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Review Paper

Place-based Alignment of Urban Resilience Features: A Systematic Qualitative Review

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Abstract
One of the main goals of the resilient discourse in the recent urban design literature has been creating resilient places. Urban resilience is defined by the URFs (urban resilience features) for operation and realization in various fields. Due to continuous urban developments, there is a need to revise URFs with a place-based approach. URFs addressed in literature are so diverse that placing them into one single general list creates many contradictions and ambiguities. To reduce or eliminate inconsistencies in the definition of URFs and the qualitative performance of each URF in delivering urban resilience, this paper justifies the key factors for ordering and classifying URFs. In this study, a systematic review of the literature on urban resilience was performed in five stages using the Scopus databases within the 1973-February 2020 period. Then, 16 URFs, using three guidelines based on the corresponding evaluation of place and resilience, were identified and classified into three groups: (1) the intrinsic (internal) characteristics of the constituent components of a resilient system, (2) the behavioral proxies (proactive/reactive) of a resilient system and (3) the resilience-reinforcing attributes of a system in relation to the external environment. This study can shed light on the proper definition of urban resilience and its operational URFs.

Keywords: *Urban resilience, Resilient place, Urban resilience features (URFs), Urban design.*

1. INTRODUCTION

The concept of resilience, based on the classical resilience paradigm, means resistance to change and return to the original state. It has been described in the literature of engineering, psychology, and crisis management (Meerow, Newell, & Stults, 2016). In this orientation, equilibrium is the fundamental factor that carries out the system and maintains the stability of urban ecosystems. The URFs listed by researchers with an equilibrium view have been based on a structural and physical approach, and focus on efficiency, stability, and predictability (Carpenter et al., 2001; Cloete, 2012; Folke et al., 2010; Holling, 1973). The question here is whether it is possible to plan and design a resilient city through hazard maps and vulnerability perceptions (Borie et al., 2019). Is it possible to visualize an urban resilience map or complete quantification of resilience? Urban resilience does not have an exploratory cartographic map (Cutter et al., 2008; Meerow et al., 2016). Urban resilience depends on a multitude of physical, social, economic, and ecological factors. From this, it can be inferred that resilience is not the result of a top-down process.

There are three challenges to the equilibrium perspective: First, it is not always desirable to return to the situation before the change, especially when the initial conditions are not favorable and are unbearable, and at the same time can be sustainable (e.g. deteriorated urban fabrics). Second, the complexity of urban systems and the conditions of uncertainty make it impossible to return to the status quo ante after the change (Barata-Salgueiro & Erkip, 2014; Klein, Nicholls, & Thomalla, 2003; Meerow et al., 2016). Third, a complex urban system rarely

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places at a point of equilibrium or stability for long periods of time (Gunderson & Holling, 2002). Resilience is imaginable to be more than vulnerability (Buckle, Mars, & Smale, 2000; Klein et al., 2003; Weichselgartner & Kelman, 2015), it includes analysis of disruption exposure and periods of recovery and reorganization that also include the characteristics of the community. This addresses the permanent and unpredictable changes in the urban system and on the other hand the multiple stages of stability in urban systems. Following the inefficiency of this attitude, the urban planning and design paradigms have been led from a traditional risk assessment engineering perspective to a more comprehensive and adaptable approach with more scenarios. Hence, urban resilience has been conceptualized in a multi-equilibrium and non-equilibrium state (Folke, 2006). Resilience is the capacity of the urban system to maintain key functions (Chelleri 2012; da Silva, Kernaghan, & Luque, 2012), but it does not necessarily mean returning to the status quo ante. The multi-equilibrium approach of resilience, which is rooted in ecological resilience (Biggs, Schlüter, & Schoon, 2015; Folke, Colding & Berkes, 2009), considers returning to previous conditions and the dimension of resistance as one of the resilience scenarios, and adaptability and acceptance of change in the urban ecosystem are other scenarios that are offered according to the context (Desouza and Flanery 2013). In this view, the concept of " failsafe " is contrasted with "safe to fail" (Ahern, 2011) and relied on the ability of the local community for adaptive resilience outputs.

In the interpretive and non-equilibrium perspective of resilience (Davoudi, Brooks, & Mehmood, 2013), social and ecological systems have been conceptualized that address the interdependence of community and the environment, and there is no steady state vis-a-vis constant change (Pickett, Cadenasso, & Grove, 2004). Community acquires the knowledge of the place through lived experience, and this knowledge produces a sense of attachment to the place (Tuan, 1977), so "being in place" is the same as "belonging"(Cresswell, 2004). Following the evolutionary process of resilience, human cognitive and perceptual characteristics of the environment have also been added to the socio-ecological factors of resilience so that being 'in place' and being 'of place' have different interpretations of urban resilience. Communities' capacity to withstand external shocks depends on their social infrastructure in addition to physical factors. This is formulated in the alignment of the new paradigm of place-based resilience. In the literature, urban resilience is operated through URFs and there is no agreement on them, and overlaps and contradictions are observed in the categories of URFs (Feliciotti, 2018). These discrepancies in the utilization of URFs might have resulted from the different perceptions of the concept of resilience in various disciplines and the inappropriate use of ecological approaches in social systems, and on the other hand due to a lack of understanding of the nature of URFs (Cumming, 2011).

In the studies and surveys that have been carried out about urban resilience, the URFs have sometimes been presented as a general list and sometimes in categories (Feliciotti, 2018). Numerous terms and titles have been used in different works for the taxonomy of URFs (Meerow et al., 2016). Sometimes a feature such as “redundancy” is regarded as an intrinsic feature of a system (Sharifi, 2019) and sometimes it is categorized alongside the behavioral proxies of that system (Ahern, 2013). Similarly, sometimes a feature such as “strength” is conceptually placed against “self-organization” and forms a paradox in the discourse of resilience (Caputo et al., 2015).

This divergence and at times contradiction bespeak the complexity and multi-layered nature of the concept of resilience (Davoudi et al., 2012; Vaništa Lazarević, Keković, & Antonić, 2018). On the other hand, the concept of place is in the spotlight of urban design knowledge, and creating a resilient place in the recent approach to urban resilience is considered an idea for the delivering of urban resilience goals (Shafiei-dastjerdi, Lak, Ghaffari, & Sharifi, 2021). Thus, interpretive properties of place in relation to resilience are useful for redefining and sorting URFs and addressing these contradictions. This study focuses on the recognition and categorization of the URFs in the literature based on the phenomenological guidelines of place. The main goal is to pave the way for forming a resilience evaluation framework that can tie together the physical, functional-behavioral (Pizzo, 2015), and cognitive-perceptual (Lak, Hasankhan, & Garakani, 2020) aspects of this concept. This framework will be presented by the authors in future studies.

In this regard, the following two research questions are raised: 1) how can we recognize URFs based on place qualitative aspects? And, 2) in what categories can URFs be classified according to their nature? To answer the first question, strategies related to URFs have been developed in the comparative cycle literature and the interpretive place literature. To answer the second question, based on the nature of URFs, it has been classified into three groups.

2. RESEARCH METHODOLOGY

The PRISMA Statement is a reporting guideline designed to improve the transparency of systematic

reviews and meta-analyses (Liberati et al., 2009; Moher et al., 2016). In this study, systematic reviews were used to review the literature. Accordingly, after a wide search, the number of articles is reduced according to the first (i.e. the scope of urban design) and the second aspects (i.e. having clear URFs). The scope of urban design can be ambiguous due to its extent. Therefore, due to the place-based nature of the studies, the articles that included the qualities of urban design (such as vitality, sense of belonging, legibility, imagination, etc.) were selected as a priority. Each of the URFs has a specific performance range and has the most effects in this domain. To define the conceptual framework of resilient place assessment, the classification of URFs is already proposed (Shafiei-dastjerdi, Lak, Ghaffari, & Sharifi, 2021). In the present article, this issue has been developed and updated, and the logic and arguments for sorting and classifying URFs have been explained. The operational implications of this classification are also described. Systematic reviews were used for exploring the literature (Okoli, 2015). The snowball method was used for completing the selection process of the study sources. Content analysis of studies about 'urban resilience' was used for the identification of URFs of this concept. This research was conducted in three different sections (Figure 1).

Stage 1: Keywords "urban resilience" and "resilient city" were searched in Scopus databases from 1973 (when Holling's paper was published) to April 2020 with English set as the language of studies and a total of 1236 papers were found.

Stage 2: At this point conference papers, notes, and duplicate papers were removed. The number of papers at this stage is 248.

Stage 3: From among the total number of papers found in the first stage, 61 studies were selected by the "urban design" search code and 14 more studies were added to that number by the snowball method, which was not in the main search.

Stage 4: Papers that clearly defined the URFs were selected. This stage was performed by content analysis of the papers. 36 sources and 55 features were extracted at this stage (Table 1).

Stage 5: The URFs were placed into three groups via content analysis by using three guidelines (Tables 3, 4, and 5). Each of the URFs has qualities that need to be dissected for effective performance. It is not possible to draw a precise boundary line between URFs, and not every URFs can be used in multiple and unlimited permutations. But the application of each URFs according to its nature can be more effective in an operational domain. Therefore, the nature of each URFs was determined according to its definitions and applications in the literature, and in accordance with one of the guidelines, it was placed in a group. URFs with different names but with the same definition were classified together.

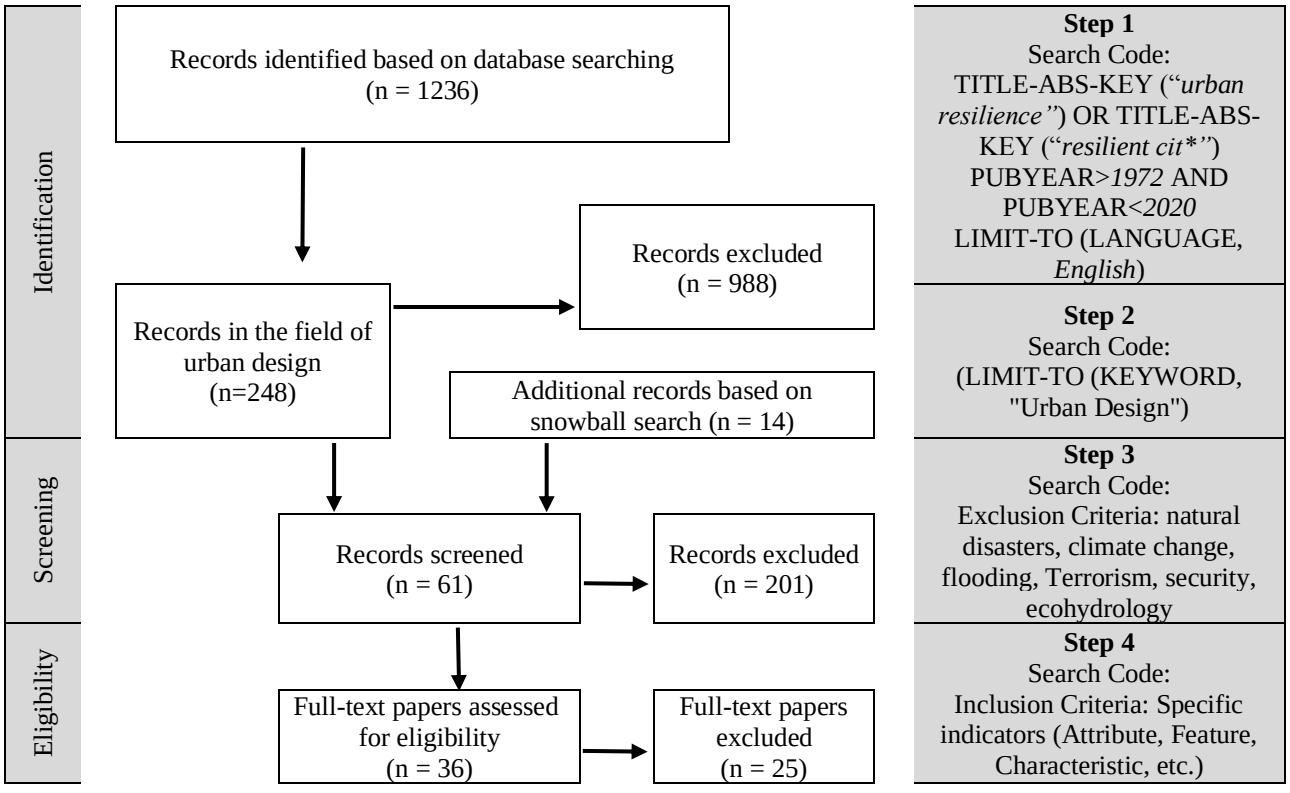

Fig 1. PRISMA Flow Diagram of the Research

Table 1. URFs derived from the literature

Feature	Freq.	Source
Diversity	23	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Liu, Xiu, and Song 2019); (Sharifi 2019a);
Redundancy	15	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Sharifi 2019a);
Connectivity	9	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019a); (Feliciotti, Romice, and Porta 2017)
Robustness	7	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Sharifi and Yamagata 2014); (Galderisi 2014)
Efficiency	12	(Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Liu, Xiu, and Song 2019); (Sharifi 2019a); (Masnavi, Gharai, and Hajibandeh 2019); (Feliciotti, Romice, and Porta 2017)
Resourcefulness	6	(Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Sharifi 2019a); (Collier et al. 2014); (Sharifi and Yamagata 2014);
Modularity	13	(Sharifi 2019b); (Sharifi 2019a); (Masnavi, Gharai, and Hajibandeh 2019); (Feliciotti, Romice, and Porta 2017); (Tabibian and Rezapour 2016);
Innovation	7	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Tabibian and Rezapour 2016); (Suárez et al. 2016);
Social Learning	6	(Lak, Hasankhan, and Garakani 2020); (Collier et al. 2014); (Marcus, L., Colding 2014); (Galderisi 2014); (Anderies 2014); (da Silva, Kernaghan, and Luque 2012)
Flexibility	4	(Sharifi 2019b); (Collier et al. 2014); (Roggema 2014); (da Silva, Kernaghan, and Luque 2012)
Self-organization	6	(Sharifi 2019b); (Sharifi 2019a); (Marcus, L., Colding 2014); (Sharifi and Yamagata 2014); (Anderies 2014)
Coherence	4	(Masnavi, Gharai, and Hajibandeh 2019); (Suárez et al. 2016); (Coaffee 2013); (Cloete 2012)
Adaptation	14	(Lak, Hasankhan, and Garakani 2020); (Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Sharifi 2019b); (Sharifi 2019a); (Meerow, Newell, and Stults 2016);
Integration	3	(Ribeiro, P.J.G., Pena Jardim Goncalves 2019); (Pickett et al. 2014); (Coaffee 2013)
persistence	4	(Sharifi 2019b); (Meerow, Newell, and Stults 2016); (Tabibian and Rezapour 2016); (Cloete 2012)
Multi-functionality	3	(Sharifi 2019b); (Jack Ahern 2013); (Jack Ahern 2011)
Transformation	3	(Meerow, Newell, and Stults 2016); (Marcus, L., Colding 2014); (Anderies 2014)
Social Capital	5	(Lak, Hasankhan, and Garakani 2020); (Sharifi 2019a); Chelleri, L., et al. 2015; (Pickett et al. 2014); (Beatley and Newman 2013)
Identity	3	(Lak, Hasankhan, and Garakani 2020); (Mehmood 2016); (Allan and Bryant 2014)
Tight feedbacks	3	(Suárez et al. 2016); (Allan and Bryant 2014); (Anderies 2014)
Ecosystem service	4	(J Ahern, Cilliers, and J Niemelä 2014); (Gómez-Baggethun et al. 2013); (Beatley and Newman 2013); (da Silva, Kernaghan, and Luque 2012)
Good Governance	3	(Therrien, Usher, and Matyas 2020); (Lak, Hasankhan, and Garakani 2020); (Pickett et al. 2014)
Coordination capacity	4	(Sharifi 2019a); (Tabibian and Rezapour 2016); (Sharifi and Yamagata 2014); (Coaffee 2013)
Responsiveness	3	(Collier et al. 2014); (da Silva, Kernaghan, and Luque 2012); (Anderies 2014)

Table 2. Ordering of the URFs based on their frequency of appearance in the literature

Feature.	Freq.	Feature	Freq.
Diversity	23	Flexibility	7
Redundancy	15	Coherence	4
adaptation	14	persistence	4
Modularity	13	Ecosystem services	4
Efficiency	12	Coordination capacity	4
Connectivity	9	Integration	3
Robustness	7	Multi-functionality	3
Innovation	7	Transformation	3
Resourcefulness	6	Identity	3
Self-organization	6	Tight feedbacks	3
Social Learning	6	Good Governance	3
Social Capital	5	Responsiveness	3

Note: URFs *with a frequency of less than three were removed.*

Table 3. Comparative comparison of resilience and interpretive facets of place

Interpretive facets of place	Guidelines to classify	Theoretical facets of resilience
Being in and of the place Lived experience; sense of place; Perceptual layers of place.	Guideline 1 Intrinsic characteristics of resilience (Prerequisite for creating a resilient place)	Intrinsic characteristics of internal elements Internal elements have an inherent resilience capacity, which is derived from the intrinsic properties and their synergy.
External agents The qualities of external agents that enhance the special character of the place.	Guideline 2 Resilience reinforcing attributes	Constructed resilience features Internal elements, thanks to empowerment, can increase their resilience capacity and their correlation vis-a-vis external changes.
Interaction The relationship and interaction of community with external agents.	Guideline 3 Place behavior (Response paths)	Behavior and response path The system responds to change through three options: recovery to the previous state, adaptability to change and evolution in new conditions.

Table 4. The intrinsic characteristics of urban resilience

feature	Definition	Freq.
Robustness	Resistance to changes and disturbances without failure and loss of functional status.	11
Coherence	The capacity of various urban elements to achieve a sense of large-scale consistency and integrated continuous urban context.	7
Flexibility	The ability to change, evolve, and adopt alternative strategies (either in the short or long-term) in response to changing conditions.	7
Self-Organization	Responding to change and the spatial (re)arrangement of elements.	6
Efficiency	Considering the costs and benefits of actions and developing strategies for maximizing benefits given the limited resources available.	12
Resourcefulness	The ability to mobilize assets and human resources and the role of the local scale to take action.	6
Social Capital	It helps people bring together in pursuit of common interests, and can develop and reinforce social networks and assets.	7
Social learning	Internalizing experience and failures, and use such experience to avoid repeating past mistakes.	6

Table 5. The behavioral Proxies of urban resilience

Feature	Definition
Recovery	The ability to recover from a change and return to pre-change performance conditions.
Adaptability	Learning from experience and adapting to change.
Transformation	Creating a completely new situation when environmental, economic, or social conditions are unsustainable.
Innovation	The creative progressive vigor eventually led to the maintenance of the status quo or creative adaptation.

3. RESULTS: EXTRACTING URFS IN THE LITERATURE

Urban resilience in the last decade with the recognition of a process of change has had content transcendence from a physical-structural to ecological-social and perceptual-environmental perspectives (Lak et al., 2020). This evolutionary orientation addresses the constant and unpredictable changes in the urban system and, on the other hand, the multiple stages of stability in urban systems (Abdulkareem & Elkadi, 2018; Davoudi et al., 2013; Mehmood, 2016; Wink et al., 2016). In this view, community capabilities for innovation and learning are seriously considered, and people's lived experiences provide the context for understanding

change in and of' the place (Adger et al., 2013; Janusz, Six, & Vanneste, 2017; Zhu et al., 2014). Various URFs have been used in the literature to describe urban resilience and resilient city and their operation. Given the search methodology, by restriction applied to search for the keywords "Urban Resilience" and "Resilient Cit *" in Scopus databases in the period 1973 to 2019 and the snowball method, finally, 36 papers were selected for content analysis. Then, 54 URFs were extracted from these papers (Table 1 and 2), based on the frequency of each feature, its priority was determined.

Diversity, redundancy, adaptability, modularity, efficiency, connectivity, robustness, innovation, resourcefulness, self-organization, social learning, social capital, flexibility, and cohesion, respectively, had the highest frequency of resilience characteristics. Recovery, adaptability, and transformation (transition) have been addressed mainly in the literature as pathways of the urban system to respond vis-a-vis change, and institutional innovations have largely embodied in behavioral proxies of adaptability and transformation. URFs have been used in the literature with several synonymous terms. For example, diversity with variability, heterogeneous components, (bio and social) diversity is also used. Coherence is referred to as both physical and social dimensions and is sometimes synonymous with continuity, and in some situations, the term cohesion is used in social dimensions. Social capital also with the terms trust, strong social networks, ties and social interconnected are also used. In the literature, URFs corresponding to physical dimensions have a higher frequency and a growing trend in non-physical URFs can be observed, focusing on non-physical dimensions.

4. DISCUSSION

To identify the class of each URFs, one must first address the main thematic domains. URFs are defined by the sharing of the two domains "resilience" and "urban". Resilience based on the adaptive renewal cycle is justified and is defined by a complete adaptive cycle in ecology. The adaptive renovation cycle and its development into nested adaptive cycles (panarchy) has been a useful conceptual framework for understanding the dynamics of change in socio-ecological systems (SESs). The weakness in the constructive features of the system resilience means the transformation from one cycle to another. The term urban also carries the concepts of urban planning and design, which is reflected in the recent convergence of the two in the delivery of a resilient place. Therefore, in the first domain (resilience theory), significant guidelines in the adaptive cycle and in the second domain (urban) interpretive facets of the place were addressed and the guidelines were extracted accordingly.

4.1. Guidelines Derived from the Adaptive Cycle

The adaptive cycle has been proposed as a basic framework for understanding the behavior and response pathways of complex systems (Holling & Sanderson, 1996). In the adaptive renewal cycle (Figure 1), ecosystem behavior can be described as a dynamic interaction between four main functions: exploitation (growth), conservation, release (creative destruction), and reorganization. Exploitation represents the process of establishing a disrupted ecosystem that has not been able to adapt to or resist change. At this stage, the behavior of the system is adaptable to new conditions. Conservation is a gradual phase of resource accumulation, and complex structures (Climax Community) are produced. Connection and stability characteristics increase during the slow sequence from exploitation to conservation, and the internal elements have a high level of interconnection (Marcus & Colding 2014). At this stage, the behavior of the system is to absorb and stabilize the status quo with the least variability. The release phase occurs when the conservation phase creates strong structures with excessive connections so that the system becomes fragile due to a change and disruption. This process of change opens up the opportunity for the fourth stage, reorganization. In this stage, the resources available for the next phase of operation are moved and mobilized. Between these two stages, the system uses its initiative and innovation to re-establish and adapt to new conditions. Resilience behavior according to the capability and capacity of the system in which the state of the cycle and the severity of environmental hazards is obtained from three main pathways (absorption capacity, adaptation, and transformation) (folke et al., 2010). The capacity of the system depends on the limitation or abundance of resources and the quantitative and qualitative richness of its internal elements, especially its institutional quality. While collapse refers to a lack of resilience, conservation and adaptability can be seen as evolutionary pathways of resilience.

Thus, the guidelines addressed in the adaptive cycle can be justified as follows:

The internal elements of the system have intrinsic and underlying characteristics on which the resilience capacity of the system depends.

Internal elements can improve their resilience capacity by acquiring capabilities, and their synergy increases the resilience of the system. In fact,

constructed (manufactured) qualities will be produced.

The system exhibits different behaviors vis-a-vis change, depending on its internal capacity and increased (manufactured) capacity.

4.2. Interpretive Facets of the Place Corresponding to Resilience

The relationship between resilience and place can also be analyzed from a qualitative perspective so the urban resilience attributes (URAs) can be examined in relation to the nature of the place (Mehmood, 2016). The aim of this paper is to recognize the general URFs in the literature and address them based on the substance qualities of place. First, the substance attributes of the place are discussed, then some guidelines for addressing and categorizing the components of resilience are formulated.

In Descartes' view which emphasizes the separation of subject and object, man is an observer in the world (a type of modern positivist view) (Harré, 2015; Schaupp, 2004). Another viewpoint often referred to as the phenomenological approach, however, mankind is a participant with an active role in the universe. In Heidegger's thought, mankind's presence in the universe and attention to '*Dasein'* as "*being in the world*" are the main foundations of phenomenology (Bachelard, 2000). To express the relationships between the presence of phenomena in the world, Heidegger uses two terms: "*readiness to hand*" and "*presence at hand*" (Heidegger, 1962). The connection between readiness to hand and presence at hand is continuous. Heidegger refers to places and spaces and their relationship with each other and the objective and subjective limits of place as a boundary (Bachelard, 2000). He believes that places gain an identity about these boundaries through the formation of the inside as opposed to the outside, i.e. unless an inside is formed against an outside, there would be no such thing as a place.

Addressing three concepts in the phenomenology of place and environment, namely (1) basic attributes and intrinsic relationships of environmental experiences, (2) environmental attributes and spatial qualities which promote the special character of the place, and (3) the contexts of human interaction with the environment which expresses the sense of place (Seamon, 1996), entails the formation of three main contexts (the inside, the outside, and relation/interaction between the two) and promotes the idea of increasing the quality and the possibility of producing and reproducing a place for "staying" and "being" (Bachelard, 2000). In the late literature on urban design and planning, this feature is referred to as *place resilience* (Allan & Bryant, 2014; Cutter et al., 2008; Lyon, 2014; Meerow et al., 2016; Mirti Chand, 2018). Thus, the link between place and resilience can prove useful by relating the components of resilience to any part of the phenomenological nature of place using the theory of place resilience (Table 3).

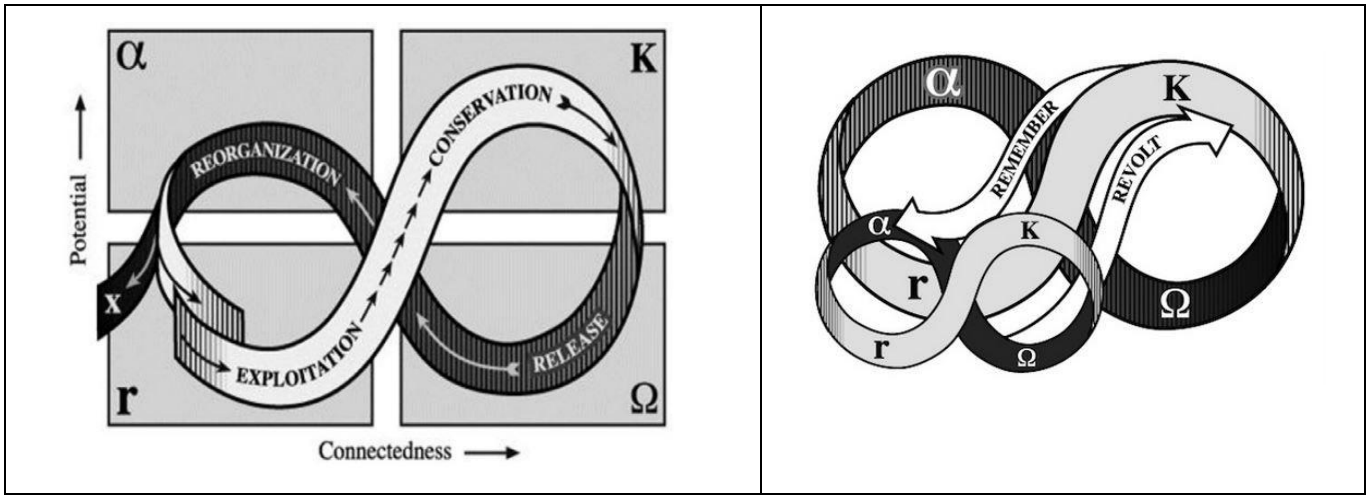

Fig 2. Adaptive Renovation Cycle on the left and panarchy, a structure in which there are two nested adaptive cycle on the right (Gunderson and Holling 2002).

4.3. Framing URFs

Significant alignment can be observed in the interpretive approach of planning and evolutionary discourse of resilience in perceptions of places not as neutral vessels but as interconnected social and ecological systems with feedback processes at different levels (Davoudi et al., 2012); both approaches and discourses agree on fluidity, reflectivity, uncertainty, and multidimensionality (Davoudi & Strange, 2008).

The place is the focal point of evolutionary resilience with interpretive and phenomenological facets that can be compared with facets of resilience (derived from the adaptive cycle) and provide common guidelines for classifying URFs (Table 3).

URFs derived from the literature have different qualities (Feliciotti, 2018; Meerow et al., 2016). Three guidelines were formulated using the three phenomenological qualities of place (the inside, the outside, and the relation/interaction between the two) and based on the three topics specified in the theoretical foundations of the urban resilience discourse. These three guidelines were then used for the categorization of the features of resilience into three groups:

4.3.1. Guideline 1: Intrinsic Characteristics of Resilience

The phenomenon of the place gains existence using its interior which allows it to be present in space: *'To be inside is the primary intention behind the place concept; that is somewhere away from what is outside'* (Relph 1976). In *Place and placelessness*, Relph (1976) states that being inside is a very important quality through which space is promoted to place. This concept is the sense of belonging to the place by which one gets to know oneself (Seamon, 2000).

Any resilient system, whether on the macro scale (region and city) (Sharifi, 2019) or the mesoscale (district and neighborhood) (Lak et al., 2020) has some constituent elements. Each of these elements has certain qualities (individual qualities), and the system as a whole also has certain qualities (general qualities) (Folke, 2006). These qualities determine the characteristic or personality of systems with different levels of resilience depending on their intensity and density. Discussion of the qualities and character of the organization and the internal elements of a system (urban fabric on different scales) concerning the outside environment (Flaherty, 2018; Pickett et al., 2004) in the literature signifies conceptualization of the intrinsic "character" or "characteristic" of a system (Cumming, Morrison, & Hughes, 2017). In fact, for an urban system to be resilient, it should have the intrinsic characteristics of resilience as the minimum level of requirement. These intrinsic characteristics extracted from the literature have been listed in Table 1. All of these characteristics highlight the internal constituent elements of place and are meaningful concerning the outside environment. In fact, the essence and nature of a system are contingent on these characteristics.

Internal characteristics are the defining indicators of a resilient place, depending on the quality of change and context, and it is possible to respond both in absorption and return to the pre-change state, and in adaptability to change. In the urban context, different elements of the urban district (morphological factors and human agents) as different elements show different resistance, durability, and adaptability. Some components have more inertia than others, which have different levels and behavior of resilience; higher robustness, more durability, more flexibility, and more variability. Bridging ties can provide a member with access to the resources and opportunities available in a network (Granovetter, 1973). Bridging social capital allows people to access the external environment and helps them to transcend social norms with the support of external networks (Smith

, Anderson, and Moore 2012). Self-organization is an inherent characteristic of internal elements that provides a balance between stabilization and adaptability. In fact, without the presence of reinforcing attributes, if the internal elements have 8 prerequisite properties, the place will have sufficient resilience vis-a-vis change and will have the necessary conditions to define a suitable adaptive cycle (Without entering another adaptive cycle).

4.3.2. Guideline 2: Place Behaviors

One of the most important features of any place is how it is connected with the universe (Seamon, 1996). In fact, the extent to which any place opens up to the universe reflects how it is related to the world. Every place is manifested in space by its very nature and since it has been and still so, it requires a spatial order, a type of order that is itself the product of perceptual order. The atmosphere of a place corresponds to an integrated form and spatial coherence, and each element of this place gets defined and recognized with the help of this corresponding whole (Norberg-Schulz, 2000; Orier & Kairos, 1976). This spatial order involves the similarity, conflict, homogeneity, and contrast of the various components of place.

The term "change" is the pivotal element of the discourse of resilience (Gunderson & Holling, 2002; Pickett et al., 2014; Vaništa Lazarević et al., 2018) and emphasizes the interaction between the inside (the

internal environment) and the outside (the external environment) (Cumming, 2011; Cumming & Epstein, 2020). The trade-offs and cross-scale interactions between the internal environment and the external environment in the perpetual process of change lead to the formation of behaviors and reactions of the inside (Anderies, 2014; Béné, 2013; Brunetta & Caldarice, 2020; Chelleri et al., 2015; Sharifi, 2016). In the resilience cycle (Gunderson & Holling, 2002), which is the starting point of the discourse of resilience, a system might show one of the following behaviors when facing changes:

1) Depending on their capacity and quality, the internal elements of the system absorb the changes and return to their initial state (Gunderson & Holling, 2002). This scenario has been conceptualized by terms such as "resistance", "stability", and "recovery" (Contreras, Blaschke, & Hodgson, 2017; Dzubakova et al., 2018; Etinay, Egbu, & Murray, 2018; Sharifi & Yamagata, 2016; Shaw & Maythorne, 2013; Vale, 2014). Stability is an engineering principle that says that systems must resist changes and maintain the status quo and their performance (Meerow & Newell, 2019), and create opportunities for self-organization through local community participation (Berkes & Ross, 2013; Carpenter et al., 2001; Cumming, 2011; Salat, 2017).

2) The changes exceed the internal capacity (Cumming et al., 2017) of the system (either due to the magnitude of the changes or the weakness of the system's internal capacity) and the system fails to completely return to its previous state and function (Abdulkareem & Elkadi, 2018; Dzubakova et al., 2018; Vaništa Lazarević et al., 2018) but regains its main functional character and performance (Gunderson & Holling, 2002). This behavior has been conceptualized in the literature by the term "adaptability" (Meerow et al., 2016). In this case, the system spends fewer resources and energy compared to the previous scenario which involved resistance without adaptation (Gómez-Baggethun et al., 2013; Leichenko, 2011; Morschek, König & Schneider, 2019).

3) The changes proved a "gradual shock" (Fang et al., 2019; Folke, 2006; Suárez et al., 2016) for the system. When the system's capacity has degraded and the magnitude of the changes proves too much for the system, the changes become a shock for the system (Barnes & Nel, 2017; Leichenko, 2011; Miller et al., 2010; Pickett et al., 2014; Salat, 2017). In this case, the system's behavior is neither absorption nor adaptability, but changeability and transformation to a new state (Béné et al., 2014; Meerow et al., 2016). This conforms to the stages of the resilience cycle and shows that any system has certain behavioral proxies (reactive and proactive) (Brunetta et al., 2019; Vale, 2014) based on the capacity of that system and the type of changes. Table 6 shows these behavioral proxies. When the system responds to changes in a predominantly physical, usually one-dimensional and limited manner, its behavior is said to be reactive. From the evolutionary perspective of resilience (Caputo et al., 2015; Cumming & Epstein, 2020), if a system's behavior proves to be based on "knowledge and learning" (Etinay et al., 2018; Folke, 2006; Lak et al., 2020) from past behaviors combined with innovation and manifests in different physical, social, economic, and environmental aspects, it is said to be "proactive" (Meerow & Newell, 2019). In the latter case, the system has more flexibility in its internal proxies (Barnes & Nel, 2017; Norris et al., 2008) and shows adaptive behavior (Smith et al., 2012) as well. Based on these definitions, a place might become more or less resilient via adapting to changes or transforming to a new state through innovation and evolution (Mehmood, 2016).

4.3.3. Guideline 3: Resilience Reinforcing Attributes

Through the lens of Heidegger's concepts of "readiness to hand" and "presence at hand" and based on the objective and subjective boundaries of place and space, the relation and interaction of the internal components with the external environment gains meaning. These relations and interactions depend on the capacity and quality of the internal components and the type and nature of external changes in the space-time continuum.

The internal qualities of a place can be reinforced via certain attributes that have been identified in the literature as resilience-reinforcing attributes (Kim & Lim, 2016; Sharifi & Yamagata, 2016). Creating a system with high structural and functional qualities must meet multiple needs at the same time without going through any structural change and work under a wide variety of conditions. Also, these attributes can increase a system's ability to adapt over time to external changes. These are the attributes that enhance a system's resilience against the external environment (Carpenter et al., 2001; Chmutina et al., 2016; Folke et al., 2002). Table 6 shows these attributes. As an attribute that can affect the power and capacity of a system, diversity has been mentioned as an important resilience characteristic. "Building type diversity" has been introduced as one of the most important features for assessing resilient locations in urban areas (Lak et al., 2020). In the discourse of resilience, diversity management is a key step in creating resilience in complex adaptive systems. Also, diversity is a prerequisite for adaptation (Erixon,

Borgström, & Andersson, 2013) and plays an important role in sustaining ecosystem resilience (Folke et al., 2002). "Modularity" refers to the organizational relationship between a system's components and its totality at different spatial scales (Feliciotti, Romice, & Porta, 2016; Sharifi, 2019) and how the components interact with the whole and the extent to which these components are separated or integrated to form higher levels. Redundancy reduces the likelihood of all functional components being the same and being affected by the same change (Ahern, 2013; Biggs et al., 2015; Lak et al., 2020). Therefore, redundant systems have a higher adaptation capacity. "Connection" is a requirement for urban resilience (Berkes & Ross, 2013; Lak et al., 2020) and allows for the exchange of information, capital, goods, etc. The connection has been deemed paradoxical by some scholars. Excessively interconnected systems can exacerbate adverse effects and create new problems (Olazabal, Chelleri, & Sharifi, 2018; Pickett et al., 2014). The connection between adjacent systems is often reinforced to withstand disruptions and prevent system change in spaces wider than individual systems with heterogeneity and diversity (Cumming & Epstein, 2020).

5. TAXONOMY OF URFS

Finally, the result of this study appears in Figure 3. Internal characteristics, reinforcing attributes, and behavioral proxies of urban resilience are contracted in correspondence with phenomenological place qualities. This taxonomy helps researchers to know more clearly each of the URFs in its performance, and therefore the contradictions in the literature are reduced, knowing that an effective feature in the internal dimension of place, with the help of a reinforcing feature concerning the external environment, reveals certain behavior.

Given the taxonomy, the proposed terminology of URFs is as follows:

- '**Feature'** is used in general, corroborating its meaning as given in Webster's dictionary "*any of the properties that are characteristic of a grammatical element*"(Anon, 2020).

- **'Characteristic'** captures the intrinsic features of resilience, as in Webster's dictionary it means "*distinctive character, quality, or property*", representing the essence (Anon, 2020).

- '**Proxy'** is assigned in correspondence with the behavior of the system, as in Webster's dictionary it means "*the agency, function, or office of a deputy who acts as a substitute for another*", representing behavior and action (Anon, 2020).

- **'Attribute'** refers to resilience reinforcing features, as in Webster's dictionary it means "*a word that describes quality*", representing a quality (Anon, 2020).

Table 6. Urban resilience-reinforcing attributes

Feature	Definition	Freq.
Diversity	The focus is on the variety of objects, but not in their more or less homogeneous state.	23
Connectivity	The relative access or spatial connection of the system or network.	9
Redundancy	The strategy to avoid putting "all eggs in one basket" and the ability to adopt alternative strategies by providing multiple routes and diverse options.	15
Modularity	Individual modules are relatively autonomous, but are connected to their context.	13

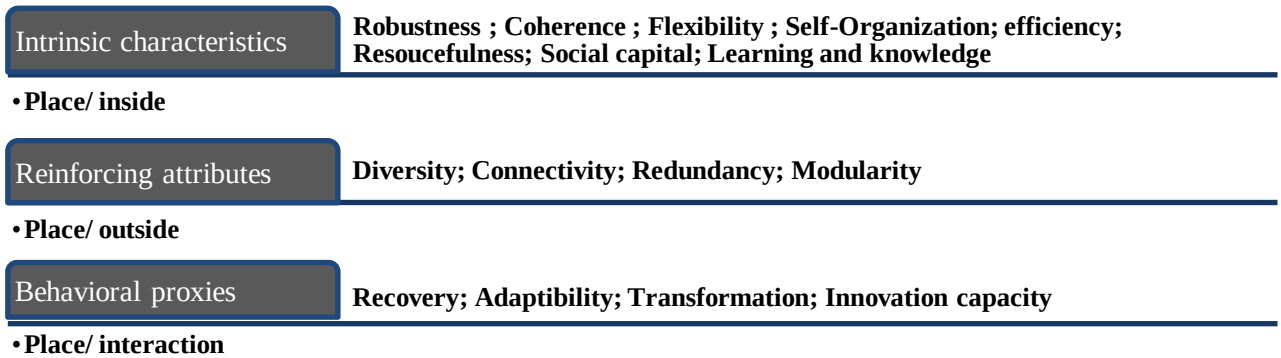

Fig 3. Taxonomy of URFs.

6. OPERATIONAL IMPLICATIONS OF THE RESEARCH

The interpretive role of urban planning and design in delivering resilience of places vis-a-vis social, economic, and environmental changes is growing (Davoudi & Strange, 2008). Until now, urban planning approaches had mainly macroscale perspectives, but the new evolution, which is place-based decision-making, considers the scale and focus of decisions as district/neighborhood and in the alignment of the theory of place-making /place-shaping (Brunetta & Salata, 2019; Morphet, 2011; Stumpp, 2013). These views replace top-down approaches, bottom-up decision-making is rooted in the capabilities and nature of the place. These concepts, which have been the principles of urban design knowledge, have gradually become the source of decision-making in the spatial planning approach (Morphet, 2011). In this approach, urban design knowledge and urban planning have more commonalities in the bottom-up planning process. In other words, the integration of qualitative and quantitative aspects of development decision-making has enabled the urban design to achieve its goals as much as possible. This prospects the urban designer as a facilitator with the aim of assisting communities to make optimal use of local resources to build intrinsic resilience capacity (Lydon & Garcia, 2015). In this regard, operational guidelines such as place-check and place-making are examples of urban management support in facilitating bottom-up decision-making (Cowan, 2000; Feliciotti, Romice, & Porta, 2017), that needs to be revised based on the place resilience approach (According to priority 8 inherent dimensions of resilience), having the efficiency in the elements in order to display a range of behaviors (resistance/adaptability) vis-a-vis critical situations. Due to the urban continuous changes and transformations, there is a need to review the evaluation criteria and how to organize and use them optimally, according to the place-based classification guidelines for URFs. An important criterion for evaluating a place's quality is its resilience. In fact, the widely used technique of place measurement in urban design should be updated based on resilience qualitative indicators. This issue has recently been raised in the discourse of "spatial resilience" (Li et al. 2014; Shafiei-dastjerdi, Lak, Ghaffari, & Sharifi, 2021). The indicators obtained in this article can provide a suitable starting point for doing this task.

7. CONCLUSION

In response to the first question of the research (How to recognize URFs based on place qualitative aspects?), this paper attempted to (a) collect all general URFs through an extensive review of the literature, (b) explain the tripartite phenomenological nature of place based on the concept of place resilience, and (c) categorize the URFs in line with the three specified guidelines. The nature of each of URFs implies one of the guidelines, and therefore, it is placed in the same category. For example, "strength" implies the stability and internal endurance of the elements of the place. Thus, it is in accordance with the first guideline (Intrinsic characteristics of resilience) and is included in the category of inherent characteristics of the elements that make up a resilient system. Also, "recovery" implies the return and reconstruction of the elements of the place to the previous state or similar to the previous state and is in accordance with the second guideline (Place behaviors) and is placed in the category of behavioral proxy. "Diversity" implies the variety of the elements of the place and the creation of different opportunities in the place, which is in accordance with the third guideline (Resilience reinforcing attributes) and is placed in the category of reinforcing attributes of the place. In response to the second question of the research (In what categories can URFs be classified according to their nature?), according to the three characteristics and strategies, finally, URFs were categorized into three groups: (1) *intrinsic characteristics* of the constituent elements of a resilience system, which highlight the capacity and qualitative capability of that system; the term “characteristic” is often used to describe these features; (2) *Behavioral proxies* (reactive and proactive) of a resilient system, which indicate the type of behavior of that system vis-a-vis change; the term “proxy” is often used to describe these features; and (3) *Resilience-reinforcing attributes* of a system concerning the external environment, which reflect that system’s adaptability and changeability and determine its ability to do exchanges with the external environment; the term “attribute” is often used to describe these features. In future studies, an analytical framework can be researched and developed based on these attributes.

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