

Challenges and opportunities for building urban resilience

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Abstract:

In science, the resilience concept has increasingly been embraced as a framework for disaster-related work. As a result, policy supports 'resilient communities' programs. The current transition from a 'descriptive' scientific concept explaining the state of a system to a 'normative' agenda applied by local authorities faces various challenges. To contribute to the A|Z journal's special issue on Cities at Risk, this paper argues that it is crucial to address and explain these challenges in order to effectively increase resilience. It examines some theoretical foundations and underlying assumptions of the resilience concept and highlights some challenges associated with practical application in urban locations. Most importantly, the chronic needs and root causes of vulnerability will remain unsolved and will continue to generate vulnerable groups as long as efforts to increase resilience ignore the preconditions and root causes of (what is effectively social and political) vulnerability. Building resilience in cities provides opportunities to address under-studied elements, to gain understanding about the historical and socio-political processes that create and maintain social vulnerabilities, and to develop designs capable of identifying options for intervention and leverage points that can move communities toward less vulnerable development pathways.

Keywords: Resilience, vulnerability, cities, urban design, development, spatial planning.

1. Introduction

At present, 'resilience' has become *the* currency in academic and policy discourses and one important guiding principle in urban development planning, replacing 'vulnerability' and 'sustainability'. Thus, it seems to be appropriate and timely to scrutinize the appropriation and use through a critical lens.

To contribute to this special issue, this paper reviews some positions and will highlight less discussed issues regarding resilience in urban contexts -

rather than trying to encompass all the detailed debates, literature, and analyses - while focusing on urban examples. The overall argument is that the renaissance of resilience thinking and the emergence of resilience-building activities in response to intellectual and pragmatic developments can lead to more context-appropriate measures and socially-robust solutions if they allow for differentiated views and pluralistic answers.

2. Resilience in theory: Concepts and characteristics

Today, resilience is a concept that is applied in various disciplines and different fields, including engineering, psychology, anthropology, and ecology. One common thread is the ability of materials, individuals, organizations and entire social-ecological (or other) systems, from critical infrastructure to rural communities, to withstand severe conditions and to absorb shocks. For ecology, the term's prominence rather than its origins can be dated back to the 1970s (Alexander, 2013). Within ecology, resilience was used for a long time before being suggested as "*a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables*" (Holling, 1973:14). The more resilient a system, the larger the stress it can absorb without shifting into an alternate regime or collapsing. Another perspective on resilience emerged in the field of natural hazards, where various authors (e.g., Timmerman, 1981; Gaillard, 2007; McAslan, 2010; O'Keefe and O'Brien, 2013) applied similar notions, including related to climate change, aiming to better understand characteristics of vulnerability and resilience of individuals and communities in the face of social-environmental challenges and changes. That is, how well could society deal with changes and disturbances, such as those caused by extreme environmental events. In a similar way, the usefulness of the concept was examined in the fields of psychology and psychiatry (Fonagy et al., 1994). Obviously, an important question of resilience thinking is: resilience to what?

Despite the wide range of application and contexts, resilience is not a universally accepted term, nor does it have a universally accepted definition even for single fields such as disaster risk reduction (DRR), climate change adaptation (CCA), humanitarian aid, or urban planning (Lewis and Kelman, 2010; Alexander, 2013; Levine et al., 2012; Davoudi, 2012). Likewise, the view of governments and organizations on resilience is diverse: resilience as a process, a state, and a quality, ranging from a global focus on food security (e.g., UN Office for the Coordination of Humanitarian Affairs, OCHA) and a national view on critical infrastructure (e.g., energy, water) to a sectoral view on business continuity (e.g., cyber-attacks, market change) and a local focus on climate change (e.g., ICLEI - Local Governments for Sustainability, an international association of local and metropolitan governments dedicated to sustainable development). Sometimes the resilience of people is focused on, sometimes the resilience of infrastructure, and sometimes the resilience of systems, such as lifelines, or combinations of people and the built environment. Thus, the critical question: resilience of what to what at what scales?

Over time, and by different academic sectors, the term 'resilience' has been used to express different meanings. Since the early 'bounce back' perspective, resilience moved towards 'anticipation', encompassing 'capacity' and 'capability' - and now coming the full way to being suggested

as doing better than before by “bouncing forward” (Manyena et al., 2011). In between remains a plurality of definitions, reflecting the different intellectual traditions and functional needs of the different disciplinary and societal fields, as well as the difficulties in understanding and communicating across disciplines and sectors. For example, based principally on ecological concepts and terms, chapters in Gunderson and Holling (2002) move beyond simple ‘bouncing back’ and discussing ‘transformations’ through their concept of ‘panarchy’.

One recent development regarding transformation approaches is the integration of a ‘proactive’ and ‘transformative’ notion into the resilience concept, manifest in the definition of DFID (2011:6). This descriptive expansion moves the concept more towards the social sciences and philosophy (e.g., Lucini, 2013) - with the normative consequence that it has to deal with ‘equity’, ‘power’, ‘justice’, and ‘social capital’, thus increasing complexity. Evidently, the ability to be resilient is never distributed homogeneously within and through social groups (e.g., Maguire and Hagan, 2007). Instead, this ability is largely determined by social, economic, and cultural factors, and because the minority of a society often holds control over the decision making for the majority, these factors may often be beyond the control of a society as a whole.

Some literature, in purporting to support social sciences, simply uses and re-interprets buzzwords such as ‘resilience, adaptability and transformability’ (Folke et al., 2010), while actually applying mainly natural science conceptualizations, mainly from ecology. Yet a framework which applies natural science thinking to social phenomena can be deeply problematic (Porter and Davoudi, 2012). Despite all the excitement for an ostensibly new concept, it is detrimental to downplay significant structural social-political processes and the major difference between ecosystems and societies: the human capacity for anticipation and learning. As a result, a further critical question appears: what aspects of the resilience concept are appropriate for social contexts and which ones are not adequate?

Some authors even refer to resilience as the “flip side” of vulnerability, i.e., vulnerability and resilience are opposites (e.g., Kaly et al., 2002; Folke et al., 2002; Adger et al., 2005), although most agree that the relationship between vulnerability and resilience is not linear and that the characteristics are not entirely independent. Gallopin (2006:301) notes that vulnerability does not appear to be the opposite of resilience, because the latter is defined in terms of state shifts between domains of attraction, while vulnerability refers to (or at least also refers to) structural changes in the system, implying changes in its stability landscape. He concludes that resilience is an internal property of the system, and does not include exposure to perturbations. For Klein and Nicholls (1999) resilience is one factor comprising vulnerability. A recent European project on Enhancing Resilience of Communities and Territories facing Natural and Nat-tech Hazards (ENSURE) provides numerous examples of how measures for increasing vulnerability do not necessarily enhance resilience and vice versa (URL-1).

In advancing the thesis that vulnerability and resilience are part of a dialectic process taking place over time without end in social organizations operating as complex open systems, Aguirre (2007) illustrates that the relationship between vulnerability and resilience is dialectical, rather than linear. Lewis, J. (2013:49) pointed out that *“recognition that resilience depends upon ‘the*

ability of a system, community or society' may be relevant to 'potential hazard' but cannot be assumed for an aftermath subject to physical and psychological shock". Therefore, resilience researchers, policy makers, and practitioners have to ask: what and who are included and excluded from defining the boundaries of the subject under consideration?

Cities are examples. The strong rural-to-urban migration trend around the world has proved to be resilient even where it leads to large numbers of people crowding into locations without services - areas which themselves also prove to be resilient. Informal communities springing up around megacities also show themselves to continue irrespective of the dangers, such as on in the shadow of Mexico City's Popocatepetl volcano, or the lack of municipal support for water, sewage, and electricity, such as around Nairobi. Therefore, it is not surprising that in policy discourses, resilience is often used in relation to resistance against change rather than continuity through change.

Overall, the relationship between vulnerability and resilience is highly contextual. Conceptually, it seems fair to assert that every entity has some degree of vulnerability and some degree of resilience. Both are different manifestations of a variety of response processes to changes (often extreme changes) in the relationship between open dynamical systems and their external environment. The degree and the exact characteristics of the vulnerability, the resilience, and their interaction and interrelationship depend on each context and are certainly a matter of perception. The current challenge with resilience is the multitude of diverse definitions and approaches, and consequently turning any of them into an operational tool and normative agenda.

3. Resilience in urban practice: Examples and essentials

While the academic debate continues on what resilience is precisely and how it relates to other core terms and concepts, governments around the world have developed plans and programs that aim to guide cities towards achieving it. From the practitioner side, an early attempt to develop a tool for rapid urban assessment to guide immediate and mid- and long-term interventions came from UN-HABITAT. Based on the European Commission's Consultative Guidelines for Sustainable Urban Development Co-Operation, the United Nations agency for human settlements implemented in 2002 an Urban Sector Profile Study in Somalia. This effort served as a blue print for UN-HABITAT's Regional Office for Africa and the Arab States, which developed the approach further to assess needs and capacity-building gaps at the city level. The initial method focused on four pillars: governance, slums, environment, and gender (Falade and Aribigbola, 2010). Today known as Rapid Urban Sector Profiling for Sustainability (RUSPS), the framework is a first approximation to an urban systems model (UN-HABITAT, 2006). The idea behind RUSPS is to help formulate urban poverty reduction policies at the local, national, and regional levels through a rapid, participatory, crosscutting, holistic, and action-oriented assessment of needs. As a methodological approach for this specific use, however, it has not been further refined as a model for assessing other aspects of urban management and governance.

Shaw et al. (2009) provide another tool. For 15 cities in Asia, they seek indicators for natural, physical, social, economic, and institutional resilience

in the context of climate and disasters. They use the data to develop maps of each type of resilience for cities and then compile the five resilience indicators into an overall Climate Disaster Resilience Index. Policy highlights and outlooks are provided for each city.

In 2010, the UN International Strategy for Disaster Reduction (UN-ISDR) launched the 'Making Cities Resilient' campaign - 'My City is Getting Ready' - to achieve resilient, sustainable urban communities, with a growing number of local governments that are taking actions to reduce the risks to disasters, based on common standards and tools (Valdés et al., 2013). This 2010-2015 World Disaster Reduction Campaign addresses issues of local governance and urban risk while drawing upon the sustainable urbanization principles developed in the UN-Habitat World Urban Campaign 2009-2013. In addition to a *Making Cities Resilient Report* (UN-ISDR, 2012a), a *Handbook for Mayors and Local Government Leaders* (UN-ISDR, 2012b), developed in line with the five priorities of the Hyogo Framework for Action 2005-2015 (UN-ISDR, 2005), provide the so-called ten essentials for making cities resilient. The self-driven essentials of this checklist-type framework, which outlined principles for local governments rather providing an assessment tool for building resilience, was criticized for not providing clear standards that urban planners, city developers, or DRR managers could put into practical application. According to Dan Lewis, chief of UN-Habitat's Risk Reduction Unit, this resilience effort does not produce a reliable baseline because the targets are entirely perceptive and subjective (Lewis D., 2013:10).

At the World Urban Forum in Naples in September 2012, UN-ISDR and UN-HABITAT agreed to strengthen joint efforts to promote disaster resilient cities. One promising approach is the new City Resilience Profiling Programme (CRPP). With an indicative budget of 8 million US\$, the aim is to develop a comprehensive and integrated urban planning and management approach for measuring and monitoring urban resilience globally (Lewis D., 2013). Based on the proposals submitted to UN-HABITAT, ten partner cities were selected in April 2013 to test and, if necessary, refine the tools and guidelines developed under the CRPP.

The recent urban resilience-building efforts undertaken by international agencies and countries illustrate the tendency to integrate various societal actors and local knowledge into the activities. There is an increased recognition that achieving disaster resilience is not solely the domain of disaster professionals but a shared responsibility across the entire society. However, it is crucial to involve local knowledge also in the interpretation and validation of the activities to move beyond the usual data-mining toward comprehensive partnerships between researchers, programmers, and the communities. This is related to another observable characteristic: the quantitative attempt to measure indicators for certain dimensions of resilience. While the political-administrative request to quantify resilience is comprehensible, i.e., to target resources, to measure impact, and to judge cost-benefits, along with the quantification of resilience comes its decontextualization, making it more difficult to recognize relevant contributing factors and to get a full picture of how hazards shape a city's response to them.

There are nonetheless limits to index-based approaches. As Levine et al. (2012:2f.) correctly remark, quantitative approaches to examining urban resilience face the challenge of constructing resilience from factors that are

found from the household level to the national and international level. Factors that cannot be captured with available data through measurable indicators, such as power relations, are often neglected, and this can lead to administrative-operational interventions that ignore other relevant determinants of resilience.

Despite the many decades since resilience became engrained in social sciences, it is surprising to see that power, governance, and social capital are not playing a more prominent role in conceptual and practical efforts aiming at increasing resilience. The dominant understanding of resilience as a “buffer capacity for preserving what we have and recovering to where we were” and the resulting emphasis on a “bounce-back-ability” discloses not only a lack of critical social science input (Davoudi, 2012:301f.), but also the underlying assumption that more resilient people can ‘bounce back better’. The latter certainly requires more empirical evidence, given the wider literature demonstrating how often this does not happen (e.g., Lewis, 1999; Glantz and Jamieson, 2000; Wisner et al., 2004) - literature which also queries why people would want to bounce back (even ‘better’) to a situation anywhere near their original situation of rampant, fundamental, chronic vulnerability, poverty, and lack of sustainability. As such, further assessments are required to identify and determine ‘to where’, ‘to what level’ and ‘in what direction’ of ‘bounce back’ should be considered appropriate (see Kennedy et al., 2008; Manyena et al., 2011). What does ‘build or bounce back better’ entail in practice? Especially since it is clear that, as with development programs, the resilience-building process itself, however it is defined, will produce winners and losers, create power divisions, and will not always reach those who are most in need of support.

Another related drawback, indeed of most resilience-building programs, is certainly that resilience was rarely acknowledged *before* a shock, stress, or disaster occurred, making both the ‘improvement’ of resilience - whether urban or national - and ‘payoff’ for resilience investments challenging for the ‘programmers’ to measure and validate. Their capacity to alter socioeconomic processes and modify societal contexts that are the root cause of vulnerability remains largely unknown. In particular with regard to urban planning and regional development, MacKinnon and Derickson (2012) reasonably argue that capitalism is the most powerful set of processes at work. We also have concerns regarding the mobilizing discourse of resilience that places the responsibility squarely on communities and regions to further adapt to the logic and implications of global capitalism and many other influences external from their own control.

Shaw and Sharma (2011) aim to address such gaps by collating research and practical aspects for building resilience in a manner that engages with social science knowledge. Chapters cover resilience mapping, the role of civil society, and knowledge exchange amongst cities for building resilience. The focus is climate change recognizing the importance of viewing climate change within the context of wider hazards and especially the vulnerability which leads to disasters.

Irrespective of the method or program, scales have to be temporally and spatially confined in order to measure resilience. By defining the urban scale as the arena for increasing resilience to specific shocks and stresses, which have their own temporal and spatial scales, these concepts and programs inevitably have limitations. Many processes that drive and shape resilience

operate on larger or smaller scales than the urban environment. The scale of the urban environment also differs substantially. The country of Norway has an entire population less than half of that found in megacities such as Shanghai and Istanbul, so for Norway, 150,000 people forms a large urban center. Spatial scale is important too. Urban sprawl with low population densities are particularly noticeable in North American suburbs—but that can be tempered by vertical expansion through high-rise blocks increasing population density and changing affluence characteristics. Toronto, Canada has areas of high population density and high affluence due to condominium development compared to high population density and low affluence in communities of low-income apartment blocks.

Extrapolating measures from one urban situation to another or making assumptions based on the obtained findings for other parts of the same urban conurbation (or adjacent cities) could result in an incorrect picture. Attempts to capture the state of and progress towards urban resilience can therefore be limited at the practical as well as the conceptual level. According to Silva Villanueva (2011:7), three characteristics are mainly responsible: (1) approaches that focus on inputs and outputs rather than processes; (2) capture of a static rather than a dynamic picture; and (3) a narrow focus on system effectiveness and efficiency rather than assessing processes of change or transformation. As long as resilience-building efforts operate without a clear baseline against which to make decisions regarding the level of resilience, the ability to make strong arguments and to achieve significant results is restricted.

4. Critical challenges: From a descriptive concept to a normative agenda

4.1 Re-labeling: Reinventing the wheel

The use of the term 'resilience' to re-frame the same challenges that have previously been discussed as 'disaster risk reduction' and 'vulnerability' - amongst many other phrases - is suggested as being a positive framing to encourage people to move forward and to seek positive approaches (e.g., Kaly et al., 2002; Folke et al., 2002). However, empirical evidence is almost never presented to affirm or rebut that assertion, beyond the comfortable assumption that it is better to be resilient. There is a sneaking suspicion that much of what has been recently labeled 'resilience' has the sticker 'Zeitgeist'. Words are instruments of power, as imposingly illustrated by Chambers (2012), and in science fashionable words are used to impress colleagues and win research proposals. It is without doubt that an extensive knowledge system exists with regard to 'dealing with disaster impacts' and 'adapting to changing environments', which is frequently not considered by researchers and not applied to maximum effect by decision makers in policy and practice.

In fact, claiming that theoretical concepts - and a re-framing of theoretical concepts with new terms - can support the design and implementation of resilient cities or countries does not give full account to the many examples where ill-understood urban planning and spatial development has increased social vulnerability (Lewis, 1999; Wisner et al., 2004). Hamza and Zetter (1998) argue just that across a range of case studies from less affluent countries. They maintain that cities and city dwellers are not inherently vulnerable by nature but are made to be vulnerable by the social and

political structures leading to rapid increases in city populations and densities.

As such, improving physical (infrastructure) resilience without adequately addressing social resilience illustrates short-term thinking in dealing with a longer-term future. One recent urban example is the 2010 Haiti earthquake. Port-au-Prince still exists as a (resilient?) city, but the social fabric has been shattered and the short-term horizon of most post-disaster activities has prevented the opportunity to establish social change (Schuller and Morales, 2012). So far, structural shifts have not followed the tectonic shifts. Hence, various researchers, such as Paton (2006), believe that DRR by itself will not necessarily build disaster resilience in communities. They feel that social interactions, competencies and interactions improved by 'community development' activities form a critical part of the resilience-building triumvirate (Dufty, 2012:41).

Some authors try to overcome these challenges, by engaging with the buzzwords and concatenating them. Roberts et al. (2013), for instance, use the title *Resilient Sustainable Cities* to engage planners and to meld academic and practitioner knowledge for long-term planning of cities as systems. The open question is whether or not the scale and population density of cities can ever be resilient and sustainability in the long-term. As alluded to earlier, that question applies to the low-population-density parts of cities as well as the high-population-density parts, irrespective of affluence level. And if slums, favelas, and ghettos are sustained and made to be resilient, how much does that help the people living there?

As such, the use of 'resilience-building' programs for cities to repack the same activities that have been unsuccessful under previous framings might be appropriate to experiment with. So far, empirical evidence is lacking that substantive positive change will result. If the goal is to significantly change structural processes so that disaster risk and disaster impacts are reduced, irrespective of the framing or labeling, it is important to understand the fundamental concepts involved and the root causes for the observations seen. By its over-use as the new 'buzz-word', as Lewis, J. (2013:50) critically remarks, 'resilience' may be damaging to practical understanding of the causative processes of vulnerability and of how disasters come to be created; resilience theory may even have detracted from crucial understandings of vulnerability as a consequence of long-term causative processes, reducing it merely to box-ticking assessments of post-disaster evidence of those processes. The same applies to the present publicity surrounding climate change and cities, which overshadows other significant long-term human-caused environmental processes (e.g., soil degradation, groundwater drawdown), as well as past DRR policies, strategies, and efforts.

There is no doubt that coastal cities need to be concerned about sea-level rise, ocean acidification, and other manifestations of climate change. Few studies detail how climate change will affect these cities compared to how cities affect their own climate. The urban heat island is the most well-known phenomenon. The effects of city topography on floods and winds are also significant. Parameters for other hazards such as tornado track (and, from a non-climate-related hazard, earthquake peak acceleration) might also undergo major influences depending on how cities and specific buildings are designed and built. As such, city design has the potential to counteract some

climate change effects, potentially making the city resilient in the face of climate change. But such discussion is purely technical. This direction of resilience discourse sometimes neglects that people live in cities and are affected by the design and operation of the urban environment.

Consequently, while this shift in conceptualizing resilience is certainly problematic for the normative contents of development, as long as people are included and the resilience of individuals and collectives is considered, we believe that the new concepts bear new opportunities and can open up fresh perspectives. Since the way we think about terms influences where we look for solutions, and the shape and character of the means we use to attain those solutions, a starting point for potential change lies in disclosing the full range of resilience thinking (well beyond ecology and engineering) and embracing the frequently ignored social-political aspects of it (Weichselgartner, 2001). Building resilience, especially in an urban context, provides opportunities to address under-studied elements, to gain understanding about the historical and socio-political processes that create and maintain social vulnerabilities, and to develop designs capable of identifying options for intervention and leverage points that can move cities and societies toward less vulnerable development pathways. Not re-labeling but reframing resilience allows values to be identified, choices to be made, and political pathways to be identified (Shaw, 2012:309).

4.2 Re-connecting: Risk and sustainability

We suggest potential pathways by which resilience could be included in other international and city goals, whether by incorporating it explicitly into indicators or by cross-referencing it to other goals and concepts, such as a rights-based approach. Mitchell and Harris (2012) consider resilience as an integrating concept that allows multiple shocks and stresses and their impacts on ecosystems and vulnerable people to be considered together in the context of development programming. Achieving more positive outcomes, however, will require policy makers and practitioners to fall back on more familiar and tangible concepts with which they have practical experience.

We also suggest that risk and sustainability, while recognizing their limitations, provide such familiar frameworks, facilitating a critical cross-issue discussion across academic disciplines and societal sectors (see also McGranahan et al., 2001). Although these terms have multiple definitions and have been debated and critiqued thoroughly, we suggest that it is precisely because of this past work that makes them useful for connecting with resilience. People have schools of thought and identify with them. The criticisms and challenges of the theory and practice are well-known so that the terms' limitations are the starting point. Approaches to overcome limitations and disagreements would be devised as part of any work. In contrast, resilience is still undergoing soul-searching in the literature with viewpoints scattered while aiming for consolidation into schools of thought and reconciliation amongst disparate viewpoints. That can be assisted by re-connecting with the other terms which have matured as a result of this lengthy process.

Moreover, resilience with its suggested change of perspective and ongoing debates may turn out to be a pragmatic bridge to positively connect research to the needs of policy and practice. Mitchell and Harris (2012:2f.) point to the fact that resilience approaches share key characteristics with the risk

concept. Among others, they both (1) provide a holistic framework for assessing systems and their interaction; (2) emphasize capacities to manage hazards or disturbances; (3) help to explore options for dealing with uncertainty, surprises, and changes; and (4) focus on being proactive. Already fourteen years ago, Gray and Wiedemann (1999) mentioned that risk management and sustainable development have much mutual relevance and could each benefit from more intensive exchange while Tobin (1999) connected that approach to resilience. Both risk management and sustainable development are frameworks for studying and managing environmental impacts of human actions and human responses to environmental phenomena. By definition, both risk and sustainability are concerned with the future and decisions that affect the future (see also Lewis, 1999; Wisner et al., 2004).

However, different perceptions and definitions of the two terms are being applied by different scientific communities and decision makers to discuss and address similar problems. A systematic exploration of the relationships and synergies between the two concepts would permit resilience to better reconnect with these terms and to engage with the long-standing literature on them, particularly to make resilience more practical, tangible, and connected to familiarity.

4.3 Re-focusing: Root causes and social transformation

The suggestion of a transition from a descriptive concept to a normative agenda provides opportunities to address under-studied elements, such as entitlements, power, and equity, all of which are extensively discussed in risk and sustainability research, policy, and practice. With a 'new' focus on resilience, some development and planning approaches are seen to shift from static to dynamic, from linear to non-linear, from short-term reaction to long-term strategy – and, as such, they partially move back to 'old' foci and traditional development concepts such as the Sustainable Livelihoods Approach (Chambers and Conway, 1991) and to dealing with vulnerability reduction as a development strategy (Lewis, 1999). But even if urban developers and spatial planners are motivated to perform these welcome shifts, in operational practice the resilience label can often be used to keep control over established actions and less to question the status quo and find solutions to problems.

While traditional quantitative risk-thinking, i.e., risk as a product of hazard probability and potential damage, overemphasizes stability, objectivity, and prediction, the apolitical equilibrium-thinking, be it the belief in a former one to which a resilient entity bounces back or a new one to which it bounces forward, overemphasizes the return to 'normal' (Weichselgartner, 2003). At the expense of adaptability and transformability, both approaches end up labeling change as negative, mostly without questioning why people are at this risk, who this normality is legitimate for or desired by, and what this normality exactly entails. Hurricane *Katrina* revealed long-existing social-cultural disparities in the city of New Orleans that amplified the devastation and subsequently shaped the context of recovery efforts (Dowty and Allen, 2011; Weber and Peek, 2012). Moreover, it illustrated that hazard protection is a socially isolated activity and disaster response is solely an event-focused reaction - both highly professionalized but seldom viewed as an integral part of a larger development context (Weichselgartner and Brévière, 2011).

Thus, returning to pre-disaster normality is certainly not always a suitable goal. In some cases, it might not be feasible. All recovery processes point to Christchurch, New Zealand having its character fundamentally changed as a result of the 22 February 2011 earthquake that killed 185 people. That does not mean a better city or a worse city, but just a different city built and operating in a different way - at individual, institutional, and urban levels (Cupples, 2012). Returning to pre-disaster normality is neither desired nor undesired, but it is not feasible.

Such realities are not always feasible within the apolitical ecological resilience thinking that tends to favor established social processes and traditional societal structures at the expense of critical thoughts of social transformation. Thinking of societal processes as merely moderating the effects of natural hazards is not just inadequate, but also misconceived (Hewitt, 1983). Understanding the historical and socio-political processes that create and maintain social vulnerabilities is absolutely central to effective DRR (Lewis, 1999; Wisner et al., 2004). What are the root causes of, or the baseline for, resilience? Focusing on easy-to-measure symptoms and available-to-process data of resilience instead of the forces, dynamics, and power relations that are at the root of much vulnerability, inevitably results in undifferentiated 'communities at risk', common 'vulnerable countries', and generalized 'resilient pixels'. As long as efforts to increase resilience ignore the preconditions of maladaptation and are detached from the underlying causes of (what is effectively social and political) vulnerability, the chronic sources of vulnerability remain unsolved and continue generating vulnerable, barely resilient groups (Lewis, 1999). Rather than viewing resilience within closures of a specific ideological construction, we suggest resilience to be foregrounding the question of social transformation "of whom and to where and at what spatial and temporal scales".

5. Conclusion

We briefly outlined the concept of resilience and portrayed some recent international resilience-building efforts to elucidate less-established questions to highlight less discussed issues and to provide ways forward from identifying gaps. The current transition of resilience from a descriptive concept to a normative agenda provides both challenges to overcome and opportunities to take up, by ensuring that both are balanced and support each other in practical implementation of resilience approaches.

In summary, we have two major concerns about the current resilience theory and application. First, too many resilience-building activities in and for cities draw upon unchallenged assumptions about the social world, effectively imposing a technical-reductionist framework upon more complex webs of action, values, and meaning. Instead, a 'critical resilience-thinking through locality and marginality' is essential. Second, the contemporary quantitative production mode of streamlining resilience into one city index hides far more than it discloses. In particular, geographical differentiation, cultural heterogeneity, and social plurality may be named with regard to local practices and knowledge-making traditions. Produced in a specific science-policy setting with particular institutional arrangements, decontextualized top-down knowledge on resilience offers a severely limited guide to urban policy and practice, and may have considerably less purchase in problem-solving than pursuing co-designed bottom-up knowledge and tools.

As the papers in this special issue make clear, this does not suggest eliminating entirely the word 'resilience' from the agendas of urban design and planning. The key starting point is combining expertise and experience from various sources. This includes integrating different kinds of knowledge and a variety of approaches in which scientists, the public, and authorities collaborate to generate not only scientifically reliable but also context-appropriate, socially robust, and actionable knowledge. Integrating diverse knowledge, producing an explicit operational definition and concrete baselines will overcome resilience's vagueness at the conceptual level and its disconnect from people's experience on the ground.

Emerging issues for future study highlight some of the challenges associated with practical application of different resilience approaches. These emerging issues need to acknowledge explicitly that resilience cuts across development and environmental processes and that resilience should be applied in such a way that it supports, rather than detracts from, sustainability. In fact, both researchers and decision-makers in policy and practice need to address the role of different socioeconomic settings in which behaviors are undertaken and the ways in which these relate to underlying social practices.

As such, far more understanding is needed about what kinds of measures are effective for increasing resilience in different ways and how they can best be designed, implemented, and maintained. Further research is needed to examine how building urban resilience can be better defined and operationalized, so that it goes beyond program timelines and facilitates long-term organizational learning and action. An important component of this is the examination of theoretical *and* practical perspectives which are necessary for understanding the practical knowledge surrounding resilience in such a way that it enables knowledge realization and ensures that action follows from knowledge. It would also help to further investigate the abilities that make the implementation of findings possible, so that building resilience involves the people most capable of leading, monitoring, and evaluating the processes. Part of that means understanding what is and is not specific to urban environments at different scales, which will also contribute to understanding the opportunities and challenges of DRR and building resilience within different types of urban spaces.

Throughout, such research should be conducted independently by scientists to ensure socially robust recommendations. Nonetheless, science should not only be a producer of resilience-related knowledge but also an agent of social change, to reach the 'urban resilience' articulated in this special issue. That can be achieved by including policy makers and practitioners in the research design from the beginning and by ensuring that the social context of the scientists' work is paramount in the research conducted. As Davoudi (2012:306) reminds us:

"In applying an ecologically rooted concept to the social setting, we need to tread carefully and ensure that in trying to understand society through the lens of ecology, we do not lose the insights from critical social science. In the social world, resilience has as much to do with shaping the challenges we face as responding to them."

References

- Adger, W.N., Hughes, T.P., Folke, C., Carpenter, S.R. and Rockström, J. (2005), Social-ecological resilience to coastal disasters, **Science**, 309:5737, 1036-1039.
- Aguirre, B.E. (2007), Dialectics of vulnerability and resilience. **Georgetown Journal of Poverty Law and Policy**, 4:1, 39-59.
- Alexander, D.E. (2013), Resilience and disaster risk reduction: An etymological journey, **Natural Hazards and Earth System Sciences, Discuss**, 1, 1257-1284.
- Cabinet Office (2010), **Strategic Framework and Policy Statement on Improving the Resilience of Critical Infrastructure to Disruption from Natural Hazards**, Cabinet Office, London.
- Cabinet Office (2011), **Keeping the Country Running: Natural Hazards and Infrastructure**, Cabinet Office, London.
- Chambers, R. (2012), **Provocations for Development**, Practical Action Publishing, Rugby.
- Chambers, R. and Conway, G.R. (1992), Sustainable rural livelihoods: Practical concepts for the 21st century, Discussion Paper 296, Institute of Development Studies, Brighton.
- Cupples, J. (2012), Boundary crossings and new striations: When disaster hits a neoliberalising campus, **Transactions of the Institute of British Geographers**, 37:3, 337-341.
- Davoudi, S. (2012), Resilience: A bridging concept or a dead end?, **Planning Theory and Practice**, 13:2, 299-307.
- DFID (2011), Defining disaster resilience: A DFID approach paper, Department for International Development, London.
- Dowty, R.A. and Allen, B.L. (eds.) (2011), **Dynamics of Disaster: Lessons on Risk, Response, and Recovery**, Earthscan, London.
- Duffy, N. (2012), Using social media to build community disaster resilience, **The Australian Journal of Emergency Management**, 27:1, 40-45.
- Falade, J.B. and Aribigbola, A. (2010), Rapid Urban Sector Profiling for Sustainability Studies (RUSP) in developing countries: Implications for urban planning in Ondo State, **Theoretical and Empirical Researches in Urban Management**, 5:14, 82-94.
- Folke, C., Carpenter, S.R., Walker, B., Scheffer, M., Chapin, T. and Rockstrom, J. (2010), Resilience thinking: integrating resilience, adaptability and transformability, **Ecology and Society**, 15:4, 20.
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C.S., Walker, B., Bengtsson, J., Berkes, F., Colding, J., Danell, K., Falkenmark, M., Gordon, L., Kaspersen, R., Kautsky, N., Kinzig, A., Levin, S., M.aler, K.-G., Moberg, F., Ohlsson, L., Olsson, P., Ostrom, E., Reid, W., Rockstroem, J., Savenije, H. and Svedin, U. (2002), Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations. Environmental Advisory Council to the Swedish Government, Stockholm.
- Fonagy, P., Steele, M., Steele, H., Higgitt, A. and Target, M. (1994), The Emanuel Miller Memorial Lecture 1992: The theory and practice of resilience, **Journal of Child Psychology and Psychiatry**, 35:2, 231-257.
- Gaillard, J.-C. (2007), Resilience of traditional societies in facing natural hazards, **Disaster Prevention and Management**, 16:4, 522-544.
- Gallopin, G.C. (2006), Linkages between vulnerability, resilience, and adaptive capacity, **Global Environmental Change**, 16:3, 293-303.

- Glantz, M.H. and Jamieson, D. (2000), Societal response to hurricane Mitch and intra versus intergenerational equity: Whose norms should apply? **Risk Analysis**, 20:6, 869-882.
- Gray, R.C.R. and Wiedemann, P.M. (1999), Risk management and sustainable development: Mutual lessons from the approaches to the use of indicators, **Journal of Risk Research**, 2:3, 201-218.
- Gunderson, L.H. and Holling, C.S. (eds.) (2001), **Panarchy: Understanding Transformations in Human and Natural Systems**, Island Press, Washington D.C.
- Hamza, M. and Zetter, R. (1998), Structural adjustment, urban systems, and disaster vulnerability in developing countries, **Cities**, 15:4, 291-299.
- Hewitt, K. (ed.) (1983), **Interpretations of Calamity from the Viewpoint of Human Ecology**, Allen & Unwin, London.
- Holling, C.S. (1973), Resilience and stability of ecological systems, **Annual Review of Ecology and Systematics**, Vol. 4, 1-23.
- IPCC (2012), **Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change**, University Press, Cambridge.
- Kaly, U., Pratt, C., Sale-Mario, E., White, O. and Seddon, J. (2002), Environmental Vulnerability Index (EVI) Project: Initial Testing of the Global EVI, Report 453, South Pacific Applied Geoscience Commission, Suva, Fiji.
- Kennedy, J., Ashmore, J., Babister, E. and Kelman, I. (2008), The meaning of 'build back better': Evidence from post-tsunami Aceh and Sri Lanka. **Journal of Contingencies and Crisis Management**, 16:1, 24-36.
- Klein, R.J.T. and Nicholls, R.J. (1999), Assessment of coastal vulnerability to climate change, **Ambio**, 28:2, 182-187.
- Levine, S., Pain, A., Bailey, S. and Fan, L. (2012), The relevance of 'resilience'?, HPG Policy Brief 49, Overseas Development Institute, London.
- Lewis, D. (2013), Reducing risk and building resilience in cities, **Natural Hazards Observer**, 37:4, 10-13.
- Lewis, J. (1999), **Development in Disaster-Prone Places: Studies of Vulnerability**, Intermediate Technology Publications, London.
- Lewis, J. (2013), Some realities of resilience: A case-study of Wittenberge, **Disaster Prevention and Management**, 22:1, 48-62.
- Lewis, J. and Kelman, I. (2010), Places, people and perpetuity: Community capacities in ecologies of catastrophe, **ACME**, 9:2, 191-220.
- Lucini, B. (2013), Social capital and sociological resilience in megacities context, **International Journal of Disaster Resilience in the Built Environment**, 4:1, 58-71.
- MacKinnon, D. and Derickson, K.D. (2012), From resilience to resourcefulness: A critique of resilience policy and activism, **Progress in Human Geography**, 37:2, 253-270.
- Maguire, B. and Hagan, P. (2007), Disasters and communities: Understanding social resilience, **The Australian Journal of Emergency Management**, 22:2, 16-20.
- Manyena, S.B., O'Brien, G., O'Keefe, P. and Rose, J. (2011), Disaster resilience: A bounce back or bounce forward ability?, **Local Environment**, 16:5, 417-424.
- McAslan, A. (2010), The concept of resilience: Understanding its origins, meaning and utility, Torrens Resilience Institute, Adelaide.

- McGranahan, G., Jacobi, P., Songsore, J., Surjadi, C. and Kjellén, M. (2001), **The Citizens at Risk: From Urban Sanitation to Sustainable Cities**, Earthscan, London.
- Mitchell, T. and Harris, K. (2012), Resilience: A risk management approach, ODI Background Notes, January 2012, Overseas Development Institute, London.
- O'Keefe, P. and O'Brien, G. (2013), **Managing Adaptation to Climate Risk: Beyond Fragmented Responses**, Routledge, Abingdon.
- Paton, D. (2006), Disaster resilience: Integrating individual, community, institutional, and environmental perspectives, In: Paton, D. and Johnston, D. (eds.), **Disaster Resilience: An Integrated Approach**, Charles C. Thomas, Springfield, pp. 305-316.
- Porter, L. and Davoudi, S. (2012), The politics of resilience: A cautionary note, **Planning Theory and Practice**, 13:2, 329-333.
- Roberts, P., Newton, P. and Pearson, L. (2013), **Resilient Sustainable Cities: A Future**, Routledge, Abingdon.
- Schuller, M. and Morales, P. (eds.) (2012), **Tectonic Shifts: Haiti since the Earthquake**, Kumarian Press, Sterling.
- Shaw, K. (2012), "Reframing" resilience: Challenges for planning theory and practice, **Planning Theory and Practice**, 13:2, 308-312.
- Shaw, R. and Sharma, A. (eds.) (2011), **Climate and Disaster Resilience in Cities**, Emerald, Bingley.
- Shaw, R., Takeuchi, Y., Razafindrabe, B.H.N. and Parvin, G.A. (2009), **City Profile: Climate and Disaster Resilience**. Kyoto University, Citynet, UN-ISDR, and UNU, Japan.
- Silva Villanueva, P. (2011), Learning to ADAPT: Monitoring and evaluation approaches in climate change adaptation and disaster risk reduction – Challenges, gaps and ways forward, Discussion Paper 9, Institute of Development Studies, Brighton.
- The National Academies (2012), **Disaster Resilience: A National Imperative**, National Academies Press, Washington, D.C.
- Timmerman, P. (1981), Vulnerability, Resilience and the Collapse of Society: A Review of Models and Possible Climatic Applications, Environmental Monograph 1, Institute for Environmental Studies, University of Toronto, Toronto.
- Tobin, G.A. (1999), Sustainability and community resilience: The holy grail of hazards planning?, **Environmental Hazards**, 1, 13-25.
- UN-HABITAT (2006), **Nairobi Urban Sector Profile**, United Nations Human Settlements Programme, Regional Office for Africa and the Arab States.
- UN-ISDR (2012a), **Making Cities Resilient Report 2012**, United Nations International Strategy for Disaster Reduction, Geneva.
- UN-ISDR (2012b), **How to Make Cities More Resilient: A Handbook for Mayors and Local Government Leaders**, United Nations International Strategy for Disaster Reduction, Geneva.
- UN-ISDR (2009), **Terminology on Disaster Risk Reduction**, United Nations International Strategy for Disaster Risk Reduction, Geneva.
- UN-ISDR (2005), **Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters**, United Nations International Strategy for Disaster Risk Reduction, Geneva.
- URL-1 Europe Real Estate Project <http://www.ensureproject.eu>.
- Valdés, H.M., Amaratunga, D. and Haigh, R. (2013), Making cities resilient: From awareness to implementation, **International Journal of Disaster Resilience in the Built Environment**, 4:1, 5-8.

- Weber, L. and Peek, L. (eds.) (2012), **Displaced: Life in the Katrina Diaspora**, University of Texas Press, Austin.
- Weichselgartner, J. (2003), Toward a policy-relevant hazard geography: Critical comments on geographic natural hazard research, **Die Erde**, 134:2, 181-193.
- Weichselgartner, J. (2001), Disaster mitigation: The concept of vulnerability revisited, **Disaster Prevention and Management**, 10:2, 85-94.
- Weichselgartner, J. and Breiviere, E. (2011), The 2002 flood disaster in the Elbe region, Germany: A lack of context-sensitive knowledge, In: Dowty, R.A. and Allen, B.L. (eds.), **Dynamics of Disaster: Lessons on Risk, Response, and Recovery**, Earthscan, London, pp. 141-158.
- Wisner, B., Blaikie, P., Cannon, T. and Davis, I. (2004), **At Risk: Natural Hazards, People's Vulnerability and Disasters**, Routledge, London.