



## Review

## Defining urban resilience: A review



Sara Meerow\*, Joshua P. Newell, Melissa Stults

School of Natural Resources and Environment, University of Michigan, 440 Church Street, Ann Arbor, MI 48109, USA

## HIGHLIGHTS

- Bibliometric analysis reveals the influential literature on urban resilience.
- The concept of resilience is beset by six conceptual tensions.
- Urban resilience has been inconsistently defined.
- The paper proposes a new, inclusive definition of urban resilience.
- The paper asks us to consider resilience for whom, what, when, where, and why.

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## ABSTRACT

Fostering resilience in the face of environmental, socioeconomic, and political uncertainty and risk has captured the attention of academics and decision makers across disciplines, sectors, and scales. Resilience has become an important goal for cities, particularly in the face of climate change. Urban areas house the majority of the world's population, and, in addition to functioning as nodes of resource consumption and as sites for innovation, have become laboratories for resilience, both in theory and in practice. This paper reviews the scholarly literature on urban resilience and concludes that the term has not been well defined. Existing definitions are inconsistent and underdeveloped with respect to incorporation of crucial concepts found in both resilience theory and urban theory. Based on this literature review, and aided by bibliometric analysis, the paper identifies six conceptual tensions fundamental to urban resilience: (1) definition of 'urban'; (2) understanding of system equilibrium; (3) positive vs. neutral (or negative) conceptualizations of resilience; (4) mechanisms for system change; (5) adaptation versus general adaptability; and (6) timescale of action. To advance this burgeoning field, more conceptual clarity is needed. This paper, therefore, proposes a new definition of urban resilience. This definition takes explicit positions on these tensions, but remains inclusive and flexible enough to enable uptake by, and collaboration among, varying disciplines. The paper concludes with a discussion of how the definition might serve as a boundary object, with the acknowledgement that applying resilience in different contexts requires answering: Resilience for whom and to what? When? Where? And why?

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\* Corresponding author.

E-mail addresses: [sameerow@umich.edu](mailto:sameerow@umich.edu) (S. Meerow), [jpnnewell@umich.edu](mailto:jpnnewell@umich.edu) (J.P. Newell), [stultsm@umich.edu](mailto:stultsm@umich.edu) (M. Stults).

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## 1. Introduction

In recent years, the popularity of “resilience” has exploded in both academic and policy discourse, with numerous explanations for this dramatic rise (Meerow & Newell, 2015). Above all perhaps, resilience theory provides insights into complex socio-ecological systems and their sustainable management (Folke, 2006; Pickett, Cadenasso, & McGrath, 2013), especially with respect to climate change (Leichenko, 2011; Pierce, Budd, & Lovrich, 2011; Solecki, Leichenko, & O'Brien, 2011; Zimmerman & Faris, 2011). As socio-ecological resilience theory understands systems as constantly changing in nonlinear ways, it is a highly relevant approach for dealing with future climate uncertainties (Rodin, 2014; Tyler & Moench, 2012). As a term, resilience also has a positive societal connotation (McEvoy, Fünfgeld, & Bosomworth, 2013; O'Hare & White, 2013; Shaw & Maythorne, 2012), leading some to suggest that it is preferable to related, but more charged concepts like “vulnerability” (Weichselgartner & Kelman, 2014, p. 10).

In particular, resilience has emerged as an attractive perspective with respect to cities, often theorized as highly complex, adaptive systems (Batty, 2008; Godschalk, 2003). Unprecedented urbanization has transformed the planet from 10 percent urban in 1990 to more than 50 percent urban in just two decades (United Nations Department of Economic and Social Affairs, UNDESA, 2010). Although urban areas (at least 50,000 residents) cover less than 3 percent of the Earth's surface, they are responsible for an estimated 71 percent of global energy-related carbon emissions (International Panel on Climate Change, IPCC, 2014). As cities continue to grow and grapple with uncertainties and challenges like climate change, urban resilience has become an increasingly favored concept (Carmin, Nadkarni, & Rhie, 2012; Leichenko, 2011).

But what exactly is meant by the term ‘urban resilience’? The etymological roots of resilience stem from the Latin word *resilio*, meaning “to bounce back” (Klein, Nicholls, & Thomalla, 2003). As an academic concept, its origins and meaning are more ambiguous (Adger, 2000; Friend & Moench, 2013; Lhomme, Serre, Diab, & Laganier, 2013; Pendall, Foster, & Cowell, 2010). Resilience has a conceptual fuzziness that is beneficial in enabling it to function as a “boundary object,” a common object or concept that appeals to multiple “social worlds” and can, therefore, foster multidisciplinary scientific collaboration (Star & Griesemer, 1989). The meaning of resilience is malleable, allowing stakeholders to come together around a common terminology without requiring them to necessarily agree on an exact definition (Brand & Jax, 2007). But this vagueness can make resilience difficult to operationalize, or to develop generalizable indicators or metrics for (Gunderson, 2000; Pizzo, 2015; Vale, 2014).

To better understand how the term has been defined and used across disciplines and fields of study, this paper reviews four decades of academic literature on urban resilience beginning in 1973. Guided by bibliometric analysis, the paper identifies the most influential thinkers and publications in this rapidly expanding research area. This review reveals that definitions of urban resilience from this period are underdeveloped in the sense that they have not explicitly addressed important conceptual tensions apparent in the urban resilience literature. Moreover, where papers do discuss these tensions, the authors' positions are often inconsistent. The first five tensions (also evident in the broader resilience literature) are as follows: (1) equilibrium vs. non-equilibrium

resilience; (2) positive vs. neutral (or negative) conceptualizations of resilience; (3) mechanism of system change (i.e., persistence, transitional, or transformative); (4) adaptation vs. general adaptability; and (5) timescale of action. The sixth conceptual tension is specific to the urban resilience literature and has to do with how ‘urban’ is defined and characterized.

Using the resilience concept in urban research and for policy contexts hinges on coming to terms with these tensions. Thus, to advance scholarship and practice, this paper proposes a new definition of urban resilience, one that explicitly includes these six conceptual tensions, yet remains flexible enough to be adopted by a range of disciplines and stakeholders. This definition is as follows:

*Urban resilience refers to the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.*

In this definition, urban resilience is dynamic and offers multiple pathways to resilience (e.g., persistence, transition, and transformation). It recognizes the importance of temporal scale, and advocates general adaptability rather than specific adaptedness. The urban system is conceptualized as complex and adaptive, and it is composed of socio-ecological and socio-technical networks that extend across multiple spatial scales. Resilience is framed as an explicitly desirable state and, therefore, should be negotiated among those who enact it empirically.

The remainder of this paper focuses on the theoretical rationale for this definition. Section 2 describes the methodology used to conduct the literature review, including the classification of previous definitions of urban resilience. Section 3 analyzes the field's influential literature and expands on the six conceptual tensions. Section 4 parses the specific components of this new definition and the rationale for their selection. The paper concludes with a discussion of how urban resilience as a term can serve as a boundary object, enabling the collaboration necessary to contemplate resilience for whom, for what, for when, for where, and why.

## 2. Materials and methods

The academic literature on urban resilience was reviewed to (1) identify the most influential studies, (2) trace the theoretical origins and development of the field, (3) compare how urban resilience is defined across studies and disciplines, and (4) develop a refined definition of urban resilience that is grounded in the literature and addresses conceptual tensions.

First, Elsevier's Scopus and Thompson Reuters Web of Science (WoS) citation databases were used to identify the literature on urban resilience over a 41-year period, beginning in 1973 (when Holling wrote his seminal article on resilience) and ending in 2013. Although relatively comprehensive, these databases do not generally include books, and by focusing mainly on English-language publications, they have an Anglo-American bias (Newell & Cousins, 2015). Given the rapid development of the urban resilience field, additional definitions may have been published since the analysis was conducted. The search terms “urban resilience” and “resilient cities” yielded 139 results in Scopus and 100 in WoS. When combined, the urban resilience dataset included 172 unique

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