

# **RESILIENCE**

## BETWEEN MITIGATION AND ADAPTATION

Edited by  
Fabrizio Tucci  
Cesare Sposito



PALERMO  
UNIVERSITY  
PRESS

Open Access Publishing Series in

**PROJECT | Essays and Researches**

*Editor in Chief*

Cesare Sposito (University of Palermo)

*International Scientific Committee*

Carlo Atzeni (University of Cagliari), Jose Ballesteros (Polytechnic University of Madrid), Mario Bisson (Polytechnic of Milano), Tiziana Campisi (University of Palermo), Maurizio Carta (University of Palermo), Xavier Casanovas (Polytechnic of Catalunya), Giuseppe De Giovanni (University of Palermo), Clive de Toledo Sanjar Mazzilli (University of São Paulo), Giuseppe Di Benedetto (University of Palermo), Manuel Gausa (University of Genova), Pedro António Janeiro (University of Lisbon), Massimo Lauria (University of Reggio Calabria), Francesco Maggio (University of Palermo), Renato Teofilo Giuseppe Morganti (University of L'Aquila), Elodie Nourrigat (Ecole Nationale Supérieure d'Architecture Montpellier), Frida Pashako (Epoka University of Tirana), Monica Rossi-Schwarzenbeck (Leipzig University of Applied Sciences), Rubén García Rubio (Tulane University, New Orleans), Dario Russo (University of Palermo), Francesca Scalisi (DEMETRA Ce.Ri.Med.), Andrea Sciascia (University of Palermo), Marco Sosa (Zayed University, Abu Dhabi), Paolo Tamborrini (Polytechnic of Torino), Marco Trisciuglio (Polytechnic of Torino)

*Each book in the publishing series is subject to a double-blind peer review process*

*In the case of an edited collection, only the papers of the Editors can be not subject to the aforementioned process if they are experts in their field of study*

Volume 3

Edited by Fabrizio Tucci and Cesare Sposito

**RESILIENCE BETWEEN MITIGATION AND ADAPTATION**

Palermo University Press | Palermo (Italy)

ISBN (print): 978-88-5509-094-0

ISBN (online): 978-88-5509-096-4

ISSN (print): 2704-6087

ISSN (online): 2704-615X

Printed in January 2020 by Fotograph srl | Palermo

*Editing and typesetting by DEMETRA Ce.Ri.Med. on behalf of NDF*

*Book cover and graphic design by Cesare Sposito*

*Promoter*

DEMETRA Ce.Ri.Med.

Centro Documentazione e Ricerca Euro-Mediterranea

(Euro-Mediterranean Documentation and Research Center)

Via Alloro n. 3 | 90133 Palermo (Italy)

© Copyright 2020 Palermo University Press | New Digital Frontiers srl

Viale delle Scienze, Edificio 16 (c/o ARCA) | 90128 Palermo (Italy)

[www.newdigitalfrontiers.com](http://www.newdigitalfrontiers.com) | [info@newdigitalfrontiers.com](mailto:info@newdigitalfrontiers.com)

On the Book Cover: Sketch based on Erhui's work entitled Rescue (1979)

## Contents

Introduction   <i>Fabrizio Tucci, Cesare Sposito (Editors)</i>	5
ARCHITECTURE	
ESSAYS & VIEWPOINT	
Innovative applications and experiments for the protection of archaeological sites   <i>Cesare Sposito, Santina Di Salvo</i>	10
Depopulation of small urban centers. Cultural landscape as resource for local communities   <i>Maria Teresa Campisi</i>	38
Resilience, repopulation and recovery of the built heritage in central Sicily   <i>Giuseppe Giugno</i>	54
Lebanon resilient. New scenarios of development and future growths directions   <i>Silvia Mazzetto</i>	70
Principles of resilience and regenerative design in coastal environment   <i>Rosa Maria Vitrano</i>	84
Durability in a resilient design approach   <i>Maria Canepa, Chiara Piccardo, Andrea Giachetta</i>	98
Adaptive dimension in architecture. Modular and transformable structures as an alternative to traditional building systems   <i>Annarita Zarrillo</i>	112
Resilience and public space. Quality combination for the contemporary city   <i>Maria Giada Di Baldassarre</i>	130
Adaptation in virtual worlds   <i>Jean-Marc Gauthier</i>	144
RESEARCH & EXPERIMENTATION	
Resilience, adaptation and mitigation under a green building approach   <i>Fabrizio Tucci, Serena Baiani, Domenico D'Olimpio, Paola Altamura, Gaia Turchetti</i>	156
Digital technologies supporting multidisciplinary approaches for climate adaptation   <i>Clara Vite, Guido Emilio Rossi</i>	192
Environmental design, coastal areas and climate impacts   <i>Maria Fabrizia Clemente</i>	210

Resilient strategies for marginal areas' development. The case of Avellino smart polis   <i>Elena Gigliarelli, Bruna Di Palma</i>	226
Resilient restoration and reuse. Methods, instruments and tools   <i>Marco Morandotti, Daniela Besana</i>	248
Assessing the heritage adaptive reuse in Qatar   <i>Silvia Mazzetto</i>	260
Doss Sant'Agata in Trento. An evolutionist approach to architecture and landscape   <i>Francesco Giampiccolo, Giovanna A. Massari</i>	274
Strategies for religious heritage. Implementing the conservation plan in Naples   <i>Maria Vittoria Iazzetti, Crescenzo Mazzuoccolo</i>	288
Age-friendly living environment in support of resilient society in the Bulgarian context   <i>Georgi Georgiev</i>	310

## DESIGN

### ESSAYS & VIEWPOINT

Participatory design models. Resilience-based re-semantization of territory   <i>Miriam Mariani</i>	320
Towards a new resilience culture. Relational design and workshops of social innovation for fragile areas of central-southern Italy   <i>Marco Manfra, Davide Turrini</i>	334

## INTRODUCTION

The climatic, environmental and anthropic changes that characterize the beginning of this millennium increasingly are a major subject in the international debate since they influence, on the one hand, the protection of territories, landscapes and fragile urban areas, and on the other, the uses, performance and efficiency of architectural artefacts and everyday objects. Moreover, the shortage of natural resources, the global economic crisis, the mass migratory flows and the unpredictability of seismic events, are a source of continuous instability which can be dealt only with ‘resilient thoughts’ capable of answering continuous or sudden changes. In general, Resilience is considered as «[...] the property of complex systems to respond to stress events, activating response and adaptation strategies in order to restore functioning mechanisms: resilient systems, facing stressful events, react by renewing themselves but maintaining the functionality and the recognizability of their systems» (Gunderson and Holling, 2002). Within a positive dynamic process, aimed at managing events and rebuilding a new (landscape, urban, architectural, economic, social, etc.) balance, resilience does not imply the restoration of an initial state, but the acquisition of a new balance and maintenance of functionality through two approach strategies.

The first strategy is Adaptive, focused on the dynamic nature of operational methods – from ideational, compositional/design, to productive, realization, operational and management methods – in which all the elements of the built environment, from the territorial and urban scale, building, to the material and object scale, effectively adapt to new balances with higher performance levels. The second strategy is Mitigative, where research is directed to innovative technologies (process, project and product) aimed at risk prevention and minimizing any impact – concerning unsettling events due to environmental, seismic, anthropic and social change – and aiming at the realization of urban systems, buildings, objects, components and sensitive materials, with variable behaviour and in an energetic-dynamic equilibrium with climatic and environmental changes.

In this regard, the book on Resilience between Mitigation and Adaptation collects essays and critical reflections, researches and experiments, projects and interventions referred, on interscale terms, to the different dimensions of the man-made and natural environment, to which risk, fragility and vulnerability can no longer be dealt with individually by the traditional tools of sustainability, innovation, redevelopment or regeneration, but only through a systemic approach capable of supporting, integrating and fostering relationships between individual, group and community, cultural and

multi/transdisciplinary competences (urban planning, architecture, representation, history, restoration and recovery, technology, design and communication, economy, sociology, psychology, etc.) thus integrating humanistic and technical knowledge. More specifically, the main areas of interest concern:

- Landscape and Territory Area, as cross-disciplinary synthesis of systemic and integrated knowledge of the Environment, in its natural aspects (natural and naturalized signs, natural network systems, etc.) and related to anthropic uses and transformations (networks and infrastructure, etc.): a resilient landscape policy must take into account, above all, the non-material interests and desires of the population, such as beauty, biological and landscape diversity, habitats, identification with the territory, etc.;
- Urban Area: the quality of cities requires complex strategies, both for intervention scales (structural and process) and for fields of action (economic, environmental, social), to be continuously implemented over time and with respect of the characteristics of the contexts; the resilient city changes by designing innovative social, economic and environmental responses that allow cities to withstand (by changing) the demands of the environment and history in the long run;
- Architecture and Building Field: to ensure a resilient approach, Architecture must absorb, on the one hand, the principle of adaptation (to contexts, to climate, to risks), and on the other the principle of limit/envelop (to be implemented increasing the permeability and going over the partitions), and finally the principle of reduction (intended as an essential tendency towards an increasingly stronger habit of saving natural resources and as a constant research on how to minimize/eliminate pollution and more generally climate-changing emissions at all stages of the life cycle: case studies and experimental creations, in this regard, represent a privileged key to interpretation);

The papers of territorial and urban field deal with this perspective. They investigate the depopulation of small cities and inner areas of the Italian Peninsula (particularly focusing on the central-southern area), due to the growing territorial, social and productive imbalance as well as the obsolescence of local identity values. These papers identify in the cultural landscape an important asset for local communities, and analyse possible strategic scenarios, examples of good practices and experiments—already implemented or underway—on relational design through an integrated, multi-functional, multidisciplinary and multi-relational approach; some of these cases are: Clichy-Batignolles Parisian Eco-District (from deteriorated suburbs to sustainable landscape), the Farm Cultural Park of Favara (from abandoned small town to cultural landscape), Irpinia and Avellino. While for the inner areas of Sicily, the papers identify tools and methodologies to be used to draft a development plan, and outline project actions and paths to support the resilient matrix of cities, documenting case studies useful to suggest measures against their desertification.

On the fragility of coastal areas – caused by climate change – the principles, method approaches, and strategic actions of Regenerative Design are described, also presented in the development of the Guidelines for the resilient regeneration of Mari-

na di Palma Waterfront. On the resilience of Lebanon and Qatar, there are respectively some interviews carried out in the academic field that allowed to identify the current development trends in the Country and to understand its future growth tendencies, and some adaptive reuse interventions on the heritage of the Arabian Peninsula, analysed through socio-economic, socio-cultural, environmental and sustainability criteria, in relation to the preservation of traditional materials, the promotion of cultural values and local climate adaptation.

On the architectural field, there are some papers on the archaeological and building cultural heritage: on the protection of archaeological sites some innovative and reliable sheltering systems are presented, perfect examples for their architectural and construction quality, flexibility and adaptability of space, energy and environmental performance. The case studies of the Monastery Santi Severino e Sossio in Naples and of the Church Doss Sant'Agata in Trento respectively represent an example of adaptive reuse created through a Conservation Plan tool and a participatory, pragmatic and sustainable project for a systemic requalification of a complex historical heritage.

On the built heritage, there are the papers resulting from the research carried out at the Department of Planning, Design and Architectural Technology of the University La Sapienza in Rome and the STEP Laboratory of the University of Pavia, which offer two operational tools (in the preliminary and design stages) to support building retrofitting interventions, in order to reach higher levels of resilience and climate adaptation capacity and, at the same time, to increase the quality of ecosystems through urban and environmental redevelopment and renewal initiatives. On the relation between resilience and public space, another paper deals with the subject of 'resilience tactics' as a possible tool to transform urban voids into quality public spaces, considered as a 'frame' to create a new resilient city, which is able to change by building new social, cultural, economic and environmental responses that allow the city to resist the demands of the environment and history.

The relation between architecture and time is the subject of two papers. The first illustrates the variations this relationship can make on the notion of resilience, applying it to architectural design and current experimentations of Design for Disassembly. The second focuses on the important subject of population ageing and on the need to study and develop forward-looking forms of a sustainable elderly-friendly living environment in Bulgaria, suggesting potential directions for future development in the context of a resilient society. Finally, the book includes an essay dealing with the importance of new digital technologies in the transition towards a resilient and sustainable city: the document describes a new design process that allows participants to collaborate with 'virtual elements', creating specific dynamic three-dimensional systems capable of self-adapting to constraints and of evolving into new spatial configurations shaped by adaptation.

The framework of research, experimentations, projects, interventions, advanced implementation is varied, in ferment and, above all, in constant evolutionary progress. Our

era has now become aware of its limits, of the meaning of ‘living in times of crisis’, of the scarcity of available resources, of the need to move in a circular sense, of the seriousness of the threats coming from the climate crisis and the environmental and social emergencies. The term ‘resilience’, once borrowed on tiptoe from the natural and ‘hard’ sciences, is now fully assimilated and key player of action, knowledge and know-how of the disciplines revolving around the intricate and increasingly complex world of contemporary design, building and living. The line is drawn, we are starting to assume ethical responsibilities, the principles, the methods, the operational strategies and the application solutions are emerging, and – by being aware that they can never be definitively codified but rather will have to perpetually regenerate, update, adapt to changing times, conditions, spaces and contexts – we are entering the main road with those who believe in a more desirable future.

Prof. Fabrizio Tucci  
*Sapienza University of Rome*

Prof. Cesare Sposito  
*University of Palermo*



Climate change (credit: Z. Chakrapong)



