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A maturity model for the involvement of stakeholders in the city resilience building process

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ABSTRACT

Recent efforts undertaken by international organizations and national governments to build cities' resilience illustrate the need to involve the different stakeholders of a city in the city resilience building process. Although there are studies that propose frameworks for building resilient cities, these studies do not provide detailed guidelines that include the sequential steps that local governments need to take to involve the different stakeholders in the city resilience building process. Given this gap, this paper presents a maturity model that provides an ideal sequence of maturity stages that can guide local government in how to involve the different city stakeholders in the city resilience building process. In addition, the maturity model provides a number of policies that local governments need to implement at each maturity stage in order to foster four principles (collaboration and networking, awareness and commitment, learning, and training and preparedness) that represent the foundation for involving stakeholders in the resilience building process. The maturity model was developed and validated as result of an iterative process that included semi-structured interviews with representatives from six different European cities.

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1. Introduction

Nowadays, the majority of the world's population live in cities, and according to forecasts, an increasing number of people will live in cities in the coming decades (100 Resilient cities, 2016; Prior and Roth, 2013). As cities continue to grow, there is an urgent need to work toward building cities' resilience to the effects of a wide spectrum of disasters, ranging from acute shocks such as floods, droughts, and earthquakes to chronic stresses such as climate change, or environmental pollution (Prior and Roth, 2013; Godschalk, 2003; Weichselgartner and Kelman, 2014). The resilience of a city is defined as the capacity of individuals, communities, institutions, businesses, and systems within the city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience (100 Resilient cities, 2016).

Multi-stakeholder integration and coordination are considered of paramount importance by the literature, international organizations, and national governments focused on building resilient cities (Weichselgartner and Kelman, 2014; Malalgoda et al., 2013; Mamula-Seadon and McLean, 2015). The stakeholders of a city are the individuals, groups or organizations from different disciplines and with different needs, responsibilities and resources that are involved in the resilience building process (Krütli

et al., 2010). Stakeholders range from the local government, emergency services, and citizens to the representatives of public and private organizations and critical infrastructures (Jabareen, 2013; Johnson and Blackburn, 2014; Tyler and Moench, 2012). Of these stakeholders, local governments are recognized as the key drivers in carrying out effective policies and tools for ensuring the development of resilient cities and preparing them to face disaster risks (Malalgoda et al., 2013; Kapucu, 2008; White et al., 2014). In this context, there currently is a lack of guidance on the steps that local governments should follow to involve the different city stakeholders in the resilience building process (Jabareen, 2013). Furthermore, the level of participation of stakeholders can vary considerably from passive consultation, where stakeholders simply provide information, to active engagement where there is a two-way exchange of information between stakeholders (Reed et al., 2009; Van Kerkhoff and Lebel, 2006; Enengel et al., 2012). In this regard, there is little understanding of how the different stakeholders of a city should work and collaborate together to develop the city's resilience (Singh-Peterson et al., 2015).

Given these gaps, this paper presents a maturity model that provides an ideal sequence of maturity stages for involving city stakeholders in the resilience building process. The maturity model consists of five maturity stages – *unrecognized*, *initial*, *formalized*, *supportive*, and *proactive* – that lead to improvements in city resilience by involving the different stakeholders in the city resilience building process. In addition, the maturity model provides a number of policies that local governments need to carry out in each maturity stage in order to foster four resilience principles (collaboration and networking, awareness and

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commitment, learning, and training and preparedness) identified in the literature for involving stakeholders in building resilient cities. The following section presents a literature review of the existing research on improving city resilience. Section 3 presents the research methodology used to develop and validate the maturity model. Section 4 describes the complete maturity model. It first describes the stakeholders that need to be involved in the resilience building process. Then, it defines the maturity stages and the sequential order in which they occur, as well as the policies that the local government needs to implement at each maturity stage. Section 5 provides a discussion of the characteristics of the maturity model. Finally, Section 6 highlights the conclusions and limitations of this research and proposes future steps for improving the maturity model.

2. State of the art

The current literature and international initiatives such as the Rockefeller foundation and the United Nations Office for Disaster Risk Reduction (UNISDR) provide a broad set of frameworks that include characteristics and priorities for building resilient cities (Jabareen, 2013; Shaw, 2012). Most of these frameworks highlight the importance of achieving multi-stakeholder involvement in the city resilience building process in order for the city stakeholders to share information, resources and knowledge and effectively coordinate their efforts (Weichselgartner and Kelman, 2014; Kernaghan and da Silva, 2014; Molin Valdés et al., 2013). Table 1 summarizes the characteristics and priorities for building resilient cities presented in these frameworks.

The first plan to reduce losses stemming from natural hazards was the *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters* (UNISDR, 2005). This framework was endorsed by the member states of the United Nations in 2005, and it addressed the roles of state, regional, and international organizations and called, on civil society, academia, volunteer and community organizations and the private sector to join resilience building efforts. Furthermore, this framework focused on the decentralization of authority and resources to promote local-level disaster risk reduction, highlighting five priorities for action. The Hyogo framework was valid until 2015, when the successor framework, the Sendai Framework for Disaster Risk Reduction 2015–2030, was developed. The Sendai Framework defines four new priorities for reducing disaster risks and recognizes that governments have the leadership, regulatory and coordination capacities to reduce disaster risk (UNISDR, 2015a).

Furthermore, in order to accelerate the implementation of the Hyogo framework and then the priorities set forth in the Sendai framework, the United Nations International Strategy for Disaster Reduction launched the Making Cities Resilient campaign. This campaign proposes ten independent working areas, which they call the ten essentials that local governments need to undertake in order to reduce disaster risks and increase the wellbeing and safety of citizens (UNISDR, 2015b).

Another useful framework is the City Resilience Framework, which was developed by Arup and the Rockefeller Foundation within the 100 Resilient Cities programme. The framework provides a lens for understanding the complexity of cities and the drivers that contribute to their resilience. By looking at these drivers, cities can assess the extent of their resilience, identify critical areas of weakness, and identify actions to improve their resilience (100 Resilient cities, 2016).

In addition, on the basis of existing studies of resilience attributes, Lu and Stead identify six characteristics of resilient cities (Lu and Stead, 2013). Furthermore, Godschalk recommends a series of actions for improving current hazard mitigation policy and practice for building resilient cities (Godschalk, 2003).

In summary, there is a range of works that propose characteristics and priorities for improving city resilience. However, they still have some limitations regarding the previous principles that local governments need to fulfill in order to be able to develop resilient cities (Jabareen, 2013). In this regard, although most of these works

Table 1
Characteristics and priorities for building resilient cities.

Author (year)	Characteristics and priorities for building resilient cities.
Hyogo Framework (2005)	<ul style="list-style-type: none"> – Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation. – Use knowledge, innovation and education to build a culture of safety resilience at all levels. – Identify, assess and monitor disaster risks and enhance early warning. – Reduce the underlying risk factors. – Strengthen disaster preparedness for effective response at all levels.
Sendai Framework (2015)	<ul style="list-style-type: none"> – Understanding disaster risk. – Strengthening disaster risk governance to manage disaster risk. – Investing in disaster risk reduction for resilience. – Enhancing disaster preparedness for effective response and to “build back better” in recovery, rehabilitation and reconstruction.
10 Essentials (2015)	<ul style="list-style-type: none"> – Increase infrastructure resilience. – Pursue resilient urban development and design. – Safeguard natural buffers to enhance ecosystems’ protective functions. – Identify, understand and use current and future risk scenarios. – Organize for disaster resilience. – Ensure effective disaster response. – Expedite recovery and build back better. – Strengthen institutional capacity for resilience. – Understand and strengthen societal capacity for resilience. – Strengthen financial capacity for resilience.
100 Resilient cities (2015)	<ul style="list-style-type: none"> – Provide reliable communication and mobility. – Provide and enhance natural and manmade assets. – Foster long term and integrated planning. – Promote leadership and effective management. – Meet basic needs. – Ensure public health services. – Ensure social stability, security and justice. – Support livelihoods and employment. – Promote cohesive and engaged communities. – Foster economic prosperity. – Ensure continuity of critical services. – Empower a broad range of stakeholders.
Lu and Stead (2013)	<ul style="list-style-type: none"> – Attention to the current situation. – Attention to trends as future threats. – Ability to involve the public. – Ability to initiate action. – Ability to set goals. – Ability to learn from previous experience.
Godschalk (2003)	<ul style="list-style-type: none"> – Operate networked communications. – Develop broad hazard mitigation commitment. – Build distributed hazard mitigation capacity. – Mitigate business interruption impacts. – Adopt recognized quality standards. – Monitor vulnerability reduction. – Assist vulnerable neighborhoods and populations.

emphasize that multi-stakeholder involvement is of paramount importance in developing resilient cities, they lack well-defined principles for achieving it. In line with this, the literature on emergency management shows that national governments across the globe (e.g. USA, UK and Australia) have been working on defining principles for achieving multi-stakeholder involvement (Weichselgartner and Kelman, 2014; Shaw, 2012). First, it is recognized that an integrated and coordinated approach and building communities of practice across stakeholders will produce greater results than individual efforts alone (Australian Government, 2011; Federal Emergency Management Agency, 2011; Kapucu, 2012; Waugh and Streib, 2006; Turoff et al., 2015). Second, it is considered that a shared understanding of community risks, needs and capabilities leads to collectively plan to find ways to address those needs (Australian Government, 2011; Turoff et al., 2015; Chalfant and Comfort, 2015). Third, it is recognized that providing a platform in which the various stakeholders draw on experiences and learn from

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