Urban Resilience: Exploring the benefits of a National Inter-City Collaboration and Knowledge Platform for New Zealand- Draft

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Abstract: Different cities view and assess resilience from different perspectives. Some cities have acquired expertise in the field of urban resilience due to prior exposures to disasters, funding availability or advanced research. Inter-city collaboration and networks aid cities which are lagging in resilience by sharing of knowledge, expertise, best practices and resources as well as providing guidance and consultancy. There seems to be a deficiency in research linking urban resilience to intercity collaboration and knowledge platforms. This paper examined both the grey and scholarly literature to explore the main characteristics and requirements for establishing successful inter-city collaboration schemes and knowledge sharing platforms to aid and enhance the building of urban resilience across cities in New Zealand.

Keywords: Inter-City Collaboration, Inter-City Knowledge Networks, Urban resilience Collaboration, Urban resilience knowledge networks.

Introduction

Urban Resilience is a critical component of the overall community resilience encompassing various critical disaster risks. Urban resilience has a changing nature, as dictated by the changing frequency and nature of challenges and hazards. Moreover, cities view urban resilience from their perspectives and use differing resilience assessment methodologies. Although cities may differ in size, culture, resources, and knowledge, similarities are sometimes unrecognised. City-to-City (C2C) collaboration and knowledge sharing can provide various opportunities for sharing knowledge, experience, technical know-how, and resources. Tailoring, modifying and fine-tuning of other cities' experiences to fit ones' circumstances can be invaluable and resource saving.

Saving the time to re-invent the wheel, collaboration and knowledge sharing between cities and cross-sectors, may act as the required catalyst and aid cities into building their resilience. Sharing of acquired knowledge and best practices may help cities in tailoring the experiences and practices of other cities according to their capacities. Understanding and unifying the ontology and concepts of Urban Resilience will be the first step towards enhancing

urban resilience and identifying the inherent status and the gaps present in cities. Sharifi et al. (2017) mention that inter-city networks, locally and globally, provide chances for cities to collaborate and support each other, open the channels for knowledge and experience sharing and facilitate peer learning, thus impacting positively on urban resilience enhancement. The underlying concepts of both inter-city collaboration and knowledge sharing platforms should be well understood and defined to maximize the awaited resilience outcomes.

This paper is the first step in a research conducted in New Zealand with the aim of connecting and linking the major cities of New Zealand in an urban resilience collaborative platform. This paper aims to explore the benefits of collaboration and inter-city networks as well as defining the best methods to develop a successful inter-city network. Understanding Urban Resilience, fundamentals of Inter-City collaboration and the essentials of knowledge sharing platforms were considered vital for building and enhancing urban resilience and will be examined in the following sections. This paper will start by discussing some of the differing views and perspectives of urban resilience and will then attempt to shed light on inter-city collaboration and knowledge sharing by examining both the scholarly and grey literature.

Urban Resilience

The 100 Resilient Cities programme defines resilience as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" (100 Resilient Cities, 2018). It is defined by the City Resilience Framework (The Rockefeller Foundation and Arup, 2014) as "the capacity of cities to function, so that the people living and working in cities – particularly the poor and vulnerable – survive and thrive no matter what stresses or shocks they encounter. Another definition is a city "that has developed capacities to help absorb future shocks and stresses to its social, economic, and technical systems and infrastructures so as to still be able to maintain essentially the same functions, structures, systems, and identity" (Resilientcity.org, 2018). Meerow et.al. (2016) define urban resilience as "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". Thus, some definitions tend to adopt a general nature; others may focus on specific areas such as city dwellers while others may link urban resilience to spatial and

temporal scales or to different outcomes. The expertise and experience lived by various urban conglomerations or districts may exhibit similarities, congruencies, be of use and value, and maybe a life jacket to others, especially those with highly vulnerable communities and limited resources.

Measuring and assessing the resilience of a city follows the same path of defining urban resilience. Thus, several methods were developed by various organizations around the world. As Cutter (2016) states, the available assessment methodologies are either indices; which are a group of combined indicators, each measuring a specific resilience characteristic, scorecards; mainly checklist questions related to different resilience characteristics to evaluate performance or progress towards resilience and lastly tools; which include pre-determined mechanisms for resilience assessment. Some researchers focused on comparing the available resilience assessment methodologies such as Lavelle et al. (2015), Reiner & McElvaney (2017) and Sharifi (2016). Diverse conclusions were reached. Some have concluded that some methodologies do not consider the need to evaluate the pre-disaster infrastructure conditions while some others recommended more focus on the environment. Some have criticized the summative nature of some assessment methodologies and urged for more formative and educational methodologies. Some have suggested the use of toolkits over indices or scorecards arguing that toolkits provide mechanisms and instructions for intervention as well as guidance through the assessment process. Both Brown et al. (2016) and Cutter (2016) agree that a baseline or a benchmark may be necessary for such assessments. Recently, specific assessment methodologies have gained popularity around the world like the UNISDR Scorecards, (United Nations Office for Disaster Risk Reduction, 2017), and the City Resilience Framework (CRF), (The Rockefeller Foundation and Arup, 2014). The UNISDR developed their Scorecards based on ten essential points which they viewed as indispensable to building urban resilience. The CRF aims at establishing a common platform for measurement and assessment of resilience among cities without comparison or ranking, with emphasis on the underprivileged and poor vulnerable groups.

All the methodologies above were developed to measure resilience from different perspectives and employ different approaches, however, talking a common language globally, sharing lessons and experiences, collaborative planning and risk assessment as well as sharing of best practices and resources may prove valuable when it comes to resilience building.

Methodology

This paper is a literature review paper to develop an understanding of the benefits and requirements of inter-city collaboration and networking towards enhancing urban resilience. A Systematic Literature Review (SLR) was conducted. Several keywords were used either solely or in combined phrases. The time period for the search was set for the previous ten years (2007 – 2017). The search was conducted worldwide and not pertaining to a certain geographical region. The abstracts of the retrieved hits were studied, and the journal articles of relevance were identified for a second round of analysis. Journals with non-relevant abstracts or research themes were disregarded. Journal articles which appeared on two or more search strings were considered only once. Table 1 portrays the used keywords and results of the conducted searches:

Keyword/Phrase	Total Hits	Initial Relevance (Abstract)	Relevance	Years of Publication
"Urban Resilience" AND "Knowledge"	50	9	5	2017(2), 2015(3)
"Urban Resilience" AND "Collaboration"	14	4	2	2017(1), 2016(1)
"Urban Resilience" AND "Lessons"	11	2	0	---
"Urban Resilience" AND "Agreement"	4	0	0	---
"Urban Resilience" AND "Inter-city"	0	0	0	---

Table 1: SLR Results (Source: Author)

The results of the SLR indicate that there is a deficiency in research linking urban resilience to inter-city collaboration, networks and knowledge platforms. The publication dates show that attention to this research field has only recently gained the attention of researchers and is an area which is still being explored and is expected to fruitfully benefit the exodus towards building and enhancing urban resilience in an inter-local context.

The scarcity of research and the under-studied connection between urban resilience and intercity collaboration and knowledge networks/platforms gives direction towards individually understanding the general nature, characteristics and requirements of each of the three concerned fields in an attempt to unravel the best possible means through which urban resilience can be collaboratively enhanced.

What are Networks?

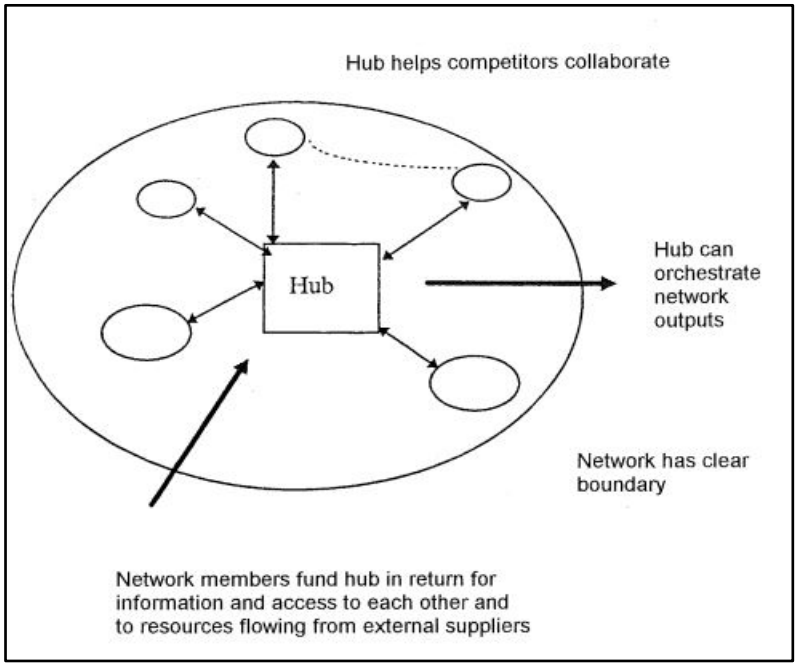
A collaborative network can be defined as a relationship between stakeholders which provides the opportunity to exchange information and knowledge and to work collaboratively towards a common goal, (Gimenez et al. 2016). Relations build and enhance social capital, which facilitates the learning, knowledge and resource sharing as well as assets.

According to Newman (2010), networks can be classified into four major categories as follows:

- Technological Networks: networks where a physical infrastructure is employed, such as the internet, power distribution networks or road networks.
- Social Networks: which are networks where the main actors are peoples or groups of individuals who create a connection between each other.
- Information Networks: which are networks in which data items are linked together such as the World Wide Web.
- Biological Networks: where patterns of interaction between biological elements produce networks.

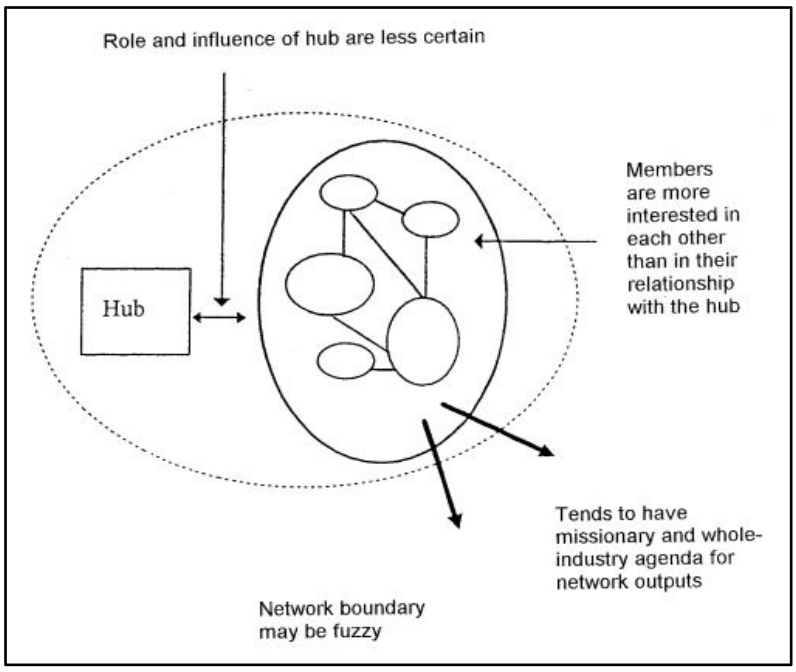
From a different perspective, Holti and Whittle (1998) considered that the role and responsibilities of a central hub and the type of link between the members can be used to classify two types of networks. The first type is the Broker Model where the network members are connected to a central hub rather than directly between each other, with the central hub supporting the members and retaining the power within the network as shown in figure 1. This type of network minimizes the connection between the members and the hub often has leverage and control over the members. It may be easier for conflicting members to obtain their knowledge requirements from the hub, provided the impartiality of the hub.

Figure 1: Broker Learning Network (From *Guide to developing effective learning networks in construction* by Holti, R. and Whittle, S, 1998, by CIRIA, London. Reprinted with permission)



The other model described by Holti and Whittle (1998) is the Thematic Network, where the members are keen on their mutual relationships with each other. In such a case, the hub acts as a facilitator providing management, direction, support and enhancing the learning and information flow between the members such as shown in figure 2.

Figure 2: Thematic Learning Network (From *Guide to developing effective learning networks in construction* by Holti, R. and Whittle, S, 1998, by CIRIA, London. Reprinted with permission)



Potential Benefits of Network Development

The Sendai framework for Disaster Risk Reduction 2015-2030 (SFDRR), endorses and calls for the collaboration of all sectors, at the local, national and global scales, in order to provide for a safer and more sustainable planet earth. A quick review of the framework reveals that the term "collaboration" has been mentioned 11 times, the term "knowledge" 33 times, the term "lessons learned" 10 times and the term "sharing" 25 times within the framework. Many clauses called for the enhancement of collaboration, sharing of lessons learned and best practices, particularly clause 24 (G), (H) and (I), Clause 25 (A), (E) and (G).

Networks and collaboration, in general, have several advantages over silo/solo approaches to challenges. Collaboration agreements and knowledge sharing platforms can be complementary to each other or can exist as stand-alone. Both share some similar characteristics and features.

Keiner and Kim (2007) mention that inter-city collaboration offers the advantage of complementing each other's resources. Furthermore, the New Zealand Auditor General (2004) encouraged working together to achieve and enhance policies and standards alignment while Docherty et al. (2004) add that intercity collaboration may aid the developing institutional and strategic capabilities. Bossuyt and Steenbergen (2012) and Sharifi (2017) add that collaborating cities provide each other long-term support adding to trust and communication, which in turn is reflected on the overall goal of capacity building.

Technical co-operation, reduced cost and enhanced knowledge sharing as well as specific issues awareness are all advantages intercity collaboration as pointed out by Nakamura et al. (2010). LeRoux et al. (2010) further project that cooperation and inter-local agreements can minimize negative spillovers between cities or municipalities. As disasters draw no boundary lines, they can either directly spread or indirectly affect other cities. Indirect effects may include activities such as relocation of citizens into neighbouring cities, creating new stresses on resources such as water, electricity or road networks. Thus pre-planned intercity collaboration schemes may offer refuge when mishaps occur.

Another advantage explored by Dyer & Nobeoka (2000) is that a network helps its members associate and identify or belong to a specific strategic cluster and nurtures the sense of belonging or identity. A similar concept about inter-city collaboration explored by Warner (2006) is that local governments will still be in charge of the services and that the local identity will not be jeopardized. He states that cooperation can address the need created by the lack of

attention to rural and small municipalities and at the same time address the problem of political fragmentation, inequity and lack of coordination which can occur in vast countries like the United States of America. There have been some movements to conglomerate cities and districts. Heritage and identity were amongst the main reasons for opposing the conglomeration trends. Co-operation and collaboration arrangements between smaller municipalities and larger cities may solve the problems of lack of attention and inequalities and can, in fact, spare Central Governments some stress. The New Zealand Auditor General (2004) encouraged working together to achieve staff costs reduction, access to expertise, best practice sharing, procurement efficiency and enhanced community outcomes. Bossuyt and Steenbergen (2012) agree and explain that information and knowledge sharing can help in strengthening existing organizations and thus decreasing the need for developing new organizations.

Requirements for Successful Network Development

Tjandradewi & Marcotullio (2009) and Van Baalen et al. (2005) stress that the existence of a particular demand or gap is crucial to driving the focus of the network or inter-city collaboration towards success. Tjandradewi & Marcotullio (2009) identified several other nurturing factors such as well-defined objectives, easy and efficient information exchanging, reciprocity, understanding and leadership. Kapucu et al. (2010) considered that trust and commitment are the cornerstones for networks or collaboration schemes. Central and Regional Governments support, partner selection criteria, availability of resources, management, stable organizational structures, official arrangements and agreements, periodic and effective communication and wider engagement of the community all nurture the success of intercity relationships, (De Villiers, 2009).

Collaboration schemes and networks may involve knowledge transfer. Knowledge exists in different forms, such as tacit, explicit and indigenous knowledge. Each type requires different transfer modes and means. Bollinger & Smith (2001) define explicit knowledge as “clearly formulated or defined, easily expressed without ambiguity or vagueness, and codified and stored in a database” while they define tacit knowledge as “the unarticulated knowledge that is in a person's head that is often difficult to describe and transfer”. Van Ewijk & Baud (2009) and Dyer and Nobeoka (2000) state that considering the type of knowledge that is to be exchanged is very important. The differences between tacit and explicit knowledge should be considered and recognized to accommodate efficient and beneficial knowledge transfer. Along

a parallel line, Van Lindert (2009) and Johnson & Wilson (2009) emphasize that intercity collaboration involves practitioner-to-practitioner knowledge sharing between practitioners and thus should stem from similar disciplines. Memon et al. (2015) suggest that tightening the network's scope and objective may yield better results.

Riege (2005) argues that the provision of resources, as well as infrastructure, constitute the main grounds for knowledge sharing networks and that IT is an essential network component and should be well integrated while ensuring compatibility with other systems. Employees should be well trained and familiar with IT systems. Nakamura et al. (2010) asserted that technical co-operation is one of the advantages offered by collaboration. Technical co-operation may be very beneficial especially in areas such as hazards and risks mapping and knowledge sharing in such vital fields can offer valuable assistance to cities.

Leadership was identified by Abrahams (2016) and Reige (2005) as another important factor for a network's performance and sustainability. Keiner and Kim (2007), Agranoff & McGuire (2001) and Suda (2015) all urged that the management strategies of the networks should be flexible and should encourage input and participation, solve problems, encourage information sharing, offer incentives and motivation, assign roles and responsibilities, and enhance communication. Incentive schemes and funds allocation were also stressed by Nakamura et al., (2010) and Dyer and Nobeoka (2000).

In New Zealand, Paulin and Edgar (2009) mentioned that existing relations, communication channels and leadership could influence collaboration networks. The Auditor General Report on Local Authorities Working Together (2004) stressed the importance of extensive pre-planning, cost/benefit analysis, risk assessment and evaluation of all feasible alternatives before formalising an inter-city collaboration program.

Difficulties in Network Development

Memon et al. (2005) suggested that early intercity cooperation initiatives scored high failure rates due to focusing on providing consultancies, equipment and capital-intensive projects. This started to change during the 1990s when the focus shifted to developing local capacity and widening the stakeholders' involvement.

Van Ewijk & Baud (2009) point that some partners may consider themselves superior in knowledge and resources, reducing the success chances of the partnership due to lack of

mutuality and reciprocity. The introduction of incentive schemes, as mentioned earlier, may be used to address such tendencies.

Memon et al. (2005) suggest that different cities priorities, as well as the ability to identify priorities within cities, can lead to network failures. Mannakkara, Wilkinson & Milicich (2017) revealed that some of the inherent resilience variations and differences which existed between the seven largest cities of New Zealand could be attributed to lack of capacity and knowledge of some cities as well as lack of funding. The 2004 New Zealand Auditor General Report on Local Authorities Working Together mentions that differences and variances in priorities, size, culture, resources, systems and standards can all act as a blocker to efficient collaboration. Paulin and Edgar (2009) concluded that collaboration between councils and local governments could be significantly hindered by leadership and lack of support. Keum (2000) suggests that structural differences, lack of discussion and communication continuity as well as staff/leadership high turnover, can hinder the growth and prosperity of networks.

Kapucu et al. (2010) point that prior conflict history between network parties as well as power/resource imbalance may hinder network co-operation and should be carefully evaluated and mitigated beforehand. Public monitoring is vital to the success of any intercity cooperation initiative, Warner (2006).

Reige (2005) states that barriers to knowledge sharing can occur at the individual, organizational and technological level. At the individual level, many factors were listed which included lack of trust, lack of network, organizational structure, lack of time and awareness. At the organizational level, the barriers included existing culture, organizational structure, lack of resources and infrastructure, lack of leadership and motivation. At the technological level, the barriers included lack of IT systems, experience, compatibility and support, unrealistic expectations and not satisfying individual needs. Bollinger & Smith (2001) add that individuals may be reluctant to share knowledge due to fears of reducing the worthiness and power. They add that at the organizational level, the resources and time required to establish a KM system are often considered as a barrier along with perceived difficulties in tracking temporary teams and challenges in codifying tacit knowledge. At the same time, networks should discourage “free riders” or knowledge in-takers without participation or reciprocity. Dyer and Nobeoka (2000) suggest that this could be achieved by encouraging open sharing and through the

reduction of propriety or rights. This is of importance if any competition exists between the users and in extreme cases, information sharing consents and penalties may be introduced.

The issue of "trust" between network members has been researched by Black et al. (2003), who state the trust is only meaningful in the presence of uncertainties and risk. They portrayed trust as the confidence of the trustee in the trustor's un-opportunistic behaviour and in the trustor's ability to combat incentives and motives if they arise. They explain that trust can be gained through assessing trustworthiness or from long-term interaction or from stemming from similar organizational cultures, norms and systems.

Discussion

Many cities have developed extensive expertise and have acquired useful knowledge and experience dealing with disasters and building urban resilience in recent times. Some cities may feel fairly literate in this space while others may have identified specific gaps in their knowledge or procedures due to a lack of exposure to disasters, lack of resources or lack of knowledge and capacity. C2C collaboration and knowledge sharing may be the helping hand towards a holistic national New Zealand approach to enhancing resilience.

Although New Zealand's cities may differ in size, culture, resources, and knowledge, similarities do exist and are often unrecognized. Collaboration and knowledge sharing between cities can provide various opportunities for sharing knowledge, experience, technical know-how, and resources. New Zealand is adamantly following the guidelines of the Sendai Framework for Disaster Risk Reduction which endorses international, national and local level collaboration.

One major advantage offered by collaboration is knowledge exchange and complementing resources. This can be very useful when it comes to urban resilience and its changing nature. The lack of experience and capacity in countries and cities facing a natural disaster or other challenges can be overcome by knowledge, procedures and social capital obtained from other members of the network. The relationship built in a collaborative network would also allow easier exchange of resources to meet demands and allow network members to contribute according to their strengths and collectively overcome individual weaknesses. The virtue of complementing knowledge and each other's resources in a network sense should be thought of holistically.

As well as providing collaborative assistance, inter-city networks should also give emphasis to developing and enhancing the local capacities of individual network members to improve self-sufficiency. Networks provide the opportunity for upskilling, training and exposure to new and innovative technologies to raise the standard of member cities and countries. Networks can be a good mechanism to connect cities that are ahead in the resilience space with those lagging behind in knowledge, technology and resources. Funding and institutional commitment for capacity building and progress is often an issue emerging in resilience building, therefore it may prove useful to conduct prior studies to identify the exact needs and limitations of network members, and create a tailored relationship that can provide mutual benefits, whether it is technological co-operation, capacity building, exchange of resources, knowledge and lessons learnt, or sharing social capital. Thus, extensive pre-engagement planning, as well as setting clear objectives, are crucial for intercity collaboration and networking.

The initial step in developing a resilience specific collaborative network should be the analysis of the needs, issues and requirements of the identified stakeholders. Getting the stakeholders together and collaboratively exploring each other's concerns can be a success factor.

Formalised agreements, trust and leadership are indispensable to the success of the scheme. Considering the types of knowledge involved as well as using the appropriate, relevant taxonomy and ontology can lead to the unification and standardization of the urban resilience language. The provision of Information Technology (IT) resources as well as appropriate IT training to the involved stakeholders facilitates and enhances the performance of collaborative schemes and networks. Regular effective communication enhances the sustainability of the schemes.

Knowledge superiority in networks should be highly discouraged since resilience is a dynamic process involving high uncertainty. The rapidly changing nature, frequency and magnitudes of natural disasters, a result of Climate Change, further increases the levels of uncertainties involved. Such quid pro quo approaches should be discouraged and more focus on the importance of leadership, ownership, mentoring satisfaction and building social capital should be emphasised. Building alliances and future social capital may be beneficial in in all stages of disaster management, from preparation to recovery. Incentives and motivations schemes can also aid in reducing reciprocity requirements. At the same time, networks should

discourage “free riders” or knowledge in-takers without participation or reciprocity. All collaborating partners and network members should always be on the quest to find possible venues where they can positively contribute and help others, even with their limited resources, as a declaration of good will and gratitude.

The research employs a co-design approach and early stakeholders’ engagement will reveal their specific needs and preferences. The research is currently at the initial stages and very preliminary findings may suggest an inclination towards a hybrid network between an information network and a social network. This will ensure maximizing the projected outcomes through emphasis on social capital and its sub categories such as mutual trust and members’ familiarity with each other.

Furthermore, the early preliminary findings also indicate that a good portion of the stakeholders are keen on a thematic network model rather than a broker model. However, some suggested the expansion of the role and responsibilities of the hub to include agendas, strategic direction, content quality and overall moderation of the network activities.

Conclusion

Inter-City collaboration and network development in today’s climate of frequent hazardous events, high uncertainty and risk can be a successful approach towards building resilience in our urban environments. Cities are facing a variety of challenges and often do not have adequate knowledge, resources and systems in place to respond effectively. However, bringing together the vast and varied experiences, knowledge, technology, resources and skills from different cities locally, nationally and internationally has proven to have many advantages.

The collaborative and knowledge sharing network in New Zealand aims at encouraging the adoption of a collaborative approach towards national resilience building. It aims at unifying the resilience definitions and seeks consensus between the cities on a common resilience language leading to enhanced sharing of information, knowledge, best practices and lessons learnt and systems. The network also aims at the major cities to act as knowledge shrines to their neighbouring smaller cities and town. Ripple effects with resilience knowledge and capacity will enhance the overall national resilience of New Zealand.

This paper explored the specific attributes and challenges in building urban resilience, and evaluated the potential benefits and challenges of using a collaborative inter-city network

approach to meet the urban resilience standards aspired to in the United Nations Sendai Framework.

The findings revealed that inter-city resilience networks can be a practical option if designed and executed carefully. Developing a successful network needs to begin with a thorough analysis of issues, requirements, agendas and current capacity of the identified stakeholders, preferably through collaborative discussions. The network should be governed by a formalised agreement built on mutual trust between cities, strong leadership and standardised taxonomy and ontology around resilience. The functions of the network can vary based on the needs of different cities, but need to focus on mentoring, building capacity, introduction to new and effective technologies and procedures, sincere and transparent sharing of knowledge, experiences and lessons to encourage learning, and create a culture of ownership and self-sufficiency within the network members. Reciprocity, where each member contributes and receives equitably has to be a key element for a network's successfulness and longevity.

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References

Abrahams, D. (2016) "The South African cities network: Towards championing the urban agenda of South Africa", *Local Economy*, Vol 31, No 1-2: 57-67.

Agranoff, R., & McGuire, M. (2001) "Big Questions in Public Network Management Research", *Journal of Public Administration Research and Theory*, Vol 11, No 3: 295-326.

Black, L.J., Cresswell, A.M., Luna, L.F., Pardo, T.A., Martinez, I.J., Thompson, F., Andersen, D.F., Canestraro, D.S., Richardson, G.P. And Cook, M. (2003) "A dynamic theory of collaboration: a structural approach to facilitating intergovernmental use of information technology, IEEE, pp. 12.

Bollinger, A. S., & Smith, R. D. (2001) "Managing organizational knowledge as a strategic asset" *Journal of Knowledge Management*, Vol 5, No 1: 8-18.

Bossuyt, J., & Steenbergen, K. (2012) "Development effectiveness at the local and regional level" *Brussels: Platforma–The European Voice of Local and Regional Authorities for Development.*

Brown, C., Shaker, R. R., & Das, R. (2016) "A review of approaches for monitoring and evaluation of urban climate resilience initiatives", *Environment, Development and Sustainability*, Vol 20, No 1: 23-40.

Butler, T., Feller, J., Pope, A., Emerson, B., & Murphy, C. (2008) "Designing a core IT artefact for knowledge management systems using participatory action research in a government and a non- government organisation", *Journal of Strategic Information Systems*, Vol 17, No 4: 249-267.

Controller and Auditor-General, (2004). Local authorities working together. New Zealand:

Cutter, S. L. (2015) "The landscape of disaster resilience indicators in the USA", *Natural Hazards*, Vol 80, No 2: 741-758.

De Villiers, J. C. (2009) "Success factors and the city-to-city partnership management process–from strategy to alliance capability", *Habitat International*, Vol 33, No 2: 149-156.

Docherty, I., Gulliver, S., & Drake, P. (2004) "Exploring the potential benefits of city collaboration", *Regional Studies*, Vol 38, No 4: 445-456.

Dyer, J. H., & Nobeoka, K. (2000) “Creating and managing a high-performance knowledge-sharing network: The Toyota case”, Strategic *Management Journal*, Vol 21, No 3: 345-367.

Gimenez, R., Labaka, L., & Hernantes, J. (2016) “Building City Resilience Through Collaborative Networks: A Literature Review”, In: Díaz P., Bellamine Ben Saoud N., Dugdale J., Hanachi C. (eds) Information Systems for Crisis Response and Management in Mediterranean Countries. ISCRAM-med 2016. Lecture Notes in Business Information Processing, Vol 265.

Holti, R., Whittle, S., & Construction Industry Research and Information Association. (1998). *Guide to developing effective learning networks in construction*. London: CIRIA.

Johnson, H., & Wilson, G. (2009) “Learning and mutuality in municipal partnerships and beyond: A focus on northern partners”, *Habitat International*, Vol 33, No 2: 210-217.

Kapucu, N., Arslan, T., & Demiroz, F. (2010) “Collaborative emergency management and national emergency management network”, *Disaster Prevention and Management: An International Journal*, Vol 19, No 4: 452-468.

Keiner, M., & Kim, A. (2007) “Transnational city networks for sustainability”, *European Planning Studies*, Vol 15, No 10: 1369-1395.

Keum, H. (2000) “Globalization and inter-city cooperation in northeast Asia”, East *Asia*, Vol 18, No 2: 97-114.

Lavelle, F., Ritchie, L., Kwasinski, A., & Wolshon, B. (2015) “Critical assessment of existing methodologies for measuring or representing community resilience of social and physical systems”, *National Institute of Standards and Technology*. doi:10.6028/nist.gcr.15-1010.

LeRoux, K., Brandenburger, P. W., & Pandey, S. K. (2010) “Interlocal service cooperation in U.S. cities: A social network explanation”, *Public Administration Review*, Vol 70, No 2: 268-278.

Mannakkara, S., Wilkinson, S. & Milicich, M., (ED) 2017. *Building urban resilience in New Zealand: Lessons from our major cities.* New Zealand: Centre for Disaster Resilience, Recovery and Reconstruction, University of Auckland, Auckland, New Zealand.

Meerow, S., Newell, J. P., & Stults, M. (2016) “Defining urban resilience: A review”, *Landscape and Urban Planning*, Vol 147: 38-49.

Memon, M. A., Pearson, C., & Imura, H. (2005) “Inter-city environmental cooperation: The case of the Kitakyushu initiative for a clean environment” *International Review for Environmental Strategies*, Vol 5, No 2: 531.

Nakamura, H., Elder, M., & Mori, H. (2010). Mutual learning through Asian intercity network programmes for the environment. IGES Report, (Available Online Http://Bit.Ly/jSQnBe [Accessed on 15/07/2017]),

NEWMAN, M. E. J. (2010). *Networks: an introduction*. Oxford University Press Inc., New York.

Paulin, J., & Edgar, N. (2009). A review of collaboration among councils. New Zealand: *The Department of Internal Affairs.*

Reiner, M., & McElvaney, L. (2017) “Foundational infrastructure framework for city resilience”, *Sustainable and Resilient Infrastructure*, Vol 2, No 1: 1-7.

Resilientcity.org. (2018). *ResilientCity: Resilience*. [Online] Available at: http://www.resilientcity.org/index.cfm?id=11449 [Accessed 1 Sep. 2018].

Riege, A. (2005) “Three-dozen knowledge-sharing barriers managers must consider”, *Journal of Knowledge Management*, Vol 9, No 1: 18–35.

Sharifi, A. (2016) “A critical review of selected tools for assessing community resilience” *Ecological Indicators*, Vol 69: 629-647.

Sharifi, A., Chelleri, L., Fox-Lent, C., Grafakos, S., Pathak, M., Olazabal, M., Yamagata, Y. (2017) “Conceptualizing Dimensions and Characteristics of Urban Resilience: Insights from a Co-Design Process”, Sustainability, Vol 9, No 6: 1032.

Suda, L. (2015) “If you build it, will they come? United Nations knowledge sharing platform”, PM *World Journal*, Vol 4, No 4: 1-9.

THE ROCKEFELLER FOUNDATION, & ARUP. (2014). City resilience framework

Tjandradewi, B. I., & Marcotullio, P. J. (2009) “City-to-city networks: Asian perspectives on key elements and areas for success”, Habitat *International*, Vol 33, No 2: 165-172.

United Nations International Strategy for Disaster Reduction (UNISDR), 2017. Disaster resilience scorecard for cities, detailed level assessment. Geneva: UNISDR.

United Nations International Strategy for Disaster Reduction (UNISDR), 2013. Making cities resilient: Summary for policymakers; A Global Snapshot of How Local Governments Reduce Disaster Risk. Geneva: UNISDR.

United Nations International Strategy for Disaster Reduction (UNISDR), 2015. Sendai framework for disaster risk reduction 2015 - 2030. Geneva: UNISDR.

Van Baalen, P., Bloemhof-Ruwaard, J., & Van Heck, E. (2005) "Knowledge sharing in an emerging network of practice: The role of a knowledge portal", *European Management Journal*, Vol 23, No 3: 300-314.

Van Ewijk, E., & Baud, I. (2009) "Partnerships between Dutch municipalities and municipalities in countries of migration to the Netherlands; knowledge exchange and mutuality", *Habitat International*, Vol 33, No 2: 218-226.

Van Lindert, P. (2009) "Transnational linking of local governments: The consolidation of the Utrecht–León municipal partnership", Habitat *Inter*national, Vol 33, No 2: 173-180.

Warner, M., E. (2006) "Inter-municipal cooperation in the U.S.: A regional governance solution*?" Urban Public Economics Review*, Vol 6: 221-239.

100 Resilient Cities. (2018). *Resources - What is Urban Resilience?* [Online] Available at: http://www.100resilientcities.org/resources/ [Accessed 1 Sep. 2018]