



## Role of the Architects in Creating Building and Urban Resilience

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### ABSTRACT

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Extreme weather events are increasing in intensity and frequency. While the social component of resilience with all its dimensions depend on all citizens, spatial and environmental components with all their dimensions depend on more from architects than from other professionals. In this context, architects have a responsibility to evaluate, design (create) and maintain resilient build environment that can better adapt to natural conditions and that can more readily absorb and recover city from different disasters. The objective of this research is to identify the role of architects in creating the building as well as the quality of urban resilience that can be implemented in a variety of contexts at national, regional or global level. Conclusions serve as a new concept to future researchers in this field and to all regional stakeholders engaged in the process of evaluating the risk related to the natural disaster. Also, it creates professional strategies for improvement of building and urban resilience.

### 1. Introduction and Literature Review

Today buildings and cities are under pressure of destructive forces coming from every day stresses, accidents in the form of the fire, storms, earthquakes, flooding, and even intentional attack-war. Architects, in the last century, has proved missing attention to the stable and resilient buildings. Many buildings have remained vulnerable to the effects of ecological worsening and an ever more commodified environment. Our environment has become ever more commodified, ever more the subject of short-term investment, income generation, and resale, rather than permanent dwelling or long-term city making (Benedikt, 1999). There is no need to argue vulnerability of buildings and cities in the region to understand the necessity to build resilience in all components and dimensions.

The challenges that built environment is facing everyday effects of changes caused by climate change, environmental degradation, and population growth. These challenges can be overcome only by making better, smarter, and in more resilient ways. There is a need for promoting the concept of resilience in architecture through learning and advanced research and development. Overcoming challenges will increase the role of architects in creating the building and urban resilience.

State of the art literature review on this topic and personal interviews in daily work with architects helped to analyze and compare the local, regional and international implementation of architectural resilience.

#### 1.1 What is the Resilience?

The term resilience derives from different fields of science.

Many definitions and interpretations of resilience exist across multiple disciplines making it a difficult concept to quantify, evaluate, and gain clarity for what it means and how it applies to different industries (Hassler, U. and Kohler, N., 2014.)

In the psychology, resilience means the ability of patients to recover from stress or depression. Resilience, as it was developed in systems thinking is "the ability [of a system] to cope with change" (Wieland, A. & Wallenburg, C.M. , 2013).

The word resilience, invoked as a universal remedy in the recent economic crises and interpreted in sociology as the art of mediation in conflicts. Thus social resilience in situations characterized by difficult challenges is now held in high regard in the field of architecture, city planning, and landscape design. It becomes one of the prime objectives in operations carried out following dramatic natural events, in particular, those produced by the action of water. (Nicolin, 2014). Resilience is designed objective for buildings and infrastructure. It is the ability to absorb or avoid damage without suffering complete failure.

Recently, it has become a key concept in contemporary urbanism in the context of the environmental, economic, and social crisis. However, resilience is mostly addressed in environmental and technical terms and often disregards social and cultural implications (Goldstein, 2011). Resilience deals with the ability of systems to adapt to the change; thus, it also offers potential to rethink assumptions and build new systems (Folke, C.; Carpenter, S.R.; Brian Walker; Scheffer, M.; Chapin, T.; Rockström, J., 2010;)

“Resilient” construction ensures that a structure will be more resistant to damage caused by hazards that destroy buildings in disasters, including fire, windstorms, earthquakes, and flooding.

### 1.2 What is the Architectural Resilience?

Architectural resilience is strongly related to the definition stated by material engineers as the capability of certain materials to recover from stress and adapt to sudden inputs (Addington, M. and D. Schodek, 2005). Climate conditions figure as important concerns for architectural resilience. Concrete is the main construction material in Kosovo and region, which is not proven as the most resilient material during earthquakes.

### 1.3 What is Urban Resilience?

Urban Resilience is the ability of communities, cities, institutions, businesses, and systems within a city to survive, adapt, and grow. Urban Resilience is defined as “Capability to prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to public safety and health, the economy, and security” (Wilbanks, 2007). As cities continue to grow and grapple with uncertainties and challenges like climate change, urban resilience has become an increasingly favored concept (Carmin, J., Nadkarni, N., & Rhie, C., 2012); (Leichenko, 2011).

Multi-hazard threats come from different uncertainties and challenges experienced as chronic stresses more related to the social component or acute shocks more related to spatial and environmental component (Figure 1). Stresses weaken the built environment of a city on a daily or cyclical basis. Elements of chronic stresses are high unemployment, inefficient public transportation system, endemic violence, and chronic food and water shortages. Acute shocks are sudden, sharp events that threaten a city. These events are categorized as earthquakes, floods, disease outbreaks, and terrorist attacks.

## 2. Research Context and Trends

Understanding context, trends, components and dimensions of resilience assessed define which research methodology to use for identifying which building and urban resilience creation strategy to be applied. Analyzing the past and current concepts it is clear that trends are going toward the process of the resilience understanding.

Participating and observing group discussions with architects helped to uncover trends in resilience understanding and implementing. Results of the research paper will help to understand the global and regional architects. Also planning professionals for promoting the notion of BIM, resilience and green building and integrating them in theory and practice.

### 2.1 Paradigm Shift

Today, architects are moving from the concept of build environment as a product and focusing on process. They know that they can contribute more to spatial and environmental components by designing, spatial planning and environmental management. They can contribute to the social component by taking responsibilities in the process of making communities more resilient. This is a clear trend and the tendency for the paradigm shift and fundamental change in architects and society's view of how to react to climate change, disasters and intentional attacks – wars.

There is not enough to assess and response by providing building safety assessments, and to disaster recovery through shelter design and urban development. Today it is the need for assisting in the process of planning and achieving resilience through problem diagnosis, risk communication, and community outreach.

We can see more and more architects in the role of mediators, community builders, designers for reuse of build environment and active design practitioners.

### 2.2 Building Resilience

Building resilience concept is emerging today's architectural practice, which is challenged to design build environment that will first shape and then sustain a dramatically different and uncertain future. This concept has components to define and organize dimensions of buildings as adaptive systems across physical and time scales. As the outcome, as well as a practical guide to organizing design decisions and strategies lead to specific solutions of a process that crates resilient building in the resilient community. Build environment has to be assessed, designed and recovered in most important properties along the specific dimensions of protection, repair cost, and recovery. Architects and building owners can implement some practical steps to create a resilience together with design professionals by:

- Creating an inventory of building assets and use experienced engineering professionals to employ a building rating system to rate the most important properties along the dimensions of safety, repair cost, and recovery.

- Ranking buildings according to their performance and identify which ones are contributing most to overall risk.

- Gathering the proper data and creating a useful portfolio to estimate expected casualties, damage costs and business interruption losses in a disaster, or over a defined time frame such as 20 or 50 years.

- Performing cost-benefit studies to best allocate resources to mitigation, risk transfer, and event response/recovery planning.

- Using building ratings to help make decisions about real estate purchases or leases.

- Identifying, buildings that are most in need of catastrophe insurance and those that can retain less or forego coverage.

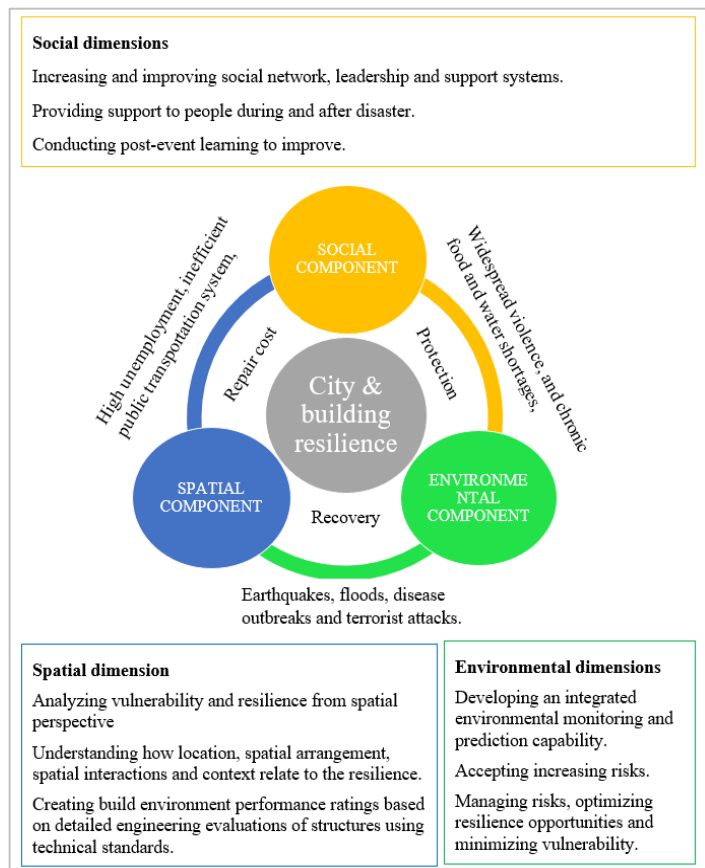
- Establishing internal company design guidelines to ensure that most important assets will perform in an adequate manner with their value.

### 2.3 City Resilience

Architects are contributing to city resilience. Generally, city resilience needs to be assessed, planned and eventually (after disasters) recovered based on social, spatial and environmental components and their dimensions.

The conceptual framework in Figure 1 is designed as the general concept that will serve professionals and all other actors. The conceptual framework will form the basis of a tool that should enable all interested in city resilience to convene around a common understanding of that idea and start to identify which components, dimensions, and indicators are most for making cities more resilient. The idea is to facilitate a process of engagement with and within cities that generate dialogue and deeper understanding. Understanding interrelations between all components, dimensions, elements of chronic stresses and shocking events will lead to new ideas and opportunities to engage new actors in civil society, government, and business on identifying what makes a specific city resilient. Hopefully, in the future, this concept will help every city to

develop specific city resilience index with specific indicators, sub-indicators, and variables in different categories.



**Figure 1:** Conceptual Framework with components, dimensions, events and elements for evaluating, designing (creating), and achieving built environment and city resilience

### 2.3.1. Social Component

Elements of chronic stresses related to high unemployment, inefficient public transportation system, and endemic violence have to be analyzed, assessed and treated with other components and all social dimensions listed below:

- Increasing and improving social network, leadership and support systems.
- Providing support to people during and after the disaster.
- Conducting post-event learning to improve.

### 2.3.2. Spatial component

Elements that threaten space in the city as an acute shock more related to spatial and environmental component have to be analyzed, assessed and treated with other components and all spatial dimensions listed below:

- Analyzing vulnerability and resilience from spatial perspective
- Understanding how location, spatial arrangement, spatial interactions, and context relate to the resilience.
- Creating build environment performance ratings based on detailed engineering evaluations of structures using technical standards.

### 2.3.3. Environmental component

Events that threaten a city environment as an acute shock more related to environmental component have to be analyzed, assessed and treated with other components and all environmental dimensions listed below:

- Developing an integrated environmental monitoring and prediction capability.
- Accepting increasing risks.
- Managing risks, optimizing resilience opportunities and minimizing vulnerability.

### 3. Suggestions

For creating the specific building and urban resilience architects have to define and quantify solutions for the identified risks. Specified resilience is resilience of a specific dimension of a system to a specific shock. It is important to have integrated data infrastructure for all components and dimensions of the system. Focus on the resilience of one part the system might come at the cost of other parts of the system. The balance between all dimensions of resilience is important. When designing and planning resilience strategies architects suggest identified principles of innovation, foresight, adaptive multi-layered governance, the effective partnership among all actors involved in the resilient city creating.

In national level, there is the need for including building and urban resilience in the unified national building code that is in the process of public discussion.

Understanding and promoting of conceptual framework as well as including building and urban resilience in education syllabuses and courses about the design of resilient architecture, will be the first steps toward resilient city system that is: capable of accommodating the natural and constant increasing uncertainty and change in today's world. Next step will be adding resilience in the national building code. As the consequence of this steps we will have very well considered, constructed and managed buildings and infrastructure so that they can survive the impacts of human made and natural hazard events without significant damage or loss of function; able to accommodate disruption, extreme pressures or surges in demand with extra capacity purposely created within systems. Resilient architecture is flexible, able to change, evolve and adapt in response to changing circumstances; able to rapidly find different ways for peoples and institutions to achieve their goals or meet their needs during a shock or when under stress. The resilience of architecture has to be supported by social aspect by consultation and engagement of communities, including the most vulnerable groups; integrated and aligned between city institutions that promote consistency in decision-making and ensure that all investments are mutually supportive to a common outcome.

### 4. Conclusion

This qualitative research resulted in above suggestions and conclusion as below:

1. Architects know both the value and natural limits of architecture and planning. We don't know all the needs of architecture in the cities after stresses and shocks in the future, but we can improve architecture in the cities in the present and plan their resilient designs in the future. Therefore, there is urgent need to expand architect's role and involvement in city systems and processes driven by government and institutions of cities and contribute to creating more resilient buildings and cities.

2. Assessing existing social, spatial and environmental conditions from resilience perspective based on identified principles architects in the same time have to improve existing and future architectural designs and urban planning (buildings and technical infrastructure) that will make the basement for implementing strategies for resilient community and city.

3. Having in mind values of resilient architecture during design, construction and maintenance process, architects have to analyze all

possible scenarios due to normal use, and all disaster situations in the environment that could challenge the integrity of the building. Context always plays a critical role in determining the factors that make resilience or not in the local environment of building or city, and so the main role of architects is to design and plan always locally specific resilient architecture by using all social spatial and environmental resources.

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