



Review

Urban-centric resilience in search of theoretical stabilisation? A phased thematic and conceptual review

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ABSTRACT

Over the last decades ‘resilience’ has particularly arisen as an attractive perspective with respect to cities. As cities continue to expand, their susceptibility to uncertainties and new challenges, such as climate change, has increased, rendering ‘urban resilience’ an increasingly favoured concept in the realm of Urban Development, Planning and Management (UDPM).

Despite recent reviews, an updated analysis of the concept is required to understand whether there is in fact scientific evidence to support the expansion and favouring of ‘urban resilience’ in UDPM. The need to understand how the concept evolved is further emphasised by the need to perceive how the distinct sciences have contributed to its development, and which were the focuses and conceptual underpinnings of such evolution. Thus, the objective of this paper is to provide a broader review of the multidimensional concept of ‘urban resilience’, while understanding how distinct research fields have contributed to its inception and expansion, and how distinct conceptualisations of resilience have influenced its evolution.

Supported by a bibliometric analysis of urban-centric publications, this paper highlights the recent extensive growth and expanding application of ‘urban resilience’ to distinct research fields, as well as an apparent theoretical stabilisation of the concept, which reemphasises the idea of a three-dimensional conceptual resilience perspective in scientific literature: (1) ‘engineering’, (2) ‘ecological’, and (3) ‘social-ecological resilience’. Consequently, this research emphasises that, if the related conceptual underpinnings are clear, ‘urban resilience’ can potentially serve as an ‘integrative metaphor’, adapted by diverse stakeholders, to reinforce UDPM initiatives.

1. Introduction

Decades of theoretical research in the empiric and formal sciences have contributed to a better understanding of the dynamics of single-equilibrium, multiple-equilibria, and non-equilibrium behaviours. This knowledge has subsidised the establishment of ‘resilience theory’ (Holling et al., 2001; Redman and Kinzig, 2003; Curtin and Parker, 2014) as a formal approach to understanding how systems respond to, persist under, and adapt to disturbances. Although early literature was conceptual and focused on developing a baseline for ‘resilience theory’ (Bhamra et al., 2011, p. 5380), over time a broad range of practical studies were developed (Redman and Kinzig, 2003; Shaw, 2012; Béné et al., 2014). Resilience-focused research grew from its original formulation in Engineering, to its application in Ecology (Mcaslan, 2010; Bhamra et al., 2011; Martin-Breen and Anderies, 2011), and to its applied development in urban-centric research (Cartalis, 2014; Hassler

and Kohler, 2014a).

The seminal work of Holling and colleagues (Holling and Goldberg, 1971; Holling, 1973, 1986; 1996, 2001; Folke et al., 2002) formed the foundation for the development of resilience studies and reinterpretations (Mcaslan, 2010; Bhamra et al., 2011; Martin-Breen and Anderies, 2011). Their work, along with continuous processes of social, economic and ecological change (Vale, 2014, p. 192), and increasingly unforeseen disturbances (Walker and Salt, 2006; Hodson and Marvin, 2009; Balaban, 2012), have highlighted the value of resilience research (Redman and Kinzig, 2003; Shaw, 2012; Hassler and Kohler, 2014a). Consequently, resilience has been widely used by academics, practitioners and policy makers (Mcaslan, 2010; Martin-Breen and Anderies, 2011; Hassler and Kohler, 2014a), traversing several research fields (Mcaslan, 2010; Martin-Breen and Anderies, 2011). Resilience has particularly arisen as an attractive perspective with respect to cities (Meerow et al., 2016), especially in the realm of Urban Development,

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Planning and Management (UDPM) (Godschalk, 2003; Beatley and Newman, 2013; Childers et al., 2015).

Contemporary cities have become the nexus of human activities, with more than 50 per cent of the world's population (Girardet, 1999; Brown et al., 2012). As “complex” (see e.g., Alberti and Marzluff, 2004; Ernstson et al., 2010), “multi-scalar” (Meerow et al., 2016, p. 45, p. 45), and “adaptive” systems (Wu, 2014, p. 216), urban environments are composed of distinct “socio-ecological and socio-technical networks” that encompass a multitude of “governance, material and energy flows, infrastructure and form, and social-economic dynamics” (Meerow et al., 2016, p. 45, p. 45), which operate and interact at various scales (see e.g., Gunderson and Holling, 2001; Holling, 2001). Urban environments are now responsible for some of the highest patterns of consumption of resources, and emission of pollutants (Meerow et al., 2016). As cities continue to expand, their susceptibility to uncertainties and new challenges, such as climate change (Leichenko, 2011; Brown et al., 2012), has increased, rendering ‘urban resilience’ an increasingly favoured concept (Pickett et al., 2004; Newman et al., 2009b; Wilkinson et al., 2010; Hassler and Kohler, 2014a).

Nevertheless, the contemporary focus of ‘urban resilience’ has varied considerably, as it has been characterised by multiple approaches that have often revolved around the abilities of urban environments (1) to absorb disturbances, (2) to recover from shocks, (3) for self-organization, and (3) for adaptation and transformation (see e.g., Davoudi, 2012; Hassler and Kohler, 2014a). Scientists have used the concept of ‘urban resilience’ in UDPM to study how urban environments can absorb and recover from disturbances, adapt and evolve upon new scenarios, and self-organise without the influence of external entities (Newman et al., 2009a; Davoudi, 2012; Cartalis, 2014; Hassler and Kohler, 2014a; Meerow et al., 2016). Likewise, the target subject of ‘urban resilience’ research has also varied from the study of urban environments as a whole (see e.g., Pickett et al., 2004; Pickett et al., 2014), to the study of their specific components (see e.g., Douglass, 2000; Andersson et al., 2014), rendering ‘urban resilience’ a multi-scalar and multi-focused concept (see e.g., Newman et al., 2009a; Cartalis, 2014; Meerow et al., 2016).

In this context, one should raise the question whether there is, in fact, scientific evidence to support the expansion and favouring of ‘urban resilience’ in UDPM. Additionally, our understanding of how the distinct sciences have contributed to the development of ‘urban resilience’ and influenced its research focuses, should also be reviewed, considering it has been somewhat limited to specific research branches (Hassler and Kohler, 2014a; Meerow et al., 2016), and circumscribed to specific clusters of knowledge (e.g., Cruz et al., 2013; e.g., Meerow and Newell, 2015). Defining resilience has also proven elusive (Mcaslan, 2010; Meerow et al., 2016). Since the early work of Tredgold (1818) and Holling (1971, 1973), for example, the broader concept of ‘resilience’ has known several definitions that have underpinned different conceptual and theoretical approaches (Brand and Jax, 2007; Mcaslan, 2010; Martin-Breen and Anderies, 2011), which have influenced the conceptualisation of ‘urban resilience’ (Davoudi, 2012; Meerow et al., 2016). Hence, the theoretical and practical application challenge of developing the concept of ‘urban resilience’ in UDPM requires a reasonable knowledge of the source domain (resilience), sufficient to enable a pertinent construct of key relational characteristics from within it, and elucidate essential relational features (Chettiparamb, 2006, p. 78).

Understanding the conceptual implications involved in the evolution of ‘urban resilience’, emphasising potential theoretical strains, is crucial to improve our understanding of the subject, thus better informing future urban-centric research. The evolution of urban-centric resilience concepts and related trends is therefore a key point that needs further investigation. The overcoming of the limitations emphasised earlier can be summarised through the following questions: (1) how has ‘urban resilience’ evolved into a favoured concept in UDPM; (2) in what way have the different research fields contributed to the development

of ‘urban resilience’; (3) has urban resilience evolved conceptually to the point of its theoretical stabilisation. The objective of this paper is to analyse the evolutionary phases of the multidimensional concept of ‘urban resilience’, while understanding how the distinct research fields have contributed to its inception and expansion. Thus, this investigation intends to contribute to the discussion of patterns, and trends in urban-centric resilience research, understanding whether there has been a search for theoretical stabilisation, and how the distinct conceptualisations of resilience (‘engineering’, ‘ecological’, and ‘socio-ecological resilience’) have influenced this process.

This paper is divided into five main sections. Following this Introduction (1), which presents the theme and objectives, the Methods section (2) explains the methodological approach followed in this research. The following section (3) presents the results of the study of the evolution of urban-centric resilience, comprising the historical, thematic and conceptual analysis of publications retrieved from the Thompson Reuters Web of Science database (WSd). The subsequent section (4) provides the discussion of the results of this research. Finally, the Conclusions section (5) comprises the main inferences and deductions of this investigation.

2. Methods

The academic literature on urban-centric resilience was reviewed to (1) trace the evolution of the concept of ‘resilience’ in urban-centric research, (2) determine its thematic urban origins and development, and (3) understand its urban focus and (4) highlight the conceptual underpinnings of its development, across studies and research fields. To provide a more holistic perspective of the evolution of ‘urban resilience’ this review was based on the bibliometric analysis of a larger sample of publications, in this case the publications retrieved from the Thompson Reuters Web of Science database (WSd). The WSd was selected because it provided one of the most integrated databases available (compiling the publications released by distinct publishers), and one of largest repositories of urban-centric resilience research.

The WSd was first used to identify the literature on urban-centric resilience, i.e., applications of ‘resilience’ to the urban realm. The combination of the search terms ‘urban’, ‘resilience’, ‘cities’, and ‘resilient’ in the Topic of publications (title, abstract, or keywords) yielded 4385 results in the WSd (search performed in February 2018). This first search was then refined to include only relevant publications (i.e., to include articles, proceedings papers, reviews, editorial material, book chapters, and books, excluding corrections, reprints, meeting abstracts, letters, news items, retracted publications, and book reviews) yielding a total of 4180 results, which included publications from 1984 up to 2018. Based on these results, seven distinct five-year periods were demarcated from the dates of the firsts publications (1984, 1986), up to the present time (1984–1989, 1989–1993, 1994–1998, 1999–2003, 2004–2008, 2009–2013, 2013–2018).

The 4180 publications retrieved from the WSd were then agglomerated into each of the predefined periods, following their publication year. These period clusters were then analysed to determine (1) how the number of publications released evolved throughout time. Moreover, to determine the (2) thematic evolution of urban-centric resilience research, the publications of each period cluster were divided according to six research fields (see Fig. 1), and 34 major research areas, which in turn summarise the 151 research subfields of the WSd. This division was based on the thematic classification provided by the WSd (Thompson Reuters Web of Science, 2018). The analysis of each subsequent group of publications, per research field and area, allowed the tracing of the thematic evolution, and the determination of the thematic focuses (the research fields and areas where research was concentrated) of urban-centric resilience research per period.

To further analyse the development of the (3) focus and (4) the conceptual underpinnings of urban-centric resilience research and establish general trends, the top ten most cited publications of each

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