

# CONCEPTUAL ASSESSMENT OF RESILIENCE THROUGH ITS ORIGINS, PERSPECTIVES AND ATTRIBUTES: FROM “RESILEMENT” TO URBAN RESILIENCE

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## Abstract

It is clear that 2000s are the periods when the complexity science was developed and there was an increasing necessity to plan and manage for the rapidly changing disorders. At this point, the concept of “resilience” can be referred to understand how to address the changes and challenges of the uncertain world. Resilience is a positive concept that dates back to 17<sup>th</sup> century. The etymology of the word is the Latin words in Classical Times which are “resilire”, “resalire”, “resilio,” meaning to jump back, rebound, walk or leap back and bounce back. It gained various descriptions, perspectives and aspects throughout history. It is usually supposed to be the flip-side of vulnerability and it is assumed that it can turn negative circumstances into advantages. Its link with the urban related sectors started to progress firstly through ecological aspects by the work of Holling in 1973. The in-dept analysis of resilience showed how the concept could shed light on the solution of the 21<sup>st</sup> century's uncertainty related urban problems by means of developing the capacity to “manage change”. For this reason, resilience is considered as a new “concept” addressing the notion of managing and adjusting to the unexpected changes, uncertainties and challenges continuously.

Today, there is an increasing interest in resilience but yet no clear consensus in favor of its attributes or conceptual expansion, besides, it is not clarified if it is a science or a theory, along with its relation between the grounded concepts such as sustainability and vulnerability. Therefore, this paper aims to elucidate resilience concept and consequently to understand how it can address the challenges of this uncertain era. For that reason, the paper constructs a better understanding and clarifies the peculiarities of resilience in two sections. The primary section discusses the origins, definitions, different perspectives and dimensions of resilience; later then explains its basic attributes. Finally, the second section evaluates its relation with basic concepts such as vulnerability and sustainability as well as its position in urban related issues.

**Keywords:** Complexity, Resilience, Vulnerability, Sustainability, Dynamism, Urban Resilience

## DAYANIKLILIĞIN (DİRENÇLİLİĞİN) KÖKENİ, PERKSPEKTİFLERİ VE NİTELİKLERİ ÜZERİNDEN KAVRAMSAL DEĞERLENDİRİMESİ: “RESILEMENT” DAN KENTSEL DAYANIKLILIĞA

## Öz

2000'li yıllar karmaşıklık biliminin geliştiği, hızla değişen dinamikleri planlamanın ve değişimi yönetmenin önemini arttırdığı bir dönemi ifade etmektedir. Bu noktada “dayanıklılık (bazı kaynaklarda “dirençlilik” olarak ifade edilmektedir. dirençliliğin “resistance” kavramıyla daha çok örtüşüğü bilinmektedir)” kavramı, belirsiz dünyanın değişimlerinin ve zorluklarının nasıl ele alınacağını anlamak için karımıza çıkar. Dayanıklılık, kökeni 17. yüzyıla kadar uzanan bir kavramdır. Kelimenin etimolojisi, Klasik Zamanlardaki “resilire”, “resalire”, “resilio” olan Latince kelimelerdir; geri atlama, geri tepmek veya geriye atlama anlamına gelir. Tarih boyunca çeşitli açıklamalar, bakış açıları ve tanımlar kazanmıştır. Genellikle kırılganlık kavramının zıt anlamlısı olarak kullanılır ve olumsuz koşulları avantaja çevirebilecek bir kapasiteyi ifade ettiği düşünülür. Kent literatürüyle bağlantısı, ilk olarak 1973'te Holling'in çalışmalarına dayanarak ekolojik temelli olarak gelişmeye başlamıştır. Dayanıklılığın derinlemesine analizi, kavramın 21. yüzyıldaki belirsizlikle ilgili sorunların çözümüne nasıl ışık tutulabileceğini göstermesi ve “değişimi yönetme” kapasitesini geliştirmesi bakımından önem arz etmektedir. Bu nedenle, dayanıklılık, beklenmeyen değişikliklerin, belirsizliklerin ve zorlukların sürekli olarak yönetilmesi ve ayarlanması fikrini ele alan yeni bir “kavram” olarak kabul edilir.

Günümüzde, dayanıklılık kavramına artan bir ilgi olmasına rağmen, özellikleri veya kavramsal açılımına dair net bir fikir birliği yoktur. Bunun yanı sıra, kavramın bir bilim veya teori olup olmadığı ve kavramın sürdürülebilirlik ya da kırılganlıkla olan ilişkisi hakkında da net bir çalışma bulunmamaktadır. Bu nedenle bu bildiri, dayanıklılık kavramını açıklamayı ve sonuç olarak bu belirsiz dönemin

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zorluklarını nasıl çözebileceğini anlatmayı amaçlamaktadır. Bu itibarla, bildiri iki temel bölüme ayrılarak dayanıklılığın kavramsal açlığını sağlamaktadır. Birincil bölüm, öncelikle kavramın kökenini, farklı bakış açılarını, boyutlarını ve tanımlarını; daha sonra temel özelliklerini açıklamaktadır. Son olarak ikinci bölüm, kırılganlık ve sürdürülebilirlik gibi temel kavramlarla olan ilişkisini ve aynı zamanda kent/kent planlama literatüründeki konumunu değerlendirmektedir.

**Anahtar Kelimeler:** Karmaşıklık, Dayanıklılık-Dirençlilik, Kırılganlık, Sürdürülebilirlik, Dinamizm, Kentsel Dayanıklılık

## 1. INTRODUCTION- WHAT IS MEANT BY “RESILIENCE”?

The publications on resilience in Thomson Reuters Web of Science database show that 1990s is the period when resilience key worded publications started to raise significance. In 2010, there were over 2000 publications of resilience which were related to various fields from psychology to urban planning. However, there is not a clear consensus about the definitions, dimensions or attributes of resilience. Therefore, this paper offers a conceptual analysis of resilience to clarify what it refers to, how it is used to upgrade other well-known concepts like vulnerability and sustainability and how to place it in urban planning paradigms.

The College Dictionary (1975) and The Oxford English Dictionary define resilience as the ability 1. to return to the original form or position after being bent, compressed or stretched; elasticity, and 2. to recover readily from illness, depression, adversity, or the like; buoyancy (Yaman-Galantini, 2018a; 2018b). However, resilience is an older Latin word in Classical Times (Alexander, 2013) “resilire”, “resalire,”, “resilio,” meaning to jump back, rebound and bounce back (Klein et al. 2003). Sir Francis Bacon did the first known scientific use of resilience in English during the period 1616–26. While, the first known dictionary definition of resilience: the Glossographia compiled by the lawyer and antiquarian Thomas Blount (1618–79) with a dual meaning: to rebound and to go back on one’s word (as in resilement, an obsolete derivative). In the first half of the 19<sup>th</sup> century, resilience was still used in the sense of rebounding and significantly, from 1839 the term was used to signify the ability to recover from adversity, in the sense of strength (Alexander, 2013). From 19<sup>th</sup> century to today, resilience has become a term of various fields.

Following Holling’s seminal work entitled “Resilience and Stability of Ecological Systems” (1973), resilience gained currency in the sphere of ecology. This period can also be interpreted as the rise of resilience in urban related issues. Many classifications or in other words more detailed descriptions of resilience were also developed afterwards. For example, Folke et al. (2010) and Miller et al. (2010) identified the distinction between “general resilience” (resilience of a large-scale system to all kinds of shocks) and “specific/targeted resilience” (tries to understand the key slow variables, which are configuring the system). Another different interpretation was “transformative resilience” which refers to an analytical tool to guide research on the nature of system change, innovation, and creativity in the face of stress or trauma (Gotham and Campanella, 2010). On the other hand, “evolutionary resilience” advocated that the very nature of systems may change over time with or without an external disturbance and resilience is not perceived as a return to normality, but rather as the ability to change, adapt, and crucially transform in response to stresses (Davoudi, 2012). Finally, Rose (2009) explained “adaptive resilience” which refers to the ability in crises to maintain function. Consequently, the most common definitions of resilience were decided as 1. the amount of disturbance a system can absorb and still remain within the same state or domain of attraction; 2. the degree to which the system is capable of self-organization; and 3. the ability to build and increase the capacity for learning and adaptation (Carpenter et al. 2001; Berkes et al. 2003; CSIRO, 2007). Thus, resilience refers to a capacity to “manage change” constantly through understanding, adapting to and surviving from complexity. This promotes a passage from static, equilibrium position toward a dynamic, non-equilibrium position.

Considering all these diverse explanations and the increasing popularity of the term, it was already crucial to discuss if resilience has become a new field of “science”, it can be called as a “theory” or a “paradigm”. For instance, Pizzo (2015) argues that it is not clear yet if resilience should become a paradigm. Moreover, it is argued that resilience is not a science or a theory. In order to build “resilience theory,” it would be required to develop a set of hypotheses, conduct controlled experiments to test them, and through this process develop a set of basic facts (Walker et al. 2006). Thus, resilience does not come down to a single testable theory or hypothesis. In addition, Folke (2006) indicates, resilience as an “approach”, a way of thinking, to guide and organize thoughts. Likewise, Carpenter and Brock (2008) stress that; resilience is a broad, multifaceted cluster of concepts related to transformation and persistence. From this point of view, resilience can be interpreted as a positive concept addressing recovery from adversity and adaptation to new conditions. So, it refers to a “dynamic” feature associated with a process of “continual adjustment”. In other words, as Yaman-Galantini (2018a) described, resilience can be considered as a new “concept” reflecting a new “approach” addressing “dynamism”.

Subsequently, considering this expansion of resilience and its raising popularity in urban related issues, then, in order to assess the resilience of urban systems or integrate it with urban planning process, there can be two important points; first of all, it is required to define its basic attributes and through which dynamic characteristics it can relate to urban planning. These attributes can be considered as “indicators of resilience”. They can be grouped as more stability related and dynamism or action related attributes, parallel with its meaning to “manage change”. More specifically, there are two options to manage change; keeping the system work/stable or making the system transform. On the other hand, as Yaman-Galantini (2018a) suggested, the basic criteria of reduced consequences from failures, reduced time to recovery and learning to live with change and uncertainty are also fundamental to provide resilience. Secondly, assessing resilience of urban systems can be handled through constructing its associations with other prominent terms such as “vulnerability” and “sustainability”. This helps not only to clarify the similarities or differences among the terms, but also clarify the attributes and the “uniqueness” of resilience.

## 2. WHAT DOES “URBAN RESILIENCE” REFER?

It is clear that, in order to understand how resilience can contribute to urban studies, it has to be measured and eventually determined if urban systems are resilient enough or they need to develop specific capacity to be resilient. In this sense, to assess the “resilience in cities”, “resilience of cities” (Ernstson et al. 2010) or how “resilient” the “urbanism” is (Gleeson, 2008), it is necessary to develop clear resilience indicators. As it was mentioned, basic attributes of resilience can give a clue about its indicators. However, to interpret the results, it is useful to consider the relation of resilience between vulnerability and sustainability.

Buckle et al. (2001), Berkes (2007) and Gallopín, (2006; 2007) studied the relation between resilience and vulnerability in order to analyze if resilience mentions “recovering from vulnerabilities”. Based on a wide literature review, Yaman-Galantini (2018a) reflected a clear correlation. Therefore, the concepts can be; 1. flip side/opposite; 2. not necessarily opposite and 3. interrelated concepts. According to Buckle et al. (2001), the higher the resilience, the less likely damage may be, and the faster and more effective recovery is likely to be and vice versa. On the other hand, Gallopín (2006) noted that vulnerability is sometimes taken to be the exact opposite of resilience, but this is not clear. For example, a certain level of exposure increasing overall vulnerability could actually create the opportunity for experiences that enhance overall system resilience. Finally, Miller et. al (2010) listed that both vulnerability and resilience; 1. are concerned with how systems respond to change; 2. focus on the interaction of slower and more rapid dynamics; 3. are concerned with multiscale temporal processes; 4. are oriented toward responses to stress and perturbations, and the interaction of slow and rapid changes; 5. need to move beyond mutual understanding; and 6. can advance a more integrated understanding of social-ecological change. Hence, this social-ecological convergence of the two areas provides conceptual and methodological

synergy and it can be interpreted as both concepts are interrelated. More importantly, this perspective also spread the idea to use vulnerability indicators to measure resilience. Surely, vulnerability indicators won't be enough to measure the "dynamic character" of resilience, however, it is useful to assess resilience from a "static" point of view.

Furthermore, the discussion of the influences of resilience on sustainability was a hot issue in 1990s. A comprehensive evaluation was made by Yaman-Galantini (2018a; 2018b) referring that there can be three possible assumptions; 1. sustainability is the overall aim so resilience is sustainability's subset; 2. resilience is a more comprehensive concept and it is necessary precondition/key concept for sustainability; 3. both terms comprehend almost the same meaning and they can be used interchangeably. Nonetheless, the relation between resilience-sustainability differs from the relation between vulnerability-resilience. Novotny et al. (2010) clarifies this distinction through the rising role of change, dynamics and uncertainty over sustainability as a different perception. It gets more important to question if sustainability is still adequate in terms of the principal idea to preserve resources from generation to generation in view of the global challenges. Survival is one of the key points of sustainability and learning to live with the limits and avoid the collapse of the systems should be the solution. Therefore, the main issue is to overcome the deficiency of sustainability in terms of the dynamic and non-equilibrium perspective, ever since sustainability used to be a concept proposing durability and stability. Thus, as Yaman-Galantini (2018b) pointed out, the reliability and rationality of a stable system's sustainability in the context of unexpected disturbances and changes have to be questioned. Consequently, the three main attributes of sustainability described in the Brundtland Report (1987) which are "the provision of needs, development and inter and intra-generational equity-justice in terms of resource maintenance", should be updated and upgraded based on today's "non-linear" "needs", "development" and "equity" approaches. So, resilience attributes can contribute to this required upgrade.

Resilience does not definitely aim to replace sustainability, neither it aims to beat vulnerability, however, it has the dynamic perspective of change, uncertainty, unpredictability and adaptability that are needed in the turbulent global systems. From this point of view, if the urban policies are developed and indicators are inferred from this aspect, then urban planning practices can help not only for the creation of resilient cities, but also the provision, enhancement and the maintenance of urban resilience. With this regard, it is possible to declare that urban resilience can contribute to fostering new approaches for urban planning practices. Indeed, to appraise how resilience can address the bottlenecks of contemporary urban planning, it is indispensable to answer where to locate resilience in planning paradigms.



Figure. Where to place "Resilience" in urban planning paradigms

Even if not described properly, there was already a tendency to provide resilience in urban plans in the 1980s with the emphasis on environmental issues. Moreover, as Plodinec (2009) explained, 1980s is the period where resilience started to be used as a physical infrastructure term in disaster related issues. Following this period, in 1990s and 2000s, strategic spatial planning was recuperated as a reaction to the complex and uncertain global challenges (Yaman-Galantini, 2018a; 2018c). Nonetheless, though the dominance of

sustainability and strategic planning in the contemporary urban development, the growing influence of complexity in 2000s resulted in the requirement of a more comprehensive approach (Figure). At this point, the aim of maintaining urban resilience can offer a new method to solve the complexities of the 21<sup>st</sup> century, comprehending the past, present and future movements, addressing all kinds of weaknesses and defining thresholds for unexpected changes, with a multi-dimensional, multi-scale and process oriented aspect. This requires to respond in a wider perspective. As Healey (2008) and Balducci et al (2011) express, urban planning should comprehend the new emerged development paths which brings about the transformation in the purpose and fundamentals of urban planning. Thus, it is relevant that the natural evolution of urban planning paradigms already promotes the incorporation of resilience and urban planning (Yaman-Galantini, 2018a; 2018c).

Recent case studies about this integration of urban resilience and urban planning can be identified in two ways; studies referring to the approach or insights, and studies referring to the process. In the meanwhile, the basic subjects are mitigation and adaptation to climate change; disaster planning, management and recovery; energy and environmental security; urban water management and urban design. Since the novelty of resilience that it refers not only to the key logic of sustainability through "stability" but also the way out of "chaos" through "recovery or transformation" (Yaman-Galantini, 2018a; 2018c), this supports the idea that resilience cannot be an approach only for disaster mitigation but also it has the tools in a larger scale in promoting economic, spatial, environmental and social enhancement. So as Yaman-Galantini and Tezer (2016) described, the integration between resilience and urban planning is actually a "forward-looking- comprehensive - strategic - systems planning approach". Therefore, this kind of urban planning is desired to solve the gaps between the old-fashioned plans and the new knowledge, to be multi-dimensional, action and process oriented, which can address existing vulnerabilities and possible ones across scales. That means, "dynamic" character of resilience can upgrade and update the steps and the basic elements of the contemporary urban planning.

### 3. CONCLUSION

To conclude, rooted for centuries, today, resilience succeeded to have a place in urban studies, and it filled a crucial gap in terms of the necessity for dynamism and adapting to changing circumstances. So, successful urban planning based on a resilience perspective is crucial for;

- giving a direction to uncertainty and preparation for an innovative transformation,
- being liable to come up against unpredicted events or accidents,
- being not only the key logic of sustainability through "stability" but also the way out of "chaos" through "recovery or transformation".

These perspectives decisively should embrace a multi-dimensional approach, need to be "case specific" and take into account the "changing targets" – with reference to "changing resilience attributes" for each case study.

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