

RESILIENT COMMUNITIES FOR SAFE CITIES

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The increase in the intensity and frequency of natural disasters in recent years require new methods and tools to deal with this change. New approaches must be developed to ensure the safety of cities and settled communities from these events. Implementing the resilience of a territory requires an integrated approach to act simultaneously on physical, economic and social reality. The described research had investigated on possible tools to really improve physical and social dimension. Resilience is assumed as a paradigm within the project for the construction/transformation of the built environment. Is highlighted the fundamental role of the social component in determining priorities and security issues for each specific context. Physical and social environment are characterized, therefore, as an inseparable dyad for any action aimed at strengthening the resilience and safety of the environment built. In the implementation process of the resilience of an urban system, two closely interrelated areas are identified: for one, the community capability of implementing organizational-procedural adaptability; contrary, the physical space and the natural dimension, as a place of construction of the technological-spatial convertibility, and the ecological and environmental responsiveness. Among the several conditions to ensure adequate levels of connection and correlation with ecological factors, topological, social and technological developments of the built environment, in this paper are described those related to risk communication as fundamental first tool.

Keywords: Resilience, Technologies processes, Safety, Integrated approach, Tools, Risk communication.

1 INTRODUCTION

The safety of the results of actions that construct/requalify the built environment constitute an important occasion for reflection for research in the field of Architectural Technology: the application of methods of safety in order to pursue the quality of interventions has become urgent, given the present condition of climate change that manifests, with absolute evidence, the need to provide rigorous instruments for determining priorities and for programming activities of risk prevention and areas at risk in which to concentrate the scarce resources available.

The pursuit of resilience in urban and architectural design may consent the passage from a heuristic approach to the programming of interventions, intended as the restoration of a damaged or interrupted function, to the forecasting of actions focused on implementing processes that pursue quality and safety, both in the present and future: the programming of actions focused on reducing risk levels and accompanying, in practice, the implementation of a proactive capacity to maintain conditions of safety by improving the reactive capacities of a system. In a situation of variability – inside or outside the system – this may allow for the definition of an integrated set of actions for safeguarding exposed elements (human safety, environmental conservation, the integrity of the system itself, economic and social revitalization, etc.) (Angelucci *et al.* 2016).

The research described in this paper has the objective to define tools that can connect the physical with the social dimension so that the resilience of a territory can be implemented as an integrated approach.

Working with the physical dimension of urban and territorial systems is not sufficient; vulnerability and resilience are concepts that deal not only with the methods of their realization, correlated with human artefacts, but also with how they are inhabited, utilized, perceived and defined by people (Angelucci *et al.* 2015).

The UNESCO-IHE Institute for Water Education has introduced the concept of *susceptibility*, which expresses to what degree, within a given system, whether urban or territorial, the exposed population is able to deal with and react to adverse events (Balica *et al.* 2012). This condition is expressed in the following equation Eq. (1):

$$\text{Vulnerability} = \text{Exposure} + \text{Susceptibility} - \text{Resilience} \quad (1)$$

Arriving at a real analysis of territories in relation to risks means acquiring the awareness also of their susceptibility, in other words of the organizational and social dimension of risk in a given territory; this depends on a multiplicity of factors: the quality of the relations between civil society/institutions, society's perception of risk, policies of prevention/protection applied.

Safety postulates a systemic vision of an object and its relations, including those human resources indispensable to the definition and maintenance of the requisite within the system. Safety, in fact, is implemented as a socio-technological process in which an undoubtedly important role is assumed also by the organizational capacity of technical and social resources dedicated to design and management. The implementation of a process of safety presupposes the assumption of a system comprised not only of the functional part of an object and the sequence of operations necessary to the permanence or evolution of what is essential, but also the entirety of human resources invested. To ensure the efficacy of the safety of a system, be it an urban space or territorial area, within the process of implementation, society represents the expression of instances but, at the same time, also the driving force behind the production of expected levels of safety (Di Sivo and Ladiana 2008).

The constitution of a socio-technical system characterized by a capacity for decision-making and government focused on ensuring the safety and quality of the built environment, and the diminution of levels of vulnerability and the improvement of resilience, requires that each local reality be equipped with tools for raising awareness about and evaluating the specific condition of risk tied to a given context.

2 THE SOCIAL DIMENSION OF RISK

It is indispensable to emphasize that the field delineated by the safety of the built environment does not exist exclusively in the physical domain as no evaluation of risk can be wholly objective: an awareness of risk independent of systems of beliefs and moral values is impossible. This is because the awareness and evaluation of risk are tied to the contexts in which it arises; it is an awareness developed by scientists and experts, but also by the general population. In fact, scientific knowledge is not extraneous to the values of a specific socio-cultural situation: it is the result of a specific way of looking at a specific reality and at a particular moment in time.

It is important to reiterate that the identification of a risk is an essentially cultural factor: an event is considered a hazard when society recognizes it as such. In industrialized nations, for example, the contamination and pollution of the environment are risks that have existed for decades, but only in relatively recent times, and with varying degrees of success in different areas, have the related risks been evaluated and minimized. In other words, it can be said that the

expectations of safety of a given society are in a state of evolution: from safety against illness we have moved on to the pursuit of safety at work, of the environment, etc. (Di Sivo and Ladiana 2008).

Safety is a requisite/objective that is permanently projected forward in relation to society's recognition of a value, and for this reason, to the perception of its possible loss or diminution as a damaging condition.

The dimension of risk is neither static nor objective, but an act of negotiation and in constant evolution, as an element of the network of social interactions and the production of meaning.

Lupton (2003) points out that *“Our awareness and knowledge of these risks, and others, contribute to various aspects of subjectivity and social life, including how we live our everyday lives, how we distinguish our selves and the social groups of which we are members from other individuals and groups. [...] Those phenomena that we single out and identify as ‘risks’, therefore, have an important ontological status in our understandings of selfhood and the social and material worlds. Societies – and within them, social institutions, social groups and individuals – need this selection process as part of their continued operation. Risk selection and the activities associated with the management of risk are central to ordering, function and individual and cultural identity.”*

For Ulrich Beck (2009), risk is the principal dimension of contemporary society: *“risks are always future events that may occur, that threaten us. But because this constant danger shapes our explanations, lodges in our heads and guides our actions, it becomes a political force that transforms the world.”*

In recent decades, the social sciences have pointed out how, other than the necessary consideration for the technical evaluations of risk management, there is a need to focus attention on the evaluation of this same risk by a community. In each local reality, the social context and individuals are, indeed, the promoters of a specific culture of safety that serves to define the criteria for establishing the priorities of creation actions or ignoring risks that do not appear to constitute a threat. Hence it becomes evident that the concept of risk entails a close interrelation between natural, anthropic, political and social aspects. Risk and the level of its perception are a living and constitutive part of social dynamics, in which scientific rationality does not always play a leading role, as compressed as it is between society, politics and information.

The very reality of risk is manifest in the fact that risks are discussed; they do not exist of their own, *“the objective nature of a risk is the product of its perception and its staging”*. Risk cannot be calculated scientifically, and those cannot be tied to the obsolete distinction typical of the technocratic and rationalist approach of “objective” risk and its “subjective” perception. For Beck (2009) the so-called staging of risk is actually the object of a harsh conflict: *“the definition and staging of risks against a background of (changing) global power relations of definition.”*

These “relations of definition” are comprised of the epistemological, political and cultural situation that consents the identification, recognition and treatment of risks, but they are simultaneously relationships of power, as they offer the possibility for particular social groups to impose their interpretation of risks, and are based on the possessions of “means of definition”, which is to say the hegemony over scientific, legal and economic instruments that consent the identification and treatment of risks.

In ideal terms, the data produced by experts should inform the decisions made by politicians to the benefit, and with the consensus of, society; however, in reality, the process is not always so linear: data produced by experts in risk management may not be specific or may be manipulated in favor of a given thesis; politicians do not always make decisions in the exclusive interests of society, and citizens, finally, may not have access to the information indispensable to expressing an informed opinion (Beck 2009).

For this reason the system often becomes bogged down, with a widespread sensation of indeterminacy and uncertainty that gives rise to the pre-modern notion of risk as an immanent and imponderable dimension; this is due to the fact that an approach to prevention, to the diminution of risk, requires, as a *conditio sine qua non*, a renewed trust in the actors responsible for change and in the idea of the improvement of a current condition; it requires the establishment of a connection, commitment, belief in an individual, group or institution.

It thus appears evident how design for quality and the reduction of risks faced by the built environment cannot be implemented within a pervasive condition marked by the absence of trust in the future, unless it is translated in accordance with a now insupportable technocratic matrix. It is clear to all that it has become impossible to bring about the resilience of urban systems, and thus their capacity to react to hazards and threats posed by adverse events, without creating a resilient society.

To characterize the capacity to react to risk possessed by the citizens of contemporary Western societies, sociological literature often refers to the concept of *reflexivity*; the term is used to refer to the capacity to respond to circumstances that generate fear or anxiety in an active rather than a passive manner (Giddens 1994).

Hence, a *reflexive society* may, or better yet can, rather than multiplying its fears, produce conditions of safety both in the present and future.

Reflexivity, the capacity to determine and evaluate risks – specific to each context and the quality/quantity of relations between decision-makers – can be affected in constructive terms by adopting the approach of *Risk Communication*.

3 RISK COMMUNICATION

Technological-scientific progress augments the gap between experts and laymen, with the consequence that in the field of knowledge society is increasingly more competent, but also more incompetent than it was before. Science, knowledge, technology, produce new methods for building/modifying the built environment, producing objects and energy, though all the while the general population trusts less, fostering an increase in the perception of insecurity. The difference between calculation (by experts) and opinion (laymen) appears imponderable, and thus requires a common ground.

The theme of Risk Communication is the object of growing attention from the scientific community with regards to the programming and management of risk. It consists in an interactive exchange of information and opinions regarding elements of danger, risks, factors tied to risks and their perception.

In 1989, the US National Research Council defined Risk Communication as “*an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reaction to risk messages or to legal or institutional arrangements for risk management.*”

“Risk”, and the aspects of which it is constituted (scientific information, probability, cognition, emotions) and its potentially unsettling character, require that it is elaborated and treated by a community or social group in order that it become part of a pre-existing system of knowledge, useful for dealing with real conditions, even if it remains founded on the typical notions of common sense. The resulting social elaborations allow for the attitudes and positions of individuals regarding risk to become part of a system of shared knowledge, which anchors them to social values and meanings, legitimizing them in the process. The objective is not to

overcome those conditions that pose an obstacle to political or technical decisions, but rather of operating in favor of the “development of a community”.

The underlying idea of Risk Communication is that of working to truly understand the perception of risk typical of the community involved. It is not about implementing a persuasive form of communication, but instead to determine procedural, structural and educational conditions, which permit the promotion of effective communications, in other words that propose to redefine the sense assumed by risk at a given moment and in a specific community, prior to negotiating the solutions useful to its elimination.

What changes is the very means of conceiving of the design of interventions of communication: from a trust in experts to guide changes in behavior and rules that are to be followed for the good of society, the attention shifts to the role of community participation in processes of communication focused on change: from a tool necessary for comprehending diverse positions, Risk Communication becomes the premise for truly beginning processes of change.

The objective of communication may be very different from one another: motivating people to adopt determinate precautions, stimulating the population to reach a particular consensus with respect to decisions to be made, reassuring them about a risk or on the contrary alerting them to a problem such that they are suitably concerned and stimulated to act.

Hence, if for a social system resilience is the capacity to confront change without losing one's identity – in other words, the sign of the capacity with which a community deals with difficult situations, without precluding transformations but maintaining its roots, its history, the connective fabric that supports daily life, social interaction, the symbolic system that supports the entire community - risk communication becomes an effective method for increasing its level of resilience in the face of possible dangers or the threat of adverse events.

Risk communication would thus appear to be an indispensable tool for the construction of social reflexivity as the condition for pursuing a hoped-for organizational-procedural adaptability (or susceptibility to risk) for the promotion of levels of adaptation to change and the acceptance of innovations by the diverse users and actors involved in the processes that transform the built environment.

This delineates two strictly interrelated environments in the process of constructing resilience: on the one hand general society, people, those responsible for establishing the meaning of actions and for implementing the organizational-procedural adaptability; on the other, the city of water, physical space and the natural dimension, as the space of the construction and structuring of meaning through the realization of technological-spatial transformability and ecological-environmental reactivity; in other words, the sum of conditions focused on guaranteeing suitable levels of connection and correlation with ecological, topological, social and technological factors.

4 CONCLUSIONS

The transition of cities and settlements at risk of flooding toward models of prevention implies the assumption during the design process of a vision of co-evolutionary adaptation between users and their systems of artefacts and the natural environment. This is a new condition that requires actions intent on favoring dynamic changes in social behavior, and spatial solutions suitable to the management and regeneration of the qualities of dwelling in relation to ever more frequent conditions of change determined by the environmental crisis.

In light of the lasting conditions of risk faced by urban systems, a reasonably “sustainable” process is indicated by the pursuit of the characteristic of resilience. This possible scenario for the evolution of the urban and architectural design of urban systems requires the definition of

innovative methods and instruments that support decision-making processes with an effect on the safety and quality of life.

However, the dimension of risk, for each specific local reality, is not static or objective, but the object of negotiation and in constant evolution: an event is considered a risk only when a community recognizes it as such.

The processes of constructing/transforming urban systems facing the risk of flooding, focused on the implementation or improvement of characteristics of resilience with respect to possible dangers or adverse events cannot, for this reason, assume the physical domain as their sole field of action, ignoring the social dimension. Doing so would frustrate any actions aimed at improving the current situation.

The physical and the social dimension, in particular in the field of risk reduction, are closely interrelated because they are associated with the idea of the future of a specific community. For this reason, when designing the construction/transformation of the built environment, the prevention and diminution of risk must together assume these dimensions beginning with the consideration of the fundamental role of citizens as the stakeholders in the field of safety, integrating within processes of design the theme of risk communication to foster the informed participation of the general public in decision-making processes relative to the definition of plans, programs and projects.

Further research work is in the direction of the experimentation of the proposed tools for the social dimension of a territory to improve resilience against every kind of risk before and during the design and construction phases of new infrastructures for safety in the physic dimension.

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