A framework for public-private-people partnerships in the city resilience-building process

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ABSTRACT

Citizens living in cities where public entities are committed to the development of city resilience are increasingly aware that the entire responsibility for preventing, responding to and recovering from crises cannot fully fall on public entities and private companies. In fact, citizens are more and more required to prepare for, respond to and recover from crises. To that end, there is an emerging need to involve not only public entities and private companies but also citizens in the process of building a city's resilience in order to understand the different perspectives on the same reality. This research paper is based on a systematic literature review to develop a framework that defines and describes the successful characteristics of public-private-people partnerships (4Ps) in the city resilience-building process. The framework revolves around two criteria for classification: the dimension of the characteristics (stakeholder relationship, information flow and conflict resolution), and the attributes of the partnership. A preliminary list of relationships among the characteristics found in the literature is also presented. The aim throughout is to define which characteristics need to be developed in order to better ensure successful cooperation among the three main stakeholders: public entities, private companies and citizens.

1. Introduction

The number of disasters that affect cities along with the number of citizens affected have increased in the last years (Malalgoda et al., 2014). This fact has made city stakeholders more aware of the need to improve the way crises are managed. While the evidence shows that developing effective city resilience-building processes is a priority for public entities, such priority setting and follow through do not always happen. According to the academic and research literatures, citizens living in cities where public entities are committed to the development of a city resilience-building process increasingly recognize that the efforts made by public entities and private companies are not always adequate, let alone sufficient, to prevent, respond to and/or recover from crises (Kernaghan and da Silva, 2014; Broto et al. 2015; Paton and Johnston, 2017). Recent events, including the 2016 earthquakes in Italy, demonstrate that the participation of citizens has an impact on the effectiveness of crisis prevention, response and recovery.

Giving citizens who have knowledge about their own community ways to share that knowledge is a key contribution to preventing and responding to crises (Koch et al., 2017). Citizens are also typically the first ones able to respond when a crisis strikes and also the most affected by the impact of crises, thereby reinforcing their involvement in the city resilience-building process as highly relevant (Chandra et al.,

2013; Ng et al., 2013; United Nations, 2015). In other words, the proactive role of citizens is of utmost importance in crisis management (Dupere, 2016; Devex, 2017).

This paper defines city resilience as "*the ability of a city or region to resist, absorb, adapt to and recover from acute shocks and chronic stresses to keep critical services functioning, and to monitor and learn from on-going processes through city and cross-regional collaboration, to increase adaptive abilities and strengthen preparedness by anticipating and appropriately responding to future challenges*" (Smart Mature Resilience, 2016, pp. 8). In brief, it is necessary by definition to develop effective mechanisms that involve all relevant stakeholders in the city resilience-building process.

This paper develops a framework that identifies, defines and describes the characteristics of successful public-private-people partnerships (4Ps) in the city resilience-building process. This framework aims to define which characteristics need to be developed in order to ensure more effective cooperation among the three main stakeholders: public entities, private companies and citizens.

In order to identify the characteristics of successful 4Ps, a systematic literature review was conducted in the Scopus database. The characteristics identified in the literature review were classified along two different axes. The first is according to dimension type, namely, stakeholder relationship, information flow and conflict resolution. The second is according to partnership attributes, which are represented in

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three different layers. The first layer includes characteristics that are applicable to any successful partnership. The second layer includes the characteristics of any successful partnership in the city resilience-building context, without considering the type of stakeholders involved. The third layer includes the characteristics of any successful 4P regardless of context. In addition to classifying the successful characteristics, the framework also gives a definition and a description of each one.

The paper is organised as follows. Section 2 presents the state of the art. Section 3 describes the research methodology to develop and validate the framework. Section 4 explicates the framework, first describing the classification scheme and then listing, defining and describing the characteristics of successful 4Ps in the city resilience-building process. Section 5 provides a discussion of the study, and Section 6 highlights the conclusions of this research effort and proposes future steps for improving it.

2. State of the art

As our point of departure, return to the early view that crisis management was to be centred around identifying and managing risks. All the prevention and preparation activities were designed to address those known or knowable risks, without considering unpredictable events (Labaka, 2013). Yet, due to the unpredictable nature of today's crises along with the increasingly complex interconnections between Critical Infrastructures (CIs) and society's great dependence on functioning CIs, cross-sectoral cooperation among different types of stakeholders is essential to improve the ability to prepare for, respond to and recover from unexpected events in the most effective manner (Eisenman et al., 2014). In this context, a promising approach to crisis management has been to adopt a resilience approach that focuses on developing transversal prevention, preparedness, response and recovery capacities in order to face both predictable and unpredictable events (Boin and McConnell, 2007; De Bruijne and Van Eeten, 2007; Hämmerli and Renda, 2010).

2.1. Resilience in crisis management

Resilience is a broad concept that has been used in multiple and different disciplines (Manyena, 2006). Within crisis management, resilience is defined as "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR, 2009, p. 24). The definition suggests the need for a holistic view when managing crises in order to adopt both reactive and proactive measures that can minimise or even avoid crises and their associated impacts (Laugé, 2014).

Moreover, the aim of adopting a resilience approach to crisis management is to address both expected and unexpected events. Although preparing for the unexpected may seem contradictory, resilience will not exist if it is not planned for (Boin and Lagadec, 2000). The resilience level of a system, in our case the city, depends greatly on proactive pre-crisis prevention and preparedness in order to develop ascertainable abilities and capabilities that improve the effectiveness of crisis management.

In many cases, the resilience level of one system depends on other systems' resilience level (Katina et al., 2014). When the functioning of a system is hampered, other systems can suffer unexpected consequences (cascading effects) given the interconnectivities between and among them (Setola et al., 2009). Cascading effects increase the complexity of crises and make crisis management more difficult. Improving a system's own resilience level must be done without losing the holistic perspective, which means involving all the relevant stakeholders. We return repeatedly to the subject of resilience across interconnected systems and stakeholders in this paper.
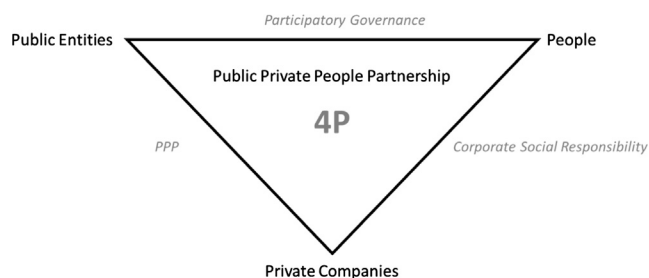

Fig. 1. Existing mechanisms to relate public entities, private companies and citizens.

2.2. City resilience

One of the most important challenges for city resilience today is the development of a multidisciplinary theory that integrates and co-ordinates a variety of city dimensions such as critical infrastructures, society, economy and environment into a unified conceptual framework (Bulkeley, 2013; Jabareen, 2013; O'Brien, 2012; Pelling, 2011; Satterthwaite, 2011; Vedeld et al., 2016). This challenge has to be addressed at both the theoretical and the practical levels by developing theories and implementation tools.

Each city dimension has its own mechanisms for involving relevant stakeholders in the resilience-building process (Gagnon et al., 2016). Public-private partnerships (PPPs) are, in particular, an effective tool for increasing critical infrastructure resilience (Dunn-Cavelty and Suter, 2009). Other mechanisms, such as participatory governance, have increased community resilience (Chandra et al., 2015; Doyle et al., 2014). Private companies also understand, to varying degrees, that they have an important role in ensuring the well-being of society; to that end some have designed corporate social responsibility strategies that also contribute to increasing city resilience (Twigg, 2015) (see Fig. 1).

2.2.1. Public-private partnerships (PPPs)

Over the last decade, interest in PPPs has increased to ensure critical infrastructure protection. A PPP is defined by the cooperation that occurs between public and private sectors in working towards shared objectives through a mutually agreed upon division of labour and by committing resources and sharing the risks as well as the benefits (Buse and Walt, 2000). A partnership could be based on formal or informal arrangements made prior to a crisis as well as on ad hoc activities occurring during an emergency. Although public entities are the main actors in charge of protecting society, nowadays an increasing number of CIs are owned or operated by private companies (Boin and McConnell, 2007). In other words, both public and private companies today are responsible for providing resources and sharing responsibilities in terms of CI protection. Promoting cooperation between both parties through PPPs is required to ensure critical infrastructure protection (Busch and Givens, 2012).

2.2.2. Participatory governance

Governance entails processes and institutions that contribute to public decision-making. Participatory governance is one institutional strategy for developing governance, where the desired outcome and logical end of participatory governance is citizen engagement (United Nations, 2007). Participatory processes within a city have also emerged over the last decade. Involving citizens in the city's decision-making and planning processes has already become common practice in major cities in developed countries (Lovan et al., 2017; Zérah, 2009). Many decisions taken regarding city resilience, regardless of the sector directly affected, end up having an indirect effect on citizens. For this reason, participatory processes within the city are seen as key elements in the community resilience-building process (Schauppenlehner-Kloyber and Penker, 2016).

2.2.3. Corporate social responsibility

Although the mission of private companies is profit-oriented, private companies have more and more come to conclude that it is also their interest, if not duty, to contribute to the growth and development of society (Devinney, 2009; Boulouta and Pitelis, 2014). Companies are more and more implementing corporate social responsibility (CSR) policies, with the aim of having a positive impact on the welfare of society. CSR strategies have been defined as "[a] concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (Commission of the European Communities, 2001). Although the interests that underlie public and private entities differ is well-known (Marques and Mintzberg, 2015; Saleem et al., 2016), some authors believe the implementation CSR policies can lead to increase financial performance (Husted and de Jesus Salazar, 2006).

2.3. Involving public entities, private companies and citizens in the city resilience-building process

Engaging city stakeholders in the city resilience-building process is not easy due to the diverging interests of public entities, private companies and citizens (McConnell and Drennan, 2006). Public entities have been expected to act as representatives of society's viewpoint. That said, miscommunication between citizens and public entities may lead and has led to misunderstandings of the same reality (Rich et al., 1995). Consequently, public entities, private companies and citizens are aware that their collaboration could bring potential benefits not only to the city resilience-building process itself but also for themselves. The wide scope of city resilience provides a common platform to create new or better forms of strategic decision-making through partnerships at the city level (Boyd and Juhola, 2014).

The need to coordinate different types of stakeholders to increase city resilience was highlighted by the president of 100 Resilient Cities, Michael Berkowitz, in his plenary speech at the Habitat III Conference, the United Nations Conference on Housing and Sustainable Urban Development (2016). "The story of resilience is really one of collaboration—it takes all levels of government, the private sector, and civil society, working cooperatively toward a common purpose: reducing catastrophic risk and, at the same time, improving the daily lives of residents" (Berkowitz, 2016). However, collaboration and partnerships, which have been identified as two of the most important aspects of managing disasters, are also the most challenging (Kapucu, 2012).

Given the above, the need to develop effective public-private-people partnerships (4Ps) that facilitate multi-level governance within cities in order to increase city resilience has emerged and taken on prominence (Vedeld et al., 2016) (see Fig. 1). These 4Ps are instruments for coordinating and aligning the efforts made in different sectors with regard to resilience.

2.4. Public-private-people partnerships (4Ps)

Within the scope of this research, partnerships are defined as purposive strategic relationships among independent entities that share compatible goals, strive for mutual benefit and acknowledge a high level of mutual interdependence. ISO 22397, entitled "Societal Security-Guidelines for establishing partnering arrangements" (2014), explains that there are a variety of partnering arrangements, both formal and informal. These include but are not limited to contracts, memoranda of understanding, mutual aid agreements, cooperation agreements, coordination agreements, operational agreements, and supply agreements. As such, 4Ps in the city resilience process are, for shorthand purposes, arrangements, both formal and informal, developed between and among public entities, private companies and citizens with the aim of improving city resilience. Successful partnerships are those that achieve their set objective or purpose in an effective manner, with the contribution of all the partners involved (Mohr and

Spekman, 1994; Gagnon et al., 2016).

3. Research methodology

The methodology for this research revolved around a systematic literature review that took place in two main steps. The first defined the research objective and the second defined the search process.

3.1. First step: Research objective

Our main research question is the following:

- Q1: What are the characteristics of successful public-private-people partnerships in the city resilience-building process?

It is necessary to understand that different types of partnerships have been used to address large-scale cross-sectoral challenges in a wide range of contexts, such as environmental sustainability (Bäckstrand, 2006) or industry (Majamaa, et al., 2008). Accordingly, it is valuable to analyse the literature on 4Ps in the city resilience-building process as well as the literature on partnerships in other contexts with respect to three specific questions:

- Q1.1: What are the characteristics that successful partnerships have in common, regardless of its type?
- Q1.2: What are the specific characteristics of successful city resilience-building partnerships (without considering the type of partners involved)?
- Q1.3: What are the specific characteristics of successful public-private-people partnerships (4Ps) (without considering the context of city resilience)?

3.2. Second step: Search process

The second step of the research was the search process, with the following sub-sections explain the search, selection and analysis processes undertaken. Different approaches have been taken to answer the three research sub-questions defined above.

3.2.1. Selecting data sources and the search strategy

Research sub-question Q1.1 was answered based on the characteristics of successful partnerships that Mohr & Spekman identified in their widely-cited article[1] "Characteristics of partnership success: partnership attributes, communication behaviour, and conflict resolution techniques" (Mohr and Spekman, 1994). The Mohr and Spekman article has subsequently been referenced by other recent researchers whose similar aim has been to find successful factors for meaningful collaboration between and among stakeholders (Boudreaux, 2015; Browning et al., 2016; Doyle and Paton, 2017).

To answer Q1.2 and Q1.3, a systematic literature review was conducted using the Scopus electronic database, which was launched in 2004 by Elsevier. We chose this database because it indexes a larger number of journals than the other databases and it is the largest searchable citation and abstract source for different scientific fields (Falagas et al., 2008; Guz and Rushchitsky, 2009).

The keywords and queries used to find papers that were relevant to the second and third research sub-questions are the following:

Q1.2:	"city resilience" OR "community resilience" OR "urban resilience" AND partnership OR collaboration
Q1.3:	

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[1] After analysing the number of citations of the paper in different databases, the results are: 95 citations in Scopus, 949 citations in Web of Science and 4073 citations in Google Scholar.

(("public-private partnership" OR "public-private collaboration" AND communit*) OR "public-private people partnership") AND ("characteristics" OR "properties" OR "dimensions")

Appendices A and B include more quantitative information about the systematic literature review process.

3.2.2. Article selection: Exclusion and inclusion criteria

In order to ensure the rigor of this study, two inclusion and exclusion criteria were defined: publication-based and content-based.

In terms of the publication-based criterion, only academic papers published in scientific journals were selected as a way to ensure a more standard set quality.

With regard to the content-based criterion, papers that did not provide useful insights in answering the defined research sub-questions were excluded at different stages of the review. The main reasons for excluding papers found in the search that addressed Q1.2 were that they were not focused on communities within the city, that the concept of resilience was not used within a more or less holistic view, and that the paper did not give any evidence of how these partnerships should be. The main reasons for excluding papers found in the search that addressed Q1.3 were that the stakeholders involved in the partnerships were not referring to 4Ps specifically, that citizens were being described as passive stakeholders that were not directly contributing to the partnership, and that the paper did not give any evidence of how these partnerships should be.

3.2.3. Article selection: The path to the final selection of relevant papers

Fig. 2 illustrates the iterative process used to remove irrelevant papers as well as to identify the characteristics of successful 4Ps in the city resilience-building process. It shows the different phases used to decide which papers were relevant and therefore included in the sample and analysed in further detail. After executing each query, the title, abstract and keywords of the identified articles were analysed to identify the relevant ones. Duplicate entries were removed.

Once unique and potentially relevant papers were identified, the process of identifying the successful characteristics that answered Q1.2

and Q1.3 consisted of five steps:

1. Develop an initial classification scheme: a preliminary version of the possible characteristics for successful resilience-building partnerships and 4Ps was developed. The initial scheme was based on the characteristics identified by the Mohr & Spekman article.
2. Scan the papers' content (abstract, methods, results and conclusions): potentially relevant articles were read in full and analysed in greater detail.
3. Identify any characteristics of successful partnership mentioned in the articles according to the classification scheme: Articles were analysed in detail to find statements that justified the characteristics included in the classification scheme as well as to find new characteristics.
4. Refine classification scheme if necessary: Preliminary characteristics were modified, removed or replaced.
5. Develop final classification: A final version of the characteristics for successful resilience-building partnerships and 4Ps was developed.

Appendix C includes more quantitative information about the systematic literature review process.

4. Characteristics of successful 4Ps in the city resilience-building process

Based on the literature review, a framework that lists 16 characteristics of successful 4Ps in the city resilience-building process was developed. This framework identifies, defines, describes and classifies the characteristics in order to be successful. We acknowledge and recognize that there are problems with how to achieve each of the Mohr and Spekman success characteristics across and within variable contexts, but for the purposes of this article, a baseline for success is needed for the following analysis. It is important to underscore that we draw on the literature review for support or qualification of each success factor.

4.1. Classifying the characteristics of successful partnerships

The framework classifies the characteristics of successful 4Ps in city resilience based on two criteria. The first takes into account three
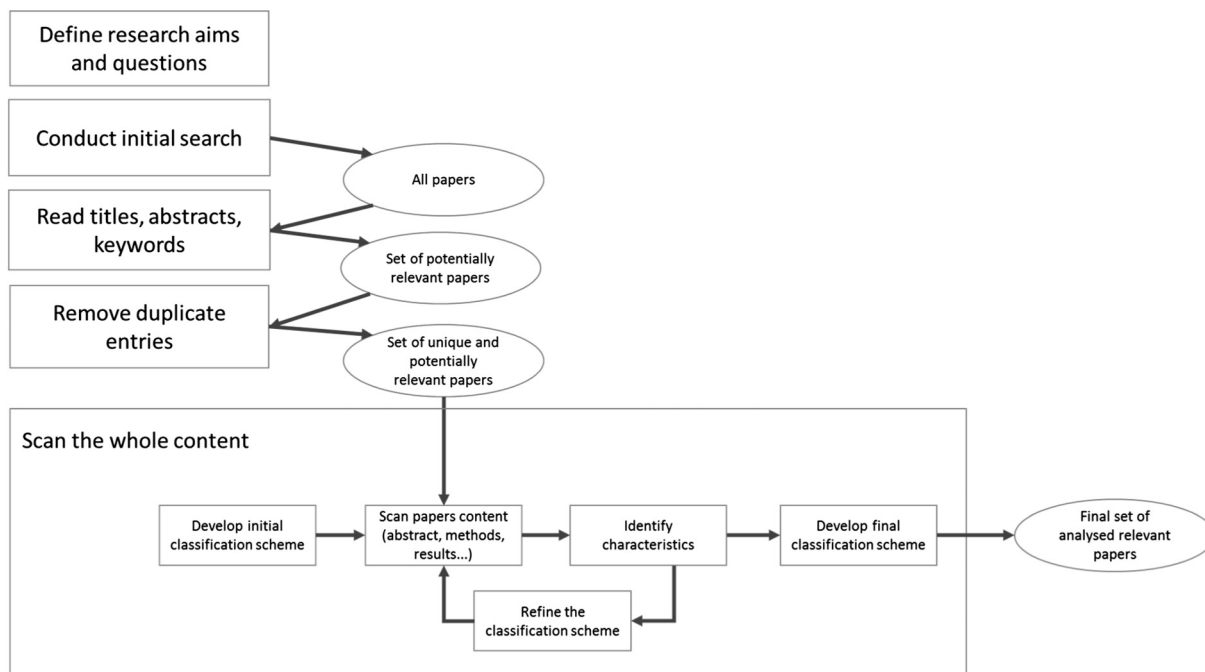

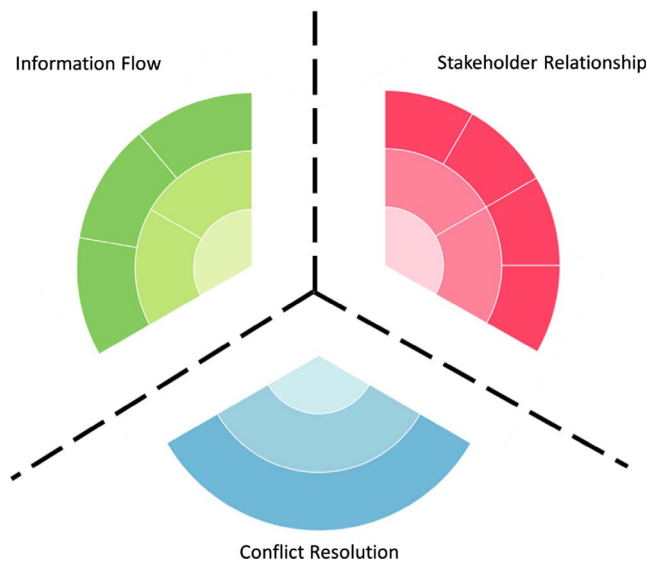**Fig. 2.** Iterative process followed to conduct the literature review.

Fig. 3. Dimension-based classification criterion.

dimensions that have been identified as relevant in successful partnerships. The second criterion classifies successful partnerships in accordance with a set of attributes any partnership should have if its success is to matter.

4.1.1. First criterion: Dimensions of the partnership
This criterion adopts the scheme developed by Mohr and Spekman (1994) and classifies the characteristics of successful 4Ps into different categories based on the dimension of the partnership they are related to. Under this scheme, there are three dimensions, (Fig. 3).

1. Stakeholder relationship: The seven characteristics in this dimension are related to the attributes and attitudes stakeholders must possess to work together successfully: commitment, coordination, interdependence, trust, integration, flexibility and inclusiveness.
2. Information flow: The six characteristics in this dimension are related to the communication channels and protocols that stakeholders must use to invest resources in the most effective manner: information quality, information sharing, participation, information accessibility, information transparency and user friendliness.
3. Conflict resolution: The three characteristics in this dimension are related to the techniques used to solve problems related to the correct functioning of the partnership: constructive resolution, reflectiveness and perspective alignment.

4.1.2. Second criterion: Attributes of the partnership
In order to be able to distinguish among different types of partnerships, we must pay attention to two different types of attributes: the purpose the partnership aims to address and the type of partners involved. This second criterion has been classified within three different layers (see Fig. 4) according to:

- The 1st layer of the framework includes general characteristics applicable to any type of partnership regardless of its specific aim or the type of partners involved.
- The 2nd layer of the framework includes the particular characteristics of partnerships filtered by context. In this study, this layer includes partnership characteristics in the context of the city resilience-building process. In this layer the type of partners involved has been not considered.
- The 3rd layer of the framework includes the specific characteristics of partnerships filtered by the type of partners involved. In this study, this layer includes partnerships formed by public entities,

private companies and people living in the cities. In this layer the aim of the partnership has not been considered.

This criterion classifies the characteristics identified in the literature considering the scheme followed for the literature review design. Characteristics found to answer Q1.1 have been placed in the first layer, characteristics found to answer Q1.2 have been placed in the second layer, and characteristics found to answer Q 1.3 have been placed in the innermost layer. These three layers together constitute the framework for 4Ps in the city resilience-building process.

4.2. Characteristics of 4Ps in the city resilience-building process

In the following section, the 16 characteristics of successful 4Ps in the city resilience-building process (see Fig. 5) are presented. First, a brief general definition of each characteristic is presented. Thereafter a more specific description of why that characteristic is relevant for 4Ps in the city resilience-building process is provided.

4.2.1. 1st layer: Successful characteristics of general partnerships
The characteristics classified in this layer are applicable to any partnership, regardless its aim and the type of stakeholders involved. After each characteristic definition, its influence on the city resilience-building process is explained drawing on the material from our literature review.

4.2.1.1. Stakeholder relationship dimension.

1. Commitment

Commitment refers to the willingness of partners to exert effort on behalf of the partnership, leaving aside their self-interests. Committed partners have the capacity to focus on long-term goals while overcoming short-term problems and discussions.
Therefore, city resilience depends in part on the ability to involve representatives from public entities, private companies and the community (Adams, 2016). All partners should feel valuable, as members who do not see any real benefit will be reluctant to take part (Doyle et al., 2014).

2. Coordination

Coordination refers to the need to define the boundaries of each partner's responsibilities and to specify the tasks each partner is expected to perform. Partners also need to specify the mechanisms and protocols that will allow them to work together in an effective manner.
Defining boundaries, developing networks and connections for collaboration, performing coordination activities across public and private entities and citizens, and facilitating access to useful resources (skills, funding, infrastructure or knowledge) are some of the activities that increase coordination among partners (Doyle et al., 2014).

3. Interdependence

Interdependence refers to the capacity of partners to assume that in order to achieve mutually beneficial goals they will depend on each other.
Finding individual benefit opportunities for partners and assuming that one's benefits usually depend on the performance of others is key for a successful city resilience-building 4P (Chandra et al., 2013; O'Sullivan et al., 2015). Developing a common vision of the challenges ahead, planning the activities that fall under that vision and the time frame for undertaking those activities, and identifying the most appropriate people to be involved are all key elements (Doyle et al., 2014). This helps prevent misunderstandings and potential conflicts in the future.
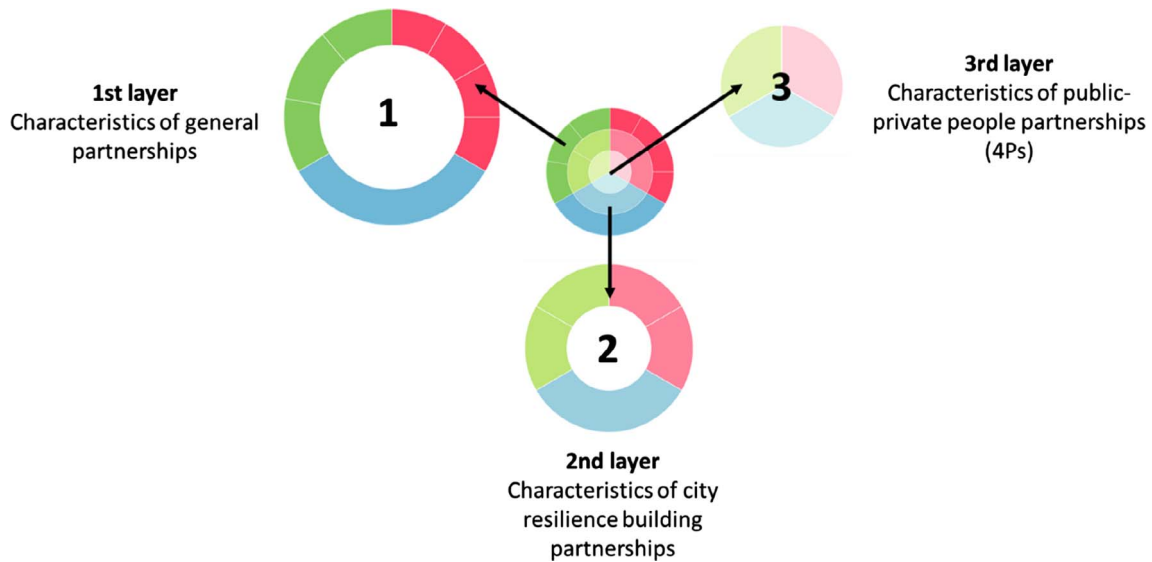
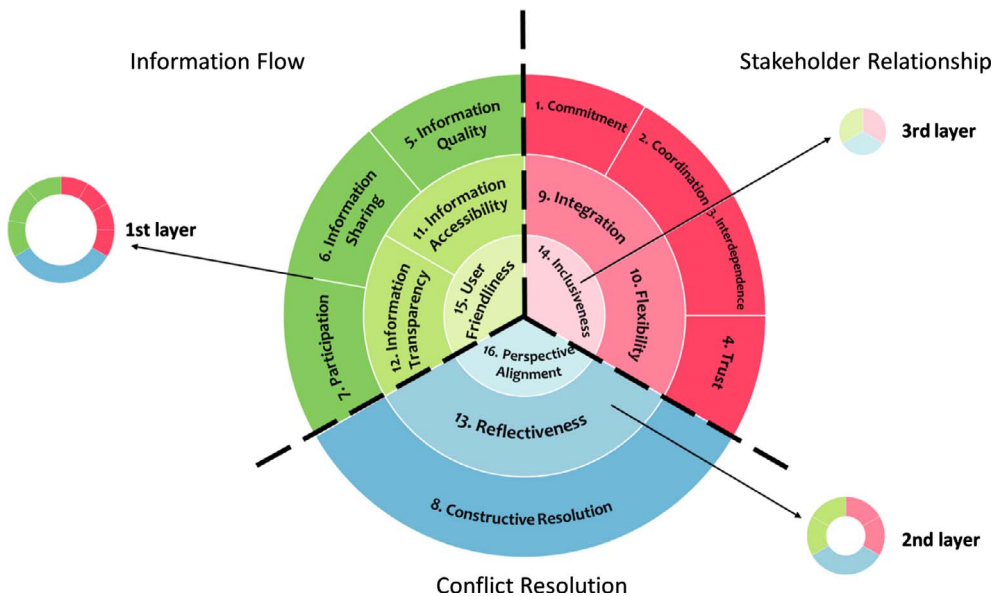**Fig. 4.** Dimension-based classification criterion.

Fig. 5. Framework showing the characteristics of successful 4Ps in the city resilience-building process.

4. Trust

Trust refers to the belief that a partner is reliable and that will fulfil its obligation in an exchange. This underwriting belief is what makes possible to work for shared objectives.

The quality of the way in which partners interact is more influenced by non-legally binding aspects such as trust (Stewart et al., 2009) than by legally binding aspects. Trust among partners is a vital component in city resilience-building if they trust each other, they are far more likely to collaborate beyond existing cross-sectoral boundaries and the hierarchical restrictions of organisations (Rogers et al., 2016). Trust increases open communication between partners, which eventually creates the belief that they are being represented fairly (Fitzpatrick and Molloy, 2014). Moreover, integrating the partners and organisations in a tighter way can build trust and improve city resilience- such as crisis preparedness activities or recovery plans (Chi et al., 2015). However, developing trust among different city stakeholders is also a very challenging issue (Doyle and Paton, 2017).

4.2.1.2. Information flow dimension.

5. Information quality

Information quality refers to timeliness, accuracy and relevance of exchanged information. This allows fluent communication among partners, thereby improving the ability to make better decisions.

High information quality facilitates communication between different partners, which enables the partnership to identify the requirements and resources needed to increase city resilience (Brogt et al., 2015). Higher quality information leads to a better decision-making process and more effective prevention of, response to and recovery from any crisis. However, implementing effective ways to exchange quality information is in no way an easy task to undertake (Allen et al., 2014).

6. Information sharing

Information sharing refers to the extent to which information is

communicated to other partners, allowing tasks to be completed more effectively.

Information sharing at best improves joint actions, which adds to city resilience by enhancing partners' capabilities to prevent, respond and recover more effectively in times of crisis (Kapucu, 2012). In fact, information sharing is believed to be one of the keys to effective collaboration (Fitzpatrick and Molloy, 2014). Moreover, information sharing prevents the duplication of effort and resources, which also increases the efficacy partnerships. Here too, fostering meaningful information exchange is not easy (Givens and Busch, 2013), with problems of information overload (too much information to share) and cognitive undercomprehension being notable (e.g., Allen et al., 2014).

7. Participation

Participation refers to the extent to which partners engage jointly in planning, goal setting and responsibility distribution, as well as in the execution of different tasks.

A collective response to resilience-related issues can help promote self-sufficiency, which is important because citizens are often familiar with the issues that affect city resilience and they are able to provide useful knowledge that increases it (Bava et al., 2010; Chandra et al., 2013). Although participation is essential, the challenge is how to sustain motivation and active participation in resilience-oriented activities (O'Sullivan et al., 2015).

4.2.1.3. Conflict resolution dimension.

8. Constructive resolution

Constructive conflict resolution refers to the way conflicts between and among different partners are solved, thereby promoting better solutions in which every partner feels their interests are taken into account.

Conflicts might appear due to the different nature of the partners who are to cooperate in increasing city resilience. Therefore, constructive resolution of conflicts is necessary to align the self-interests and perspectives of different partners. City resilience-building 4Ps must include on-going dialogue to encourage stakeholders to engage in collaborative problem-solving and address potential conflicts (Bava et al., 2010; O'Sullivan et al., 2015).

4.2.2. 2nd layer: Successful characteristics of city resilience-building partnerships

The characteristics classified in this layer are applicable to partnerships created to increase city resilience-building, without considering the type of stakeholders involved. As was done for the 1st layer, each characteristic is defined and its influence on the city resilience is explained.

4.2.2.1. Stakeholder relationship dimension.

9. Integration

Integration refers to the extent that the partnership is interconnected to systems, institutions or other partnerships that have similar or complementary purposes, working together to achieve better results.

Integrating the efforts of city stakeholders with other agencies or organisations outside the city-boundaries but also involved in resilience-building is required to align efforts and improve the efficacy of the city resilience-building partnerships. This could be done, for instance, by aligning the efforts that at the city level with what is being done at regional, national and even international levels. Moreover, greater integration can also contribute to aligning crisis prevention, response and recovery plans and activities in a collaborative way,

preventing the duplication of effort by various agencies or organisations (Chi et al., 2015; Shoaf et al., 2014). The need to integrate efforts in the context of city resilience has been highlighted by numerous academics and practitioners; however, the focus should be now in developing new methods that support this integration processes (Kapucu, 2012).

10. Flexibility

Flexibility refers to the adaptability of the partnership in the face of changing circumstances, new challenges or sudden crises.

Although the partnership's structure, roles and responsibilities can benefit prevention and the decisive and timely response to a crisis, these structural elements must permit flexibility so that existing relationships can adapt to respond to and recover from a crisis in the most effective manner (Doyle et al. 2014; Stewart et al., 2009). Moreover, partnerships must be flexible to be able to evolve and adapt to face emerging challenges and risks. Although rigid agreements have proven to be suitable to address certain types of crises, solely trusting them is not always result effective (Stewart et al., 2009). Conducting training activities with stakeholders to improve the capacity to improvise could help in developing flexible partnerships (Scolobig et al., 2015).

4.2.2.2. Information flow dimension.

11. Information accessibility

Information accessibility refers to how quickly information is available to the relevant stakeholders and the ease with which the information can be used.

Clear communication protocols as well as timely notification of new or updated information are valuable to ensure all partners are up to date and have the same information (Adams, 2016). This makes possible to identify needs and resources that the city and its citizens require in terms of resilience (Brogt et al., 2015) and to help to improve the decision-making process, in order to reduce the impacts caused by cascading effects (Toubin et al., 2014). For instance, at the peak of a crisis, information should be instantaneously available for any stakeholder so they can respond in the most effective manner. Effective mechanisms that deal with this challenge are still under development, however (Roche et al., 2013).

12. Information transparency

Information transparency refers to the extent to which critical and sensitive information is shared with other partners, allowing tasks to be completed more effectively.

This fosters engagement and develops a common vision of how city resilience could evolve in order to respond to local concerns (Gagnon et al., 2016). However, due to the diverging interests of all the stakeholders, ensuring the transparency of the information provided by private companies and citizens is not easy (Busch and Givens, 2012). The information that should be shared in order to increase the city's resilience level is usually sensitive, which makes this characteristic more relevant.

4.2.2.3. Conflict resolution dimension.

13. Reflectiveness

Reflectiveness refers to the ability of the partnership to use past experience for future decisions, modifying procedures and behaviours accordingly.

Identifying and framing collective experiences, analysing successes and failures and assessing performance is critical to ensure long-term collaboration among partners (Pfefferbaum et al., 2013). By definition, to be resilient is to be adaptable. Therefore, it is necessary to consider

not only our own experiences but also to learn from others. Lessons learnt in the past should not be ignored; instead, they should be considered and integrated into future city resilience-building strategies (Fitzpatrick and Molloy, 2014). Additionally, it is not enough to work on identifying lessons learnt it is also necessary to apply them in real contexts to be better prepared.

4.2.3. 3rd layer: Successful characteristics of 4Ps

The characteristics classified in this layer are applicable to partnerships involving public, private and people, without considering the aim of city resilience. As was done for the first two layers, each characteristic is defined and its influence on the city resilience-building process is projected.

4.2.3.1. Stakeholder relationship dimension.

14. Inclusiveness

Inclusiveness refers to the need to involve representatives from different groups to create a sense of shared ownership or joint vision.

In terms of the literature reviewed, successful 4Ps in the city resilience-building process should promote more equal access to information and opportunities for participation without excluding the opinions of certain stakeholder groups (Akamani et al., 2015). In fact, excluding the opinions of the representatives of key stakeholder groups reduces the legitimacy of the decisions and actions taken and may cause the disapproval of certain stakeholders, thereby hampering the correct functioning of the partnership (Atela et al., 2015). Building a sense of belonging is key for successful partnerships (Coffin and Barbero, 2009).

4.2.3.2. Information flow dimension.

15. User friendliness

User friendliness refers to the ease with which all partners understand and can use information. This means that there is a need to adapt how information is expressed so that the highest number of stakeholders can understand it, which gives equal access to the content.

Not using language that is precise and easily understandable by all the stakeholders involved in 4Ps keeps the partnership from functioning correctly. Moreover, each type of stakeholders is interested in having access to different information to further enhance their knowledge about certain topics (Addison et al., 2015).

4.2.3.3. Conflict resolution dimension.

16. Perspective alignment

Perspective alignment refers to the capacity to analyse the self-interest of each partner and to discuss their commonalities and how to align the different existing perspectives and meet a mutually beneficial goal.

The positive outcomes of successful partnerships can be limited by misalignments in stakeholders' self-interests and individual goals (Atela et al., 2015). The process of developing a common strategy involves representatives from public entities, private companies and communities, thus promoting a type of collective decision-making that identifies the community's needs in order to align all the decisions and future activities (Addison et al., 2015; Coffin and Barbero, 2009).

5. Interconnections between characteristics

It is important to note that within the scope of this research, the above characteristics have been analysed separately and without considering the existing interconnections among them. While conducting the systematic literature review, we found, however, evidence of

existing relationships between and among characteristics. In other words, improving certain characteristics directly influences the effectiveness of others. As a result, focusing on improving the most influential characteristics will ensure a greater impact on the overall effectiveness of the partnership. Table 1 summarizes some of the statements, actually hypotheses, found in the literature that support this idea.

Considering the interconnections that exist among the characteristics will enable resources (money and time) to be deployed in the most effective manner. These interconnections will suggest an optimal implementation order that should be considered in the future when developing successful 4Ps in the city resilience-building process.

6. Conclusions and future research

Including citizens in the city resilience-building process allows the most vulnerable sectors of society to be directly represented in the city resilience-building process. That said, fostering cooperation among stakeholders that might have different interests and backgrounds is a challenging task. At best, this framework provides insights and highlights which characteristics are to be considered in order to develop better, if not successful partnerships.

The literature has demonstrated that further analysis and research is needed to operationalize well-meaning, but too generalized, ideas about what is required to develop effective 4Ps in the city resilience context. This framework is at best theoretical and in urgent need of being operationalized. Future research should focus on gathering evidence that validates the relationships between and among the identified characteristics, as these relationships are core to partnership implementation. In the process of further research, the policies, best

Table 1
Statements (hypotheses) found in the literature and the relationships among the characteristics.

Statement	Relationships among characteristics
"Greater integration of organisations can build trust and increase participation in emergency preparedness activities that increase knowledge and contribute to enhanced preparedness and recovery plans." (Chi et al., 2015)	Integration → Trust → Participation → Coordination
"Trust and open communication between the research team and the community were key for fostering engagement and developing a vision of how the project could collectively evolve to respond to the local context…" (Gagnon et al., 2016)	Trust, Information Transparency → Commitment
"Furthermore, once engaged, the challenge is how to sustain motivation and active participation in resilience-oriented activities." (O'Sullivan et al., 2015)	Commitment → Participation
"In our case study, we documented the perception among participants that residents are not included in restoration planning and are largely unaware of projects until after implementation. This sentiment has been noted in other studies investigating community members' relationships with natural resource management agencies and can be detrimental to building trusting relationships." (Davenport et al., 2010)	Information Sharing → Trust → Inclusiveness
"Collaborative planning techniques in which citizens play an active role in defining problems and goals, gathering information, developing alternatives, and evaluating success may prove to be more effective in encouraging local participation and building trust than conventional project scoping and review." (Davenport et al., 2010)	Inclusiveness → Trust → Participation

practices and lessons learnt that can improve the development of these characteristics can be identified. Moreover, there is still the need to set a priority order on the implementation of policies that improve each individual characteristic. The resources (time and money) are most often limited, such that deciding which ones are the most influential is crucial as well as the order in which they are to be undertaken. Finally, indicators for monitoring the evolution of the partnership itself and the impact of the partnership on the city resilience-building process have to be collated from the academic literature and refined by experts and other stakeholder in the context of actually empirically improving city

resilience. Doing so would transform this theoretical framework into a practical tool that will be useful to city stakeholders that are working on the city resilience-building process.

Acknowledgements

Appendix A. Quantitative results of the systematic literature review

See Figs. 6 and 7.

Fig. 6. Quantitative results obtained after executing the query related to the second research sub-question (Q1.2: What are the characteristics of successful City Resilience-Building Partnerships?) in December 2016.
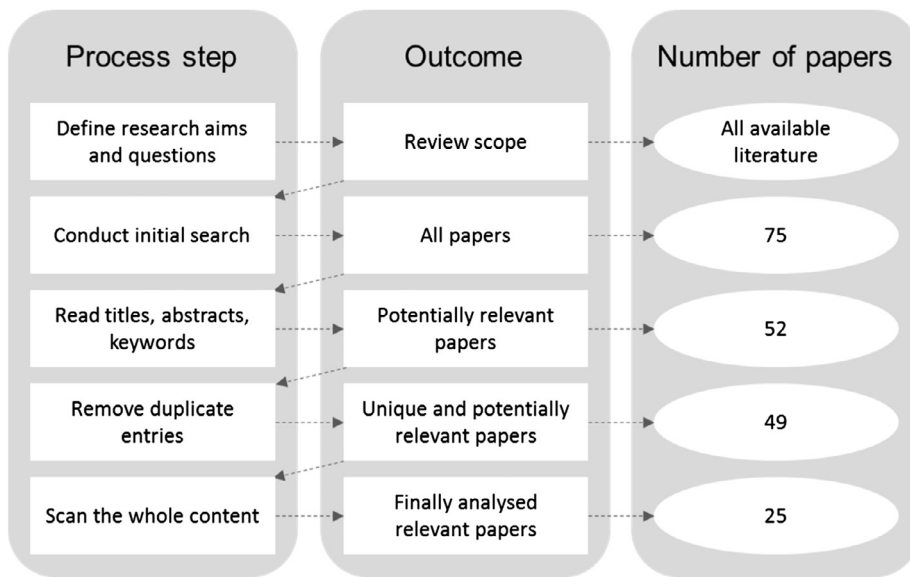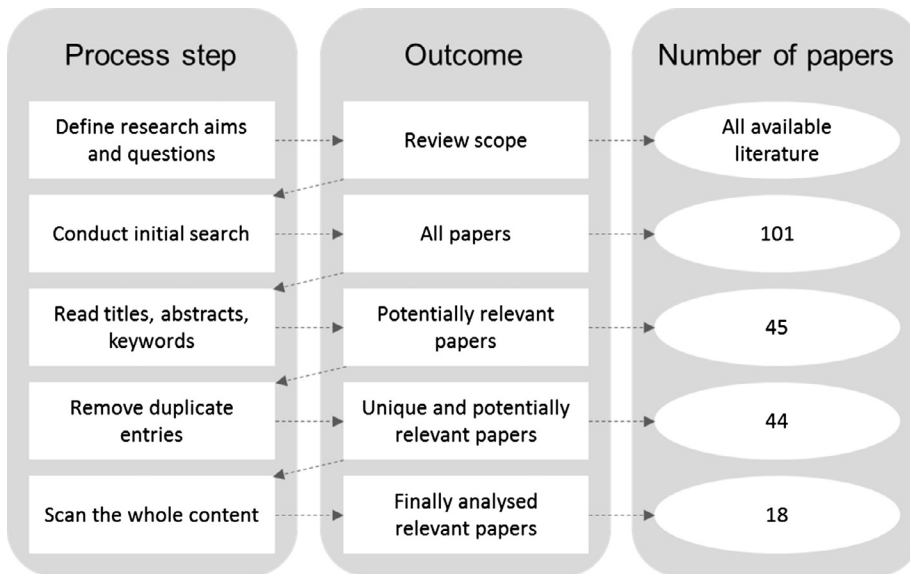

Fig. 7. Quantitative results obtained after executing the query related to the third research sub-question (Q1.3: What are the characteristics of successful public-private-people partnerships?) in December 2016.

Appendix B. Relevant papers selected to answer the 2nd and 3rd research sub-questions

		Layer	1st layer: General Partnerships								2nd layer: Topic: City Resilience					3rd layer: Stakeholders: 4P		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Promoting Disaster Resilience Through Use of Interdisciplinary Teams: A Program Evaluation of the Integrated Care Team Approach (Adams, L.M., 2016)	2 and 3	x	x			x				x		x		x	x		
2	Lessons in Collaboration, Four Years Post-Katrina (Bava, S., Coffey, E. P., Weingarten, K., & Becker, C., 2010)	2	x	x	x	x			x	x					x			
3	Adaptive climate change governance for urban resilience (Boyd, E., & Juhola, S., 2015)	2	x	x								x						
4	Clergy views on their role in city resilience: lessons from the Canterbury earthquakes (Brogt, E., Grimshaw, M., & Baird, N., 2015)	2					x						x					
5	Getting actionable about community resilience: The Los Angeles county community disaster resilience project (Chandra, A., Williams, M., Plough, A., Stayton, A., Wells, K. B., Horta, M., & Tang, J., 2013)	2 and 3			x			x					x					x
6	Developing a Tabletop Exercise to Test Community Resilience: Lessons from the Los Angeles County Community Disaster Resilience Project (Chandra, A., Williams, M. V., Lopez, C., Tang, J., Eisenman, D., & Magana, A., 2015)	2	x					x			x							
7	Partnerships for community resilience: Perspectives from the Los Angeles County Community Disaster Resilience project (APA Chi, G. C., Williams, M., Chandra, A., Plough, A., & Eisenman, D., 2015)	2				x		x			x			x				
8	Knowledge transfer between communities, practitioners, and researchers: A case study for community resilience in Wellington, New Zealand (Doyle, E. E, 2014)	2 and 3	x	x	x	x	x		x		x	x		x		x	x	
9	The Los Angeles county community disaster resilience project - A Community-Level, public health initiative to build community disaster resilience (Eisenman, D., 2014)	2	x		x	x		x	x		x							
10	The role of NGOs in building sustainable community resilience (Fitzpatrick, T., & Molloy, J., 2014)	2			x	x		x	x		x	x			x			
11	Exploring partnership functioning within a community-based participatory intervention to improve disaster resilience (Gagnon, E., O'Sullivan, T., Lane, D. E., & Paré, N., 2016)	2	x	x	x	x					x			x				
12	Disaster Resilience and Adaptive Capacity in Central Florida, US, and in Eastern Marmara Region, Turkey (Kapucu, N., 2012).	2		x	x		x	x		x	x	x		x				
13	What does built environment research have to do with risk mitigation, resilience and disaster recovery? (Miller, W., 2015).)	2					x	x										
14	A conceptual model of a school-community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia (Oktari, R. S., Shiwaku, K., Munadi, K., & Shaw, R., 2015)	2	x	x	x			x	x		x							
15	Use of the Structured Interview Matrix to Enhance Community Resilience Through Collaboration and Inclusive Engagement (O'Sullivan, T. L., Corneil, W., Kuziemsky, C. E., & Toal-Sullivan, D., 2015)	2 and 3	x	x	x			x	x	x						x		
16	The communities advancing resilience toolkit (CART): An intervention to build community resilience to disasters (Pfefferbaum, R. L., Pfefferbaum, B., Van Horn, R. L., Klomp, R. W., Norris, F. H., & Reissman, D. B., 2013)	2 and 3	x	x	x			x	x	x		x			x	x		
17	Collaboration and communication: Building a research agenda and way of working towards community disaster resilience (Rogers, P., Burnside-Lawry, J., Dragisic, J., & Mills, C., 2016)	2	x	x	x	x	x	x		x			x		x			
18	Between participation and collective action-from occasional liaisons towards long-term co-management for urban resilience (Schauppenlehner-Kloyber, E., & Penker, M., 2016)	2			x	x		x	x			x		x	x			
19	Enhancing emergency preparedness and response systems: Correlates of collaboration between local health departments and school districts (Shoaf, K. I., Kelley, M. M., O'Keefe, K., Arrington, K. D., & Prelip, M. L., 2014)	2	x	x	x	x		x			x			x				
20	Leveraging public-private partnerships to improve community resilience in times of disaster (Stewart, G. T., Kolluru, R., & Smith, M., 2009)	2	x	x		x		x				x		x				
21	Improving the conditions for urban resilience through collaborative learning of Parisian urban services (Toubin, M., Laganier, R., Diab, Y., & Serre, D., 2014)	2	x		x	x		x					x		x			
22	Opportunities and challenges for public libraries to enhance community resilience (Veil, S. R., & Bishop, B. W., 2014)	2		x		x	x	x			x				x			

#			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
23	Community Resilience after Disaster in Taiwan: A Case Study of Jialan Village with the Strengths Perspective (Veil, S. R., & Bishop, B. W., 2014)	2		x	x		x	x							x			
24	Building Community Resilience to Counter Violent Extremism (Veil, S. R., & Bishop, B. W., 2014)	2 and 3	x			x			x							x		
25	Applying community engagement to disaster planning: Developing the vision and design for the Los Angeles county community disaster resilience initiative (Wells, K. B., Tang, J., Lizaola, E., Jones, F., Brown, A., Stayton, A. & Plough, A., 2013)	2 and 3	x	x		x			x			x					x	
26	Toward a digital resilience (Wright, D. J., 2016)	2 and 3	x			x			x				x	x			x	
27	Building collaborative health promotion partnerships: The Jackson heart study (Addison, C. C., Campbell Jenkins, B. W., Odom, D., Fortenberry, M., Wilson, G., Young, L., & Antoine-LaVigne, D., 2015)	3	x			x			x								x	x
28	Barriers to collaborative forest management and implications for building the resilience of forest-dependent communities in the Ashanti region of Ghana (Akamani, K., Wilson, P. I., & Hall, T. E., 2015)	3				1			1							1	1	
29	Implementing REDD+ at the local level: Assessing the key enablers for credible mitigation and sustainable livelihood outcomes (Akamani, K., Wilson, P. I., & Hall, T. E., 2015)	3		x												x		
30	Public-private partnerships in emergency and disaster management: Examples from the Queensland floods 2010-11 (Bajracharya, B., & Hastings, P., 2015)	2 and 3	x	x	x	x			x									x
31	Human resources for health and universal health coverage: Fostering equity and effective coverage (Campbell, J., Buchan, J., Cometto, G., David, B., Dussault, G., Fogstad, H. & Quain, E. E., 2013)	3	x	x					x									x
32	Making connections in the brownfield marketplace (Coffin, S. L., & Barbero, C., 2009)	3	x	x				x	x	x						x		x
33	Building local community commitment to wetlands restoration: A case study of the cache river wetlands in Southern Illinois, USA (Davenport, M. A., Bridges, C. A., Mangun, J. C., Carver, A. D., Williard, K. W., & Jones, E. O., 2010)	3	x	x		x		x	x							x		
34	Why not partner with local government?: Nonprofit managerial perceptions of collaborative disadvantage (Gazley, B., 2010)	3	x		x	x	x	x										x
35	Criteria for the management partnership model in croatian seaports (Perić Hadžić, A., Jugović, A., & Perić, M., 2015)	3		x	x	x			x							x		x
36	Emergent communities of practice in temporary inter-organisational partnerships (Juriado, R., & Gustafsson, N., 2007)	3	x	x		x			x									
37	Toward Landscape-Scale Stewardship and Development: A Theoretical Framework of United States National Heritage Areas (Laven, D. N., Jewiss, J. L., & Mitchell, N. J., 2013)	3		x		x										x	x	
38	End-user oriented public-private partnerships in real estate industry (Majamaa, W., Junnila, S., Doloi, H., & Niemistö, E., 2008)	3							x								x	
39	Public-private partnerships: The trojan horse of neoliberal development? (Miraftab, F., 2004)	3			x				x							x		x
40	Residents' beliefs about responsibility for the stewardship of park trees and street trees in New York City (Moskell, C., & Allred, S. B., 2013)	3	x	x	x	x			x							x	x	
41	Dimensions of the efficiency of public - Private partnership (Skietrys, E., Raipa, A., & Bartkus, E. V., 2008)	3			x	x	x	x								x	x	x
42	Developing public private people partnership (4P) for post disaster infrastructure procurement (Zhang, J., Zou, W. & Kumaraswamy, M., 2015)	2 and 3	x	x		x		x	x	x						x		x

Appendix C. Total number of cites per characteristic

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TOTAL # OF CITES PER CHARACTERISTIC	26	25	20	26	10	23	23	8	12	7	6	8	9	15	9	10

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