS network started in 2007 with the 7 partners thanks to a EU project and counts now on 140 HEIs grouped in 16 LeNS regional networks in all the continents (see Figure 1).

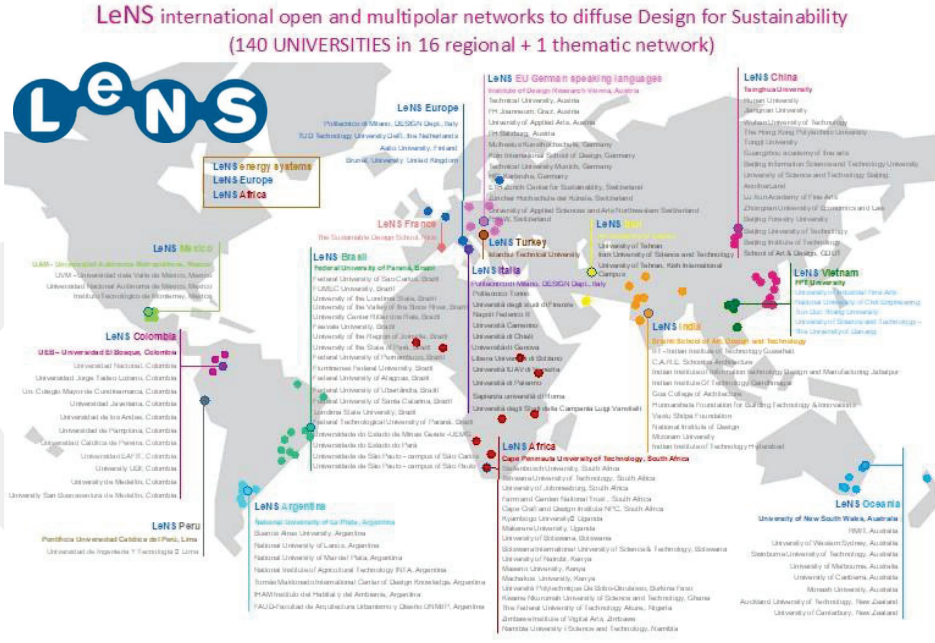


Figure 1: The LeNS world network of networks

The LeNS introduced, since its foundation, **a new ethos for the design community:** *the shift towards a multipolar, open access, learning-by-sharing distributed knowledge generation and dissemination (on DfS) to speed up the worldwide penetration of this agenda into design HEIs*.

The main **tools** of the LeNS network are its **distributed Open Learning E-Platform** (d.OLEP) and **network of open Labs**.

B. Methods

The LeNS growth has been supported and facilitated by three consecutive EU supported multiregional projects: 2007-2010: **LeNS**: **Learning Network for Sustainability** project; 2013-2016: **LeNSes: Learning Network for Sustainable energy systems** project funded by *European Union Edulink II*, biregional *Europe-Africa;* 2015-2019: **LeNSin: the international Learning Network of networks for Sustainability** funded by *European Union Erasmus+*, multiregional *Europe-Mexico-Brazil-South Africa-India-China).*

The EU projects along with various activities (pilot courses, seminars, conferences etc.) were refined with different strategies (evaluated by panel of external and internal observers). For example, in any of the 3 EU projects, a set of consecutive pilot courses (involving teachers from different contexts) were organised to both test and improve the learning-by-sharing open mechanism as well as testing and refining the tools to enable such activity.

All the learning resources have been shared with others right after the end of each course. Then, these resources were eventually reused and remixed in each following pilot course. These iterations with a systematic feedback and report loop were resulted in the articulation of the research, learning resources; and the refinement and redevelopment of the platform and labs.

Both the strategies for an active, cohesive open and multipolar network of networks; and the open ethos were formalised into a **manifesto** firstly signed in Bangalore in 2010 (see *www.lens-international.org)*. In fact, during the last decade, the number of HEIs, even though not partners in any of the EU funded project, has rapidly grown.

C. Findings and Discussion

Within the scope of the LeNS project, two tools have been developed:

(1) LeNS Decentralised **Open Learning E-Platform:** decentralised web platforms to upload open access learning resources (courses/lectures, tools, case/criteria, projects, etc.) that anyone can view and download; and any teachers can modify/remix and reuse allowing a collaborative production, fruition and cross-fertilisation of knowledge.

(2) **LeNS open labs**: a series of rooms equipped with computers, support tools for design for sustainability, videoconferencing facilities, etc., all are accessible for free.

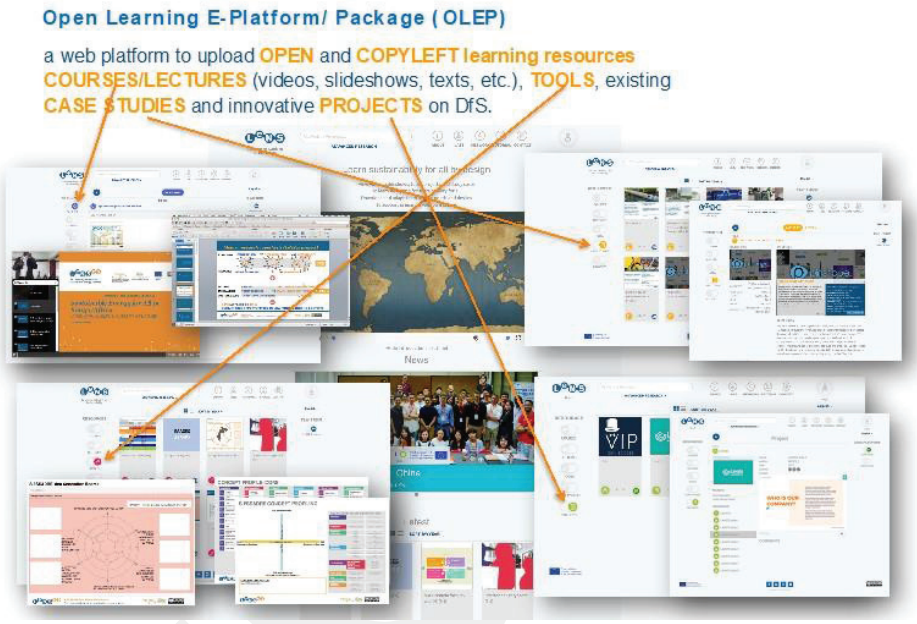


*Figure 2: Main sections of the d.OLEP (on DfS) (*www.lens-international.org*)*

In fact, it was decided in 2008 that the same LeNS *web platform* (*OLEP)* should be open access and downloadable for free by any regional LeNS, i.e. allowing its download and reconfiguration in relation to specific needs, areas of interest and themes.

Being an open platform dedicated to DfS topic, with an advanced search engine designed particularly to allow *easy access to its open source content*, the platform is intended to overcome one of the biggest deterrents for open educational resources (OER) (Allen, 2014).

In other words, the LeNS project has the ambition of being a catalyser for actions and exchanges on education (and research) in design for sustainability worldwide with the innovations that:

- any educational institution, teacher, sustainability-focused network, can generate a new LeNS-based web-platform, reconfiguring it by re-defining partners (the scientific board), the sustainability focus, and the geographical representation;
- any new generated web-platform uploads and manages learning resources independently (controlling also the scientific reliability). This is an important issue since scientific reliability is identified as another one of the most important deterrents of OER (Allen, 2014);
- any new generated web-platform is linked to the others. Even though the platforms are regionally based to upload learning resources locally, it is designed in a way to allow searching and accessing to the content of any other platform with switches (on the interface) to turn on and off the platforms it is linked to.

The LeNS network has expanded not only with the financed partners of the 3 consecutive EU projects but also with many other institutions joining the LeNS Network without a financial support. Such growth was supported and facilitated by a very inclusive policy of the LeNS community that allows new members to join with a letter of intent, without any cost and any obligation; as well as by the following win-win opportunities:

- knowledge-building as open access resources speed up the learning-by-sharing for researching and teaching i.e. through allowing remix/reuse of others' resources
- improved opportunities for public fundraising of a new established regional LeNS due to being part of such a wide and successful international network.

The incredible growth of the LeNS network could be explained with the following main drives:

- as sustainability is being incorporated in the worldwide agenda, and in all levels, there is a clear perceived growing demand of design for sustainability;
- and as open source education is increasingly being adapted in the education system throughout the world, and it is increasingly accepted as being vitally important to tackle the many issues the humanity is facing now (UNESCO, 2012).

D. Conclusion

LeNS is characterised by being *open* (because its contents are freely available for teachers, students, designers, companies, NGOs and interested persons; and they can be

downloaded, altered and reused), *multi-polar* (because there is no hierarchy and any person can talk with anyone belonging to the network, *interconnected* (because there is a continuous exchange and sharing of contents and didactic materials), and *regenerative* (because the same web-platform can be downloaded and reconfigured to meet specific needs).

LeNS allows a *process of mutual learning*, facilitating a readily access, exchange, review and update of knowledge. In this sense, LeNS is intended as a sort of *cross-learning mechanism* among design researchers and educators. For this reason, LeNS can potentially speed up the achievement of **research** results on one hand, and their dissemination on the other.

In this sense LeNS, fostering a new generation of design researchers and educators, seems to be an effective project to contribute to the promotion of a new generation of designers effectively capable of having a role as catalysers and enablers of the transformation of our consumption and production patterns, with consequent positive implications for the whole **society**.

References

Burek, P., Satoh, Y., Fischer, G., Kahil, M. T., Scherzer, A., Tramberend, S., ... & Hanasaki, N. (2016). Water Futures and Solution-Fast Track Initiative (Final Report).

WHO. (2018). *Air Pollution.* Retrieved Sep 1, 2018, from http://www.who.int/airpollution/en/

FAO. (2017). *The state of food security and nutrition in the world*. Rome: FAO.

Klein, N. (2015). *This changes everything: Capitalism vs. the climate*. Simon and Schuster.

UN. (2015). Transforming our world: The 2030 agenda for sustainable development. Resolution adopted by the General Assembly.

Network, G. F. (2018). The National Footprint Accounts. Oakland, CA.

Vezzoli, C.A., (2018). *Design for Environmental Sustainability: Life Cycle Design of Products*. London: Springer.

Allen, I. E., & Seaman, J. (2014). Opening the Curriculum: Open Educational Resources in US Higher Education, 2014. *Babson Survey Research Group*.

UNESCO. (2012). *The Paris OER Declaration*. Retrieved Sep 1, 2018, from https://en.unesco.org/oer/paris-declaration

INDEX

Akbay, Saadet 64
Akdemir, Furkan 43
Al-Hafith, Omar 50
Altay Kaya, Deniz 55
Alves, Susana 59
Argenziano, Pasquale 91, 153
Atakan, Gökçe 64
Ataman, Cem 70, 76
Atmaca, İlker 81
Aurilio, Marianna 423
Avella, Alessandra 91
Aydın, Özlem 99
Aydın, Dicle 142
Aytekin, Öznur 721
Bal Koçyiğit, Filiz 105
Barani, Abdelhamed 111
Barbaros Akay, Emine 118
Baş Bütüner, Funda 220
Bellucci, Roberta 161
Berrin, Ayşem 220
Bingöl, Ebru 133
Boganini, Leonardo 372
Bosone, Martina 174
Boussora, K. 390
Burak Bican, Nezih 123
Büken Cantimur, Burcu 137
Büyükşahin Sıramkaya, Süheyla 142
Cacace, Daniela 148
Campone, Carolina 153
Cannaviello, Monica 558
Carillo, Saverio 153
Caruso, Ivo 215
Carusone, Marco 161
Castanò, Francesca 167
Cennamo, Claudia 148
Cennamo, Antonio 534
Ciampa, Francesca 174
Ciampi, Giovanni 640, 678
Cianfanelli, Elisabetta 180
Ciervo, Antonio 640
Cioffi, Gianluca 184
Cirafici, Alessandra 190
Cirillo, Vincenzo 195
Corlito, Valentina 298
Corniello, Luigi 201
Costanzo, Francesco 207
Cristallo, Vincenzo 215
Cusano, Concetta 148
Çankaya Topak, Sıla 226
Çavdar, Rabia Çiğdem 232
Çelebi Yazıcıoğlu, N. Mine 236
Çelik Başok, Gülşah 247
Çevik, Aslıhan 253
Çoban, Gamze 260
D'Aprile, Marina 269
Daneshvar Rouyandozagh, Yousef 275
De Biase, Claudia 282, 428
De Martino, Raffaela 287
De Mase, Antonio 534
De Matteis, Gianfranco 148, 292, 298
de Wilde, Pieter 50, 306
Del Prete, Salvatore 762
Del Prete, Antonino 292
Demir, Başak 310
di Vico, Barbara 287
Dinç Kalaycı, Pınar 260
Dizdaroğlu, M. S. 489
Doğan, Huriye Armağan 315, 686
Dokmeci Yorukoglu, Papatya Nur 331
Duarte, Rui 319
Ekiz, Aslınur 43
Elmalı Şen, Derya 324
Eshtiwi, Ehab Ali 331
Etyemez Çıplak, Leyla 336
Faella, Giuseppe 423
Fernanda María, Garcia Marino 384
Fırat, Hasan Baran 344
Fiorentino, Caterina 190

Fiorillo, Raffaela	349
Forte, Fabiana	428, 798
Franchino, Rossella	356, 362
Frettoloso, Caterina	362, 367
Galderisi, Adriana	428, 796
Gallo, Paola	367, 372
Gambardella, Claudio	379
Garofalo, Antonio	534
Ghida, Nassila	390
Gianetti, Anna	398
Giordano, Paolo	403
Gölgelioğlu, Can	408
Gönül, Hale	417
Grunskis, Tomas	686
Guadagnuolo, Mariateresa	423
Guida, Giuseppe	428, 755
Günaydın Temel, Dilşa	433
Gürsel Dino, İpek	70, 76
Haliloğlu Kahraman, Z. Ezgi	433
Hamiloğlu, Ceren	439
Harputlugil, Timuçin	443
Husaunndee, A. M.	489
Ilgın Bahçeci, Hazal	81
Ippolito, Fabrizia	190
Iuliano, Giuseppina	678
Jacazzi, Danila	449
Jahed, Sevil	456
Kahraman, Zerrin Ezgi	111
Kalfa Ataklı, Başak	463
Kalınbayrak Ercan, Aygün	469
Karabetça, Aliye Rahşan	474
Karaman, Özge	479
Katipoğlu Özmen, Ceren	485
Kaya Pazarbasi, Cigdem	780
Kayaçetin, N. Cihan	489
Kazanasmaz, Tuğçe	253, 510, 617, 623
Khoury, Karen Boujaoudeh	496
Kıraç, A. Binnur	137
Kitapci, Kivanc	502
Köse, Büşra	510
Kumkale Acikgoz, Ece	275
Kurtay, Cüneyt	456
La Rocca, Francesca	660
Langella, Carla	515
Layas, Hetham F.	538
Liberti, Roberto	520
Maffei, Luigi	344, 640, 710, 797
Maliqari, Andrea	201
Manzo, Elena	398, 525
Martucci, Angela Pecorario	529
Martusciello, Sabina	534
Masullo, Massimiliano	344, 534, 710
Memikoğlu, İpek	538, 543
Meydan Yıldız, Seçil Gül	81
Mirra, Enrico	201
Monaco, Michela	282
Morelli, Maria Dolores	548
Mottola, Carla	201
Muzzillo, Francesca	553
Nappo, Geremia	534
Netti, Nadia	558
Okyay, Gülce G.	137
Oliva, Gaspare	563
Orhan, Ezgi	572
Öktem, Zeynep	728
Önge, Mustafa	576
Örmecioğlu, Hilal Tuğba	118, 581
Özdal Oktay, Simge	408
Özdamar, Esen Gökçe	587
Özdemir, Suna S.	593
Özgönül, Nimet	463
Özkan Öztürk, H. Nur	600
Özmen, Ayça	605, 799
Özturk, Ahsen	612
Öztürk, Yasemin	617, 623
Öztürk, Elif	324
Öztürk Büke, Fatma Gül	629
Perricone, Valentina	515
Pinheiro, Ana Paula	634
Pisacane, Nicola	91, 362
Pontillo, Ilaria	525
Ranzo, Patrzia	520
Rosa De Micco, Rosa	534
Rosato, Antonio	640, 678
Russo, Michela	161
Russo, Dario	379

Sapio, Valentina	648
Satish , B. K.	50
Sav, Sedef	652
Sbordone, Maria Antonietta	282
Scarpitti, Chiara	660
Scorpio, Michelangelo	640, 678
Sılay Emir, Hafize Nur	668
Sibilio, Sergio	640, 678
Sinkienė, Jolita	686
Soleti, Graziella	298
Spanodimitriou, Yorgos	678
Stasi, Renato	180
Süzer, Özge	690
Şekerci, Yaren	118
Şenocak, Gülşah	698
Tafuro, Anna	423
Taşlı Pektaş, Şule	703
Tercan, Binali	707
Tessitore, Alessandro	534
Toma, Roxana Adina	710
Tranavičiūtė, Brigita	686
Tufarelli, Margherita	180
Tunçer, Mehmet	715, 721
Tünger, Çetin	728
Türel, Ali	735
Ulukavak Harputlugil, Gülsu	489, 793
Ulvi, Hayri	43
Uysal Ürey, Zeynep Çiğdem	742
Ümütlü, Şükran Büşra	747
Veneziano, Rosanna	751
Vingelli, Federica	755
Viola, Serena	356
Violano, Antonella	762, 794
Vitkuvienė, Jurga	686
Yaldız, Esra	142
Yalman, Onur Lami	769
Yeşilbağ, Damla	773
Yetim, Evşen	324
Yıldırım, Nazlı Nazende	105
Yılmaz, Meltem	690
Yılmaz, Saime	43
Yüksel, Can Uçkan	780
Zaleckis, Kęstutis	686
Zerlenga, Ornella	785, 798
Zizi, Mattia	292

GCRIS

GCRIS

BEYOND ALL LIMITS CONGRESS 2018

https://beyondalllimits.cankaya.edu.tr

Supporting Organizations:

ISBN: 978-975-6734-20-9