

Beyond bouncing back? Comparing and contesting urban resilience frames in US and Latin American contexts

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HIGHLIGHTS

- Resilience has rapidly emerged as a major focus of urban research and practice.
- We know little about resilience frames across different urban contexts and actors.
- In practice, most resilience frames do not align with notions of transformation.
- Implications of cultural and political differences in frames deserve more attention.
- Resilience practice needs to include anticipation, systems thinking, and equity.

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ABSTRACT

Urban resilience has gained considerable popularity in planning and policy to address cities' capacity to cope with climate change. While many studies discuss the different ways that academics define resilience, little attention has been given to how resilience is conceptualized across different urban contexts and among the actors that engage in building resilience 'on the ground'. Given the implications that resilience frames can have for the solutions that are pursued (and who benefits from them), it is important to examine how transformative definitions of urban resilience are in practice. In this paper, we use data from a survey of nine US and Latin American and Caribbean cities to explore how the concept is framed across multiple governance sectors, including governmental, non-governmental, business, research, and hybrid organizations. We examine these framings in light of recent conceptual developments and tensions found in the literature. The results highlight that, in general across the nine cities, framings converge with definitions of resilience as the ability to resist, cope with, or bounce back to previous conditions, whereas sustainability, equity, and social-ecological-technological systems (SETS) perspectives are rarely associated with resilience. There are noticeable differences across cities and governance actors that point to geographic and political variation in the way resilience is conceptualized. We unpack these differences and discuss their implications for resilience research and practice moving forward. We argue that if resilience is going to remain a major goal for city policies into the future, it needs to be conceived in a more transformative, anticipatory, and equitable way, and acknowledge interconnected SETS.

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1. Introduction

Recent unprecedented events, such as record-breaking hurricanes and heat waves, the COVID-19 pandemic, and anti-racism protests, are testing cities' ability to navigate complex challenges and rapid changes. Many researchers as well as political, civic, and urban leaders suggest that these intersecting crises underscore the need for greater urban resilience and provide an opportunity for transformation (Walker, 2020; Sharifi and Khavarian-Garmsir, 2020; Wray, 2020).

For the last decade, urban planners and policymakers have increasingly employed the idea of urban resilience to help build the capacities of cities to cope with various stresses and shocks (Meerow et al., 2016). The concept has motivated diverse actors and initiatives to mobilize research, financial investments, and capacities towards strategies to help communities and cities thrive in the face of disruption. For example, the Rockefeller Foundation's *100 Resilient Cities* (now the *Resilient Cities Network*) define urban resilience as the capacity for cities to adapt and transform in the face of stresses or shocks (Rockefeller Foundation, 2019), ICLEI (2019) as not just recovering but improving future responses, and the Kresge Foundation (2015) as bouncing forward and prospering in the face of climate change. The idea of building urban resilience to promote change resonates with the conceptualization that many scholars and policymakers have about cities as sites of innovation and experimentation for climate action (van der Heijden, 2019). At the same time, the resilience discourse has been heavily criticized for what some perceive as an agenda that is not transformative enough, because it maintains the status quo of systems—bouncing back to prior unsustainable and unjust conditions—and avoids the politics associated with systemic change (Vale, 2014; Béné et al., 2018).

Numerous authors have pointed out inconsistencies and tensions in how resilience is defined and used in policy contexts (Grafton et al., 2019; Moser et al., 2019; Walker, 2020). Although previous studies have unpacked definitions of resilience in the academic literature (Meerow et al., 2016; Grove, 2018) or policy discourse (Schipper & Langstan, 2015), little research looks at how resilience is conceptualized across different urban contexts and actors that engage in building resilience 'on the ground'. How is resilience framed across a diverse set of urban actors and perspectives? Are decision-makers and communities in different cities thinking about resilience in a transformative way? What are the points of convergence, or divergence, among these framings, and what are the implications for resilience research and practice?

In this paper, we examine these questions, beginning with the premise that it is necessary to understand the diversity of ways that the term is understood and debated because framings of resilience have implications for how the concept is applied in planning, design, and policy (Béné et al., 2018; Grafton et al., 2019; Moser et al., 2019). Analyzing differences in resilience frames brings to the fore the solutions, narratives, values, interests, and knowledges that are included, and more importantly, neglected or excluded, in urban planning and practice (O'Brien et al., 2007). Few studies, however, have examined definitions systematically across diverse governance actors, and these have generated mixed results. A study of US city government representatives by Meerow and Stults (2016) showed that they tend to favor engineering-based or bouncing back definitions of resilience. International studies showed that practitioners frame urban resilience in diverse ways, including resilience as maintenance or transformation of system conditions (Borie et al., 2019; Keating & Hanger-Kopp, 2020). Missing is an understanding of how resilience is understood outside of academia and government, including from communities, NGOs, and businesses, which also shape policy and governance of urban resilience. Furthermore, most studies on urban resilience conceptualizations are dominated by Global North perspectives (cities in North America and Europe); thus, a large gap remains about how the concept is framed in cities of the Global South (Nagendra et al., 2018).

To address these questions, we draw upon an extensive cross-city survey ($n = 547$) of researchers, government practitioners, and

members of civic and business sector groups in US and Latin American and Caribbean (LAC) cities. The survey was conducted as part of the Urban Resilience to Extremes Sustainability Research Network (UREx SRN), an international research network funded by the US National Science Foundation that seeks to enhance urban resilience and accelerate urban sustainability transitions through research and action.

Understanding diverse resilience framings does not mean that we do away with difference. On the contrary, we acknowledge that it is precisely in the constructive exploration and negotiations of divergent framings that exciting pathways for transformation will emerge (Grove, 2018; Harris et al., 2018). Therefore, we aim to make visible and connect the plurality of ideas and perspectives underlying resilience framings as a starting point for working towards transition pathways of urban development that are legitimate, equitable, and focus on long-term systemic changes. The paper proceeds with a brief overview of tensions and debates in the resilience literature. We then describe the data collection and analysis methods and present the key framings across cities and actors. We conclude by discussing the main points of convergence and divergence across city and sector framings and their implications for advancing resilience research and practice.

2. Background: Conceptualizing and debating urban resilience

Although the urban resilience concept has only recently been widely adopted by city officials, it draws from diverse research realms, including psychology, engineering, hazards and disaster studies, social-ecological resilience, social vulnerability, development studies, urban ecology, and climate change resilience (Grimm et al., 2008; Cutter et al., 2009; Pelling, 2010; Leach et al., 2010; Alexander, 2013; for a description of the concept's evolutionary paths see Béné et al., 2018). While urban resilience originates from the more generic concept of resilience, Meerow et al. (2016) identified 25 different definitions of urban resilience in the literature and inconsistencies around crucial concepts in resilience and urban theory. With such an extensive lineage and diverse perspectives, it is no surprise that the concept is debated and discussed across multiple scientific disciplines. Because the scope of this paper is on cities and urban planning, and not on individual resilience, we limit our background to the academic and gray literature that approaches resilience from a systems perspective, including extensive literature reviews that highlight the tensions in resilience conceptualizations and implications for translating resilience into practice (Meerow et al., 2016; Béné et al., 2018; Moser et al., 2019).

2.1. Definitions and tensions in the resilience literature

The concept of resilience, as we are using it in this paper, emerged in the 1970s from the work of ecologist C.S. (Buzz) Holling, who defined resilience as a "measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations and state variables" (Holling, 1973, p. 14). Holling later broadened the conceptual scope of resilience and proposed the idea of *ecological resilience*, which he defined as the ability of a system to withstand shock and maintain critical relationships (Holling, 1996). This was in contrast to *engineering resilience*, which was defined as the speed at which a system returns to equilibrium following a disturbance (Pimm, 1991). Importantly, the ecological definition did not recognize single equilibria in ecological systems, but rather, suggested that systems could maintain identity within a broad domain of stable states. Beginning in the 2000s, the ecological resilience field took a "social turn" (Adger, 2000; Brown, 2014) incorporating theoretical constructs from the social sciences, including transition and transformations, to account for multiple desirable pathways, and evolving into the concept now known as *social-ecological resilience* (Adger, 2000; Berkes et al., 2003; Folke, 2006). This shift was partly due to growing interest by resilience scholars in matters beyond resource management towards broader system governance (Folke et al., 2005).

Although most researchers agree that resilience is about thriving in the context of change, its meaning and ‘proper’ use are still contested. A recent *meta-analysis* of the resilience literature argued that there are three distinct understandings: resilience as a system property, resilience as a process, and resilience as an outcome (Moser et al., 2019). In the first instance, resilience is described as a property of the system that, in itself, is neither positive nor negative. Process-focused definitions emphasize the management or governance of the system or city, as opposed to the characteristics of the system (Quinlan et al., 2016). Process definitions are found more often in the social science literature (Moser et al., 2019). Finally, outcome-focused definitions present resilience as a normative goal or prescription of what the city should be or become (Brand & Jax, 2007), while the ecological and engineering conceptualizations of resilience seek to describe or analyze the system as it is (Quinlan et al., 2016). Although distinct, these conceptualizations are not necessarily mutually exclusive. Some scholars, for example, define resilience as both a process and outcome (Matyas & Pelling, 2015).

Different interpretations of resilience have implications for the relationship between resilience and sustainability (Redman, 2014; Moser et al., 2019). When resilience is a property, a highly resilient system may or may not be sustainable. If resilience is a process, it is often a means of achieving a more sustainable system, whereas if resilience is a desired goal or outcome, it may be used interchangeably with sustainability or it may even be in conflict with sustainability. This is because, traditionally, sustainability has been tied to normative visions for what *ought* to be. In turn, a process or outcome-focused interpretation makes resilience an inevitably contested concept and difficult to measure (Harris et al., 2018). A descriptive focus on system characteristics allows researchers to identify, track, and quantify the performance of key system traits and critical thresholds. On the other hand, narrow appraisals of resilience can leave out other less tractable types of knowledge about a system’s resilience, including uncertainty, ambiguity, and ignorance, that participatory methods and other tools, such as scenario analysis and multi-criteria assessments, are better suited to exploring (Smith & Stirling, 2010; Eakin et al., 2018).

Another difference in the resilience literature relates to the type and saliency of events, particularly whether resilience is related to shocks, stresses, or both (Smith & Stirling, 2010; Olsson et al., 2014). Shocks generally refer to rapid-onset, lower-probability extreme events, such as hurricanes. These events are likely to trigger management actions that seek to reduce the immediate risk of a disaster by building specific adaptive capacities, such as buying flood insurance or raising the height of seawalls to protect communities from floods. In contrast, stresses are slow-moving disturbances that occur over long periods of time, such as climate change, that require long-term responses to build systemic resilience or generic adaptive capacities, such as moving out of the floodplain or investing in basic human development needs (e.g., health, education, affordable housing, mobility) (Eakin et al., 2014). Although social-ecological resilience scholars (Elmqvist et al., 2019), and even policy initiatives like the Rockefeller Foundation (2019) argue that resilience should encompass both shocks and stresses, many of the definitions in the literature associate resilience only with shocks, or do not specify (Meerow et al., 2016). Variation in terminology also complicates this distinction, as some literature refers to slow-onset shocks (Boyd & Folke, 2012).

Finally, the extent to which pathways to resilience incorporate system change is debated, with conceptualizations falling along a spectrum from resistance to transformation, with recovery, incremental change, and adaptation somewhere in between (Matyas & Pelling, 2015; Chelleri et al., 2015). Resistance means the system maintains equilibrium or stays in a particular regime in the face of a shock for stress, recovery means that a system may be disrupted, but reorganizes and makes incremental changes as needed to return to the prior equilibrium or regime. Approaches to adapt or cope, while accommodating some change, too often focus on incremental solutions that respond to near-

term risks (Chu et al., 2019).

At the other end of the spectrum is transformation. Although researchers conceptualize the term in various ways, transformation often involves major, fundamental change, in contrast to small, incremental change (Feola, 2015). Social-ecological resilience scholars view transformation as a fundamental characteristic of a resilient system (Olsson et al., 2014). Transition scholars define transformation as abandoning equilibrium altogether and fundamentally restructuring system dynamics into a new state (Feola 2015). Social scientists have criticized the applications of engineering resilience, which tend to fit more closely with resistance or recovery, suggesting they could be misused to support business as usual rather than challenge the economic and political inequalities that produced physical and social vulnerabilities in the first place (Brown, 2014; Vale, 2014). If urban resilience is associated with maintaining the status quo, framed around notions of bouncing back or “going back to normal,” then it becomes a barrier to system change and may even increase risks and inequities (The Kresge Foundation, 2015; Walker, 2020). Attempts have been made to reframe resilience from merely bouncing back to “building back better,” bouncing forward, or the ability to “thrive” in the face of challenges and extreme events (O’Brien, 2012). However, as O’Brien et al. (2007) suggest, bouncing forward after a disaster may encourage ‘doing it better’ but not necessarily ‘doing it differently’, which is what is needed for transformation.

2.2. Elements of transformation in resilience framings

Recent calls by urban sustainability scholars point out that the confluence of global urban acceleration, loss of biodiversity, increasing social injustices, and extreme climate events demands nothing short of radical departure from the status quo in order to avoid maladaptive pathways (McPhearson et al., 2021). Transformations can be described as either emergent or intentional system change (Feola, 2015). However, we argue that deliberate transformations, or the act of anticipating and inducing change, is necessary in urban resilience planning in order to continue delivering values to society in an equitable way (Iwaniec et al., 2019; Walker, 2020). Operationalizing transformative urban resilience would require fundamental changes to social, ecological, and technological systems, with an explicit focus on enhancing social equity and deliberate thinking about the future (Chu et al., 2019). Yet research suggests that resilience is seldom conceived this way.

Resilience, as we are using the concept in this paper, is commonly associated with *systems thinking*, but the type of systems examined have expanded over time, including social-ecological systems (Folke, 2006) and social-technological systems (Smith & Stirling, 2010; Hollnagel, 2014). Urban scholars have argued that urban systems inevitably have social, ecological, and technological components, and thus propose a social-ecological-technological systems (SETS) framework for urban resilience (Grimm et al., 2017; Markolf et al., 2018). The SETS framework posits that urban systems comprise complex interactions among social networks, institutions, and knowledge; physical infrastructure, technologies, and the built environment; and the ecological systems that are interacting with the human and built elements or that are designed into them (e.g., green infrastructure; Miller et al., 2018). We refer to ‘system’ broadly to incorporate interactions, complexity, and many network components that span different spatial and temporal scales (Meerow et al., 2016). A SETS framework provides a useful starting point for exploring the interlinkages or ‘couplings’ among systems’ elements that may enable or inhibit transformation (McPhearson et al., 2021), yet it is unclear whether integrated SETS thinking extends beyond the academic literature into practice.

For social systems, positive transformation means increasing equity. Yet the urban resilience agenda is commonly critiqued for inadequately addressing *equity* (Vale, 2014; Fitzgibbons & Mitchell, 2019). Social science scholars have pointed out that an inequitable system can be resilient insofar that it is resistant to change, but not desirable (Chelleri et al., 2015). Meerow and Newell (2019) address equity questions in

resilience by recommending that we consider the “who, what, when, where, and why” of urban resilience initiatives. For example, we would need to consider “whose resilience is prioritized,” and “is the focus on the resilience of present or future generations?” Additionally, conceptualizations of equity should not be limited to distributional concerns, meaning the equitable distribution of goods, services, and opportunities, but should also integrate procedural and recognition considerations (Fitzgibbons & Mitchell, 2019; Meerow et al., 2019). Procedural equity refers to fairness in the decision-making processes and structural conditions that shape outcomes, including the policymaking processes, legal frameworks, and deliberative procedures (Schlosberg, 2013; Popke et al., 2016). Recognition refers to the status, legitimacy, and respect afforded to social and cultural groups, and attention to the “cultural symbolic injustices” that underwrite distributive outcomes (Popke et al., 2016).

Equitably transforming urban SETS requires deliberate thinking about the future, including anticipating potential risks and planning for desired changes (Muñoz-Erickson et al., 2021). Resilience theory includes time scale as an essential component, as systems change over time and can evolve or be pushed into different basins of attraction (Folke, 2006). Resilience scholars have applied foresight approaches like scenario planning to articulate alternative futures and experiment with multiple courses of action before implementation (Peterson et al., 2003; Iwaniec et al., 2020). In practice, however, the urban planning community has not yet widely adopted scenario planning or other types of anticipatory techniques to explore the future in climate-planning efforts (Stults & Larsen, 2018). Some authors suggest that, as a management approach, resilience has been implemented in a reactionary rather than anticipatory mode (Vale, 2014).

2.3. Translating urban resilience frames into practice

While conceptualizations of resilience are debated in the literature, cities are translating the concept into practice, and less is known about how urban resilience is framed by different actors in different cities. Frames are cultural and political devices that people and organizations use to interpret an issue or situation, prioritize responses, and make investments on those actions (Bosomworth, 2015). The way in which actors frame urban resilience in practice has significant implications for the types of responses and investments that urban leaders legitimize and who benefits from them. New York City (NYC), for instance, took very different approaches to resilience in the wake of Hurricane Sandy in 2012. Fairstein (2018) analyzed the plans advanced by Michael Bloomberg and his *Stronger More Resilient New York* in 2013 and Mayor Bill de Blasio's *One New York: The Plan for a Strong and Just City* in 2015 and identified different resilience agendas and solutions. Bloomberg's agenda focused mainly on the city's infrastructure, promoting development in flood-prone areas and encouraging wealthy investors in the city to increase the tax base to pay for specific adaptation measures. In contrast, Bill de Blasio's plan paid more attention to general adaptive capacities and emphasized income inequalities, affordable housing, education, and other socio-demographic parameters that the literature suggests increase resilience to a variety of shocks and threats and increase human well-being (e.g., Eakin et al., 2014). Two municipal leaders with different understandings of resilience legitimized different investments for the city with different beneficiaries.

Because of the varied and sometimes conflicting outcomes that resilience framings can produce in practice, some scholars argue for defining resilience as a value-free assessment of system dynamics and making sustainability the goal to guide policy (Redman, 2014; Elmqvist et al., 2019). Yet, the meaning and use of sustainability frames in urban planning and practice are also unclear. Some authors have suggested that resilience is replacing sustainability as the normative goal in cities, while others have found that the US public associates sustainability more with environmental concerns and therefore finds it a more appealing policy frame than resilience (Meerow & Neuner, 2021). By

examining whether stakeholders in different cities associate resilience with sustainability, this paper contributes to this ongoing debate.

3. Methods

3.1. Data collection

We derived the data on resilience framings from the UREx SRN Governance Survey for the network's cities, including Baltimore, Miami, New York, Phoenix, Portland, and Syracuse in the US and Hermosillo (Mexico), San Juan (Puerto Rico), and Valdivia (Chile) in Latin America and the Caribbean (LAC). We developed the Governance Survey with the dual objectives of understanding existing governance conditions around climate resilience planning, and as the base for a stakeholder analysis that was used to support the network's participatory scenario development efforts in each city (see Appendix A). The survey consisted of a combination of open and closed-ended questions. The work presented here focuses on an open-ended question, which asked respondents: “The concept of resilience can mean different things to different people. In a few words, what comes to your mind when you think of cities (or your city in particular) as being resilient to climate change?”. We implemented the survey between February of 2017 and August of 2019 and followed Dillman's (1999) tailored design method for online survey design and contacting respondents multiple times (see Appendix A).

3.2. Sampling procedure

We defined stakeholders as those actors (organizations or groups) with interests, responsibilities, or power over urban and climate planning and policies, and those that are most affected (or that work for those affected) by the outcomes of policies and actions or those that are most vulnerable to climate hazards. We included representatives of organizations in the government, civic, research, and private sectors working on urban climate resilience, including city planning and community development, infrastructure management, climate adaptation, hazard mitigation, and emergency management within the target spatial scale. Our aim was to cast a wide net of actors around the problem of building urban climate resilience, and not limit the sample to well-known actors or those closely tied to members of the network. In this way we diminished the chance of missing marginal perspectives, especially of groups underrepresented in the planning and policy processes, and allowed for a diversity of framing, preferences, priorities, and knowledge systems to emerge (Reed et al., 2009; Leventon et al., 2016).

We used a combination of purposive sampling and the snowball method to build the participant lists (Etikan, Musa, & Alkassim, 2016). Based on our definition of stakeholders, we worked with the network's city teams to build an initial list of actors (organizations and groups) and then augmented this list with other lists provided by local municipal and civic organization partners. The snowball sampling involved reviewing responses to the survey question on collaboration networks once the survey was deployed, allowing the city team to verify if our list missed any organizations/groups mentioned by survey participants. Following our snowball sampling approach, any missed organizations/groups were then invited to complete the survey. We updated and rigorously validated the list with all members of the city team. More details on the sampling approach can be found in Appendix A.

3.3. Coding and analysis

We coded open-ended survey responses to the resilience conceptualization question using a deductive coding approach (Weed, 2005). We developed a codebook that reflects the various definitions and tensions around the concepts of resilience and transformation discussed in section 2. Codes were refined following a random test in a small sample of cities (Appendix B). After the codebook was developed, teams of two resilience scholars from the UREx SRN coded responses in each city to

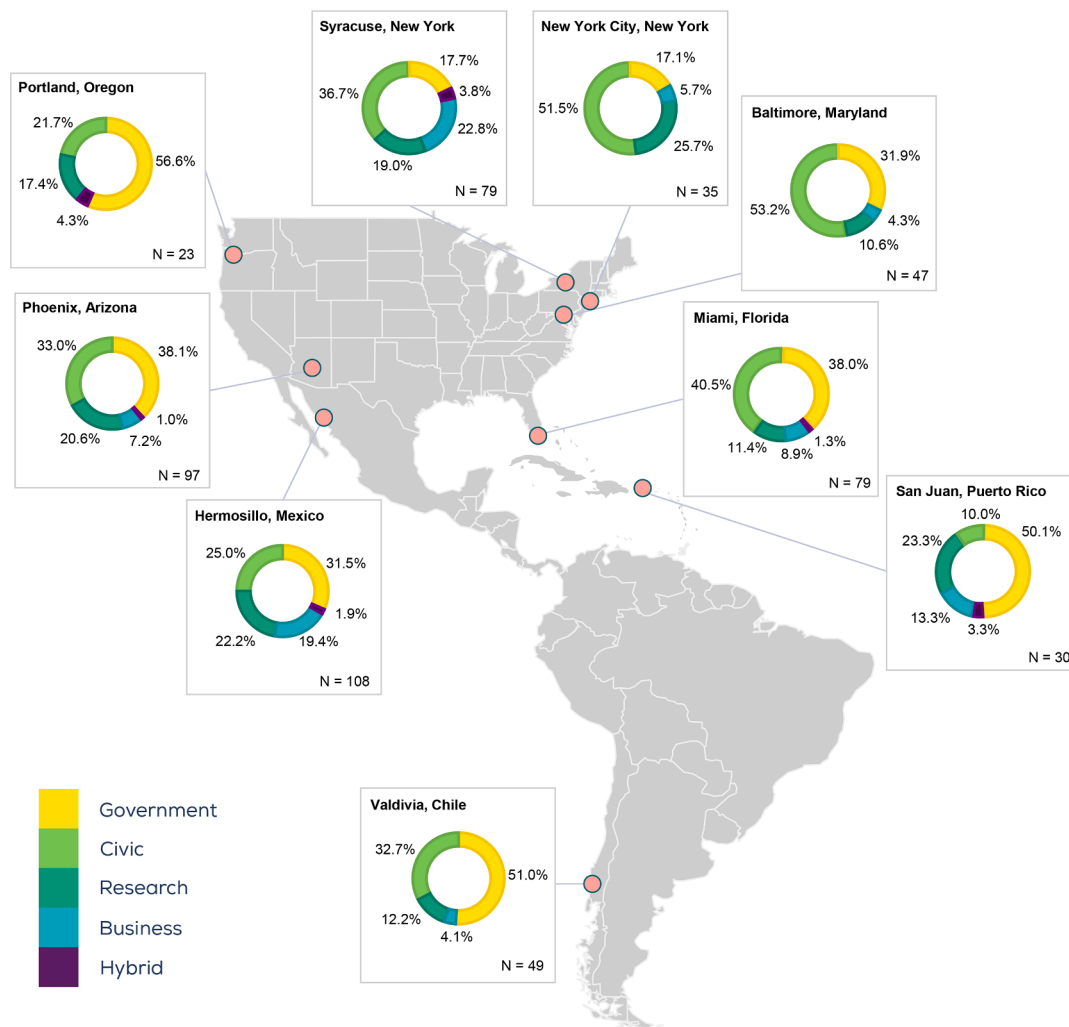


Fig. 1. Map of the cities included in the survey and the percent of responses by governance sector for each city.

improve replicability and reliability of the data (MacQueen et al., 1998). Teams with Spanish speakers coded the responses for the LAC cities to maintain the integrity of the coding from the original response and not a translated version. Each pair coded the responses individually then met to resolve any disputes. Following best practices (Ratajczyk et al., 2016), we maintained inter-coder reliability of 80% throughout the coding process and revised the codebook iteratively as needed to provide greater clarity. A final cross-city reliability check was performed by the lead coders to ensure consistency across the city coding teams and returned a percent agreement of 89%. Our coding was non-exclusive to allow us to account for multiple categories in a definition, such as when respondents defined resilience both in terms of system property and outcome. Therefore, some of the results add up to over 100%.

Stakeholders from multiple sectors of society completed the survey (Fig. 1). Participants were given the option to select an organization type that best represents their organization based on the following categories: civic (formal or informal non-profit organization), business (private sector), government (local, regional, state, or federal agency), research (research institute, academia), professional organizations, or other. We validated the organization type selected by reviewing statements on the organization's website or official organization documents. In the case of a discrepancy with self-reported responses, we used the classification on the official organization website or documents. If respondents indicated multiple organization types or if their official documents indicated that they were a public-private partnership, we recoded these organizations as hybrid—the majority being utility providers.

4. Limitations

This study provides important insights into varying resilience frames, but our non-probabilistic purposive sampling limits the generalizability of our concerning differences across cities or organization types. Qualitative research methods, such as interviews or ethnographic approaches, are needed to understand the cultural and political contexts of frames.

Additionally, although the UREx SRN survey included cities from Latin America and the Caribbean and provided an even greater mix of urban contexts to explore resilience framings, the small number of cities also precludes generalizing our findings on differences between Global North and Global South perspectives. Nevertheless, we raise key inquiries or hypotheses in our Discussion for future research to expand on the geographic and political variations of resilience framings.

5. Results

5.1. Resilience as system property, outcome, and process

Our survey data reveal that across the nine cities, the majority of survey respondents (55%) defined resilience as a system property and as an outcome (40%), and fewer (22%) as a process (Fig. 2). In some cases, responses fit into more than one category. For example, this definition from Baltimore describes a desired outcome for the city and discusses processes for how the city should be managed:

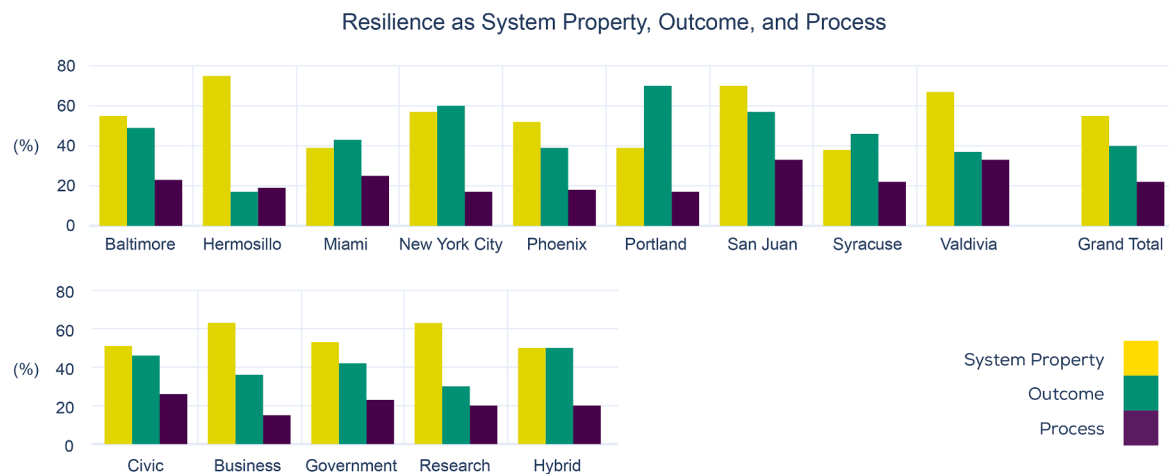


Fig. 2. Percent of responses that defined resilience as a system property, outcome, or process across the different cities (top chart) and across different governance sectors (bottom chart).

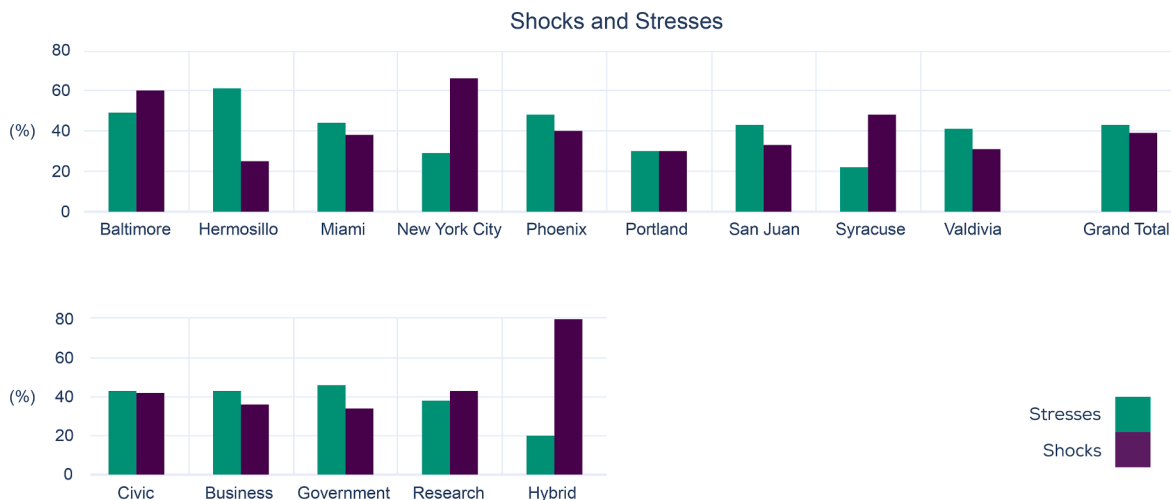


Fig. 3. Percent of responses that defined resilience with respect to shock or stress events across the different cities (top chart) and across different governance sectors (bottom chart).

“Dynamic infrastructure, communities, and individuals who are well equipped to handle whatever weather or climate event that occurs. A more integrated sharing of knowledge and a complete de-siloing of information, mitigation, and adaptation strategies, and significant (85%+) buy-in and continued engagement of communities and individuals to continually improve and maintain the resilience of all infrastructure and for all people.” (Baltimore, Government)

In five cities—Baltimore, Hermosillo, Phoenix, San Juan, and Valdivia—the system property definitions were the most common, whereas in Miami, Portland, and Syracuse, the majority were outcome-focused. In all cities, respondents were least likely to define resilience as a process (Fig. 2). The percentage of respondents that defined resilience as a property, outcome, or process differed slightly by organization type, with the business and research types aligning more closely with system property and the government and civic types aligning more with resilience as an outcome (Fig. 2).

5.2. Shocks and stresses

Both shocks (39%) and stresses (43%) were about equally present in resilience framings across all survey participants (Fig. 3) but varied by city. In particular, the two cities in the state of New York tended to

associate resilience primarily with shocks rather than stresses. Shocks were associated with 66% (NYC) and 48% (Syracuse) of responses. As an example, one NYC stakeholder framed resilience explicitly in relation to extreme events (shocks):

“The ability to bounce back after an extreme event—doing what we can to mitigate the event itself, but also be prepared for the events we can’t prevent (or reduce sufficiently)” (NYC, Government)

At the other end of the spectrum, Hermosillo actors associated resilience primarily with stressors (61%) rather than shocks (25%). They tended to refer primarily to resilience to climate change or new climate conditions rather than individual events (shocks). There were also several differences when disaggregating the responses by organization type (Fig. 3). The researchers in our survey tend to associate resilience equally with shocks (43%) and stresses (38%). In contrast, hybrid organizations tended to associate resilience with shocks (80%) rather than stresses (20%).

5.3. Pathways of change to urban resilience

Taken together, most respondents framed change in resilience in terms of coping (32%), resistance (28%), and bouncing back (22%; Fig. 4). Bouncing forward (12%) and transformation (10%) were

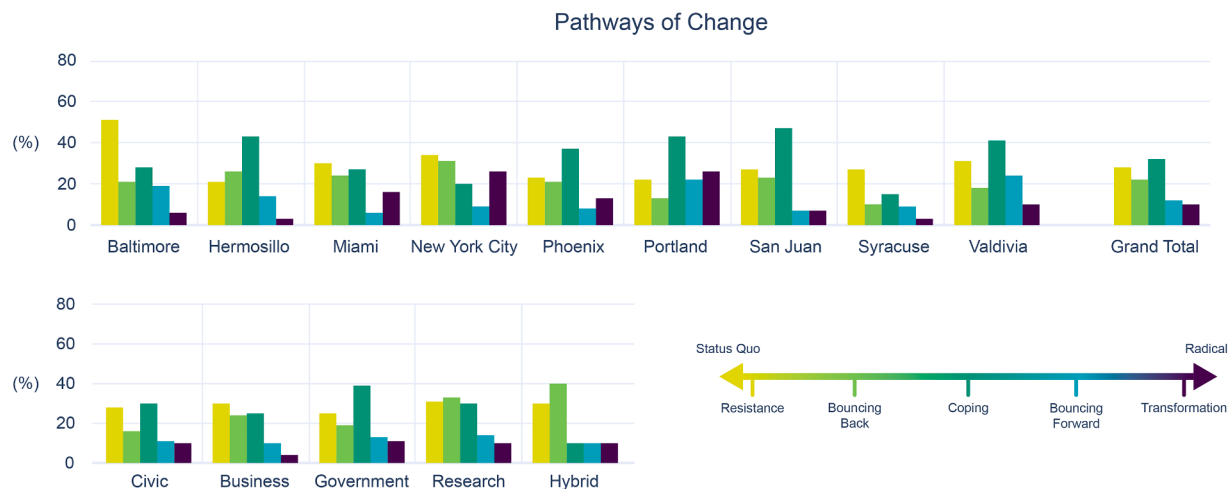


Fig. 4. Different pathways of change as framed in resilience definitions and the percent of responses that fall under each type of pathway across the different cities (top chart) and across different governance sectors (bottom chart).

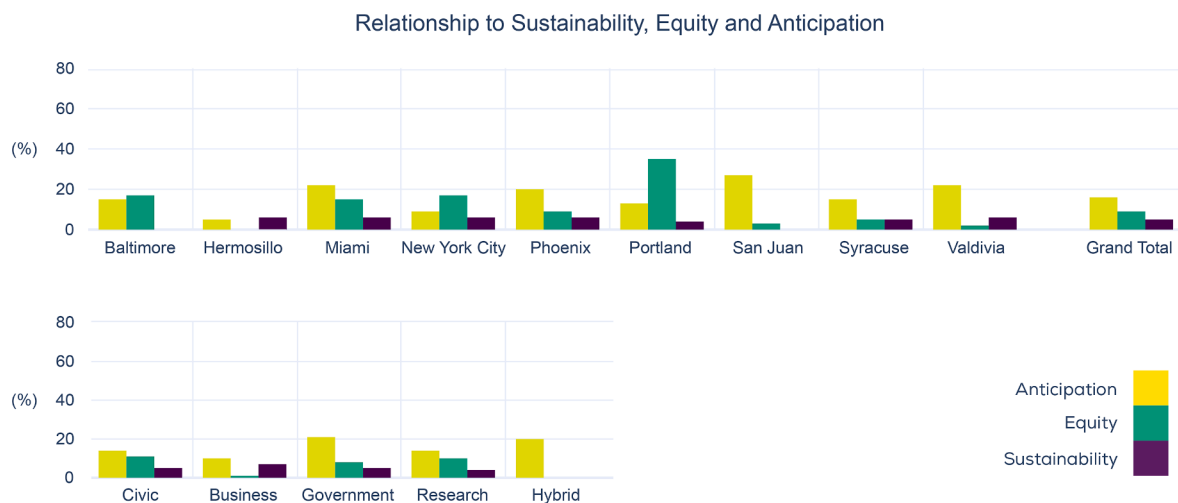


Fig. 5. Percent of responses that connect resilience to sustainability, equity, and anticipation across the different cities (top chart) and across different governance sectors (bottom chart).

mentioned the least. Responses varied across both cities and governance sectors. Baltimore respondents defined resilience as resistance more than other cities at 51%, but resistance definitions were relatively consistent across the other cities (21–34%) and organization types (25–30%). Coping was most commonly discussed among respondents from Portland and the LAC cities. Government organizations' responses were most commonly focused on coping (39%), while hybrid organizations had the fewest responses that identified coping (10%). Discussions of coping were strongly related to the capacity to adapt to change, such as a city that *"is prepared in terms of its structures and an educated population to survive these extreme events"* (San Juan, Government).

The notion of bouncing back appeared most among respondents from NYC, Hermosillo, Miami, and San Juan and least among Syracuse and Portland respondents. For hybrid and research organizations, bouncing back definitions were more common, while civic and government organizations mentioned it the least. These definitions included references to recovering previous conditions following a disturbance, for instance, as a city that is *"the ability of a city to resist an adverse climate event and return to its previous state"* (Hermosillo, NGO).

Valdivia had the highest number of responses coded as bouncing forward, and NYC was highest for transformation; Portland had a high number of responses for both bouncing forward and transformation

(Fig. 4). These two definitions were fairly consistent across organizations (10–14% and 10–11% respectively), except for the business sector, which had few transformation definitions (4%; Fig. 4). The following quote is an example of a transformation definition, describing a new system state envisioned as part of a resilient city:

"No flooding, more surface permeability, less greenhouse gas emissions, no car idling, children walk & bike safely to school, safe schools, good neighbors meaning less neighborhood violence, more help available to vulnerable: single parents, seniors, homeless, more healthy food availability, good neighborhood communication systems. Better air quality, safe drinking water, everyone knows how to cook, more community gardens." (NYC, Civic)

5.4. Long-term perspectives and anticipation

Anticipatory perspectives were marginally present across all nine cities. San Juan (27%), Valdivia (22%), Phoenix (20%), and Miami (22%) had the highest percentage of responses that included long-term perspectives in their conceptualizations of resilience (Fig. 5). This quote from Valdivia shows resilience connected to awareness and long-term thinking:



Fig. 6. a) Percent of responses that included social, ecological, or technological systems in their definitions across different cities (top chart) and across different governance sectors (bottom chart). b) The distribution of resilience framings across all cities by SETS domains.

“That [the city] understands, becomes aware, and acts according to the importance and in some cases gravity of the situation, establishing a medium and long-term perspective”. (Valdivia, Government)

Across organization types, government and hybrid organizations associated resilience most with anticipatory perspectives (21% and 20% respectively), while the business group had the fewest mentions for anticipatory perspectives (10%).

5.5. Equity concerns

Equity themes were discussed in only 9% of resilience definitions across all cities. Equity was invoked most frequently among respondents from Portland (35%), very infrequently in Valdivia (2%), and not at all in Hermosillo (Fig. 5). Across different organization types, civic organizations included equity in their conceptualizations the most (11%), followed by researchers (10%), government groups (8%), and businesses (1%). Individuals from hybrid groups did not include equity in their conceptualizations of resilience.

Consistent with Meerow et al. (2019), respondents who linked resilience to equity focused on distributional concerns, such as “reducing income inequality” (NYC, Government), and “affordable housing and inclusive economic development” (Miami, Government), and maintaining

“the resilience of all infrastructure and for all people” (Baltimore, Government). A few respondents connected distributional concerns to procedures, such as “governance, leadership, and the critical social obligations we have to each other to proactively protect, create flexible/adaptable safety institutions for the most vulnerable lives” (Phoenix, Research). One respondent from Baltimore (Government) emphasized the importance of “significant (85%) buy-in and continued engagement of communities and individuals.” Recognition was rarely explicitly discussed in resilience framings, but it was implied in some responses. For example, a respondent from Miami (Research) expressed their “concern that they will not treat the poor and vulnerable populations with respect and equality.”

5.6. Linkages between sustainability and resilience

Sustainability was minimally present in resilience framings across both cities and groups (Fig. 5). We found the concept of sustainability explicitly mentioned in only 5% of responses, with respondents in Baltimore and San Juan not mentioning the term at all. Business groups were the most likely to mention sustainability (7%), followed by civic and government actors. Additionally, definitions that included sustainability overlapped more with definitions for transformation (14%) than with bouncing forward (7%), suggesting that practitioners find more synergies for sustainability with transformation than with resilience. While few respondents seemed to immediately connect resilience with

sustainability, we acknowledge that some characteristics commonly associated with sustainability may manifest in resilience definitions, such as environmental protection and equity.

5.7. SETS perspective

We examined which of the SETS dimensions practitioners emphasized as an indication of how practitioners are bounding urban systems in their frames. Very few mentioned all three—social, ecological, and technological—aspects together (4.6%). The following quote is an example where a respondent did reference all three:

“Resilience means we are able to carry on without disruption after extreme events and even have the wherewithal to be prepared with plans that allow us to build better after extreme events that result in equitable and sustainable actions in **social, ecological and technological realms**.” (Miami, Research; emphasis added)

We found that the majority of cities and organization types in our sample bounded their urban system in terms of social resilience, rather than technological or ecological resilience. Almost half of the respondents (47%) from different organizations included social aspects in their resilience definitions (Fig. 6a). In comparison, only 24% of respondents discussed technological systems such as infrastructure or the built environment, and 18% referenced natural or ecological systems in their definition. Organizations from US cities tended to frame resilience more in social terms than those from LAC cities. Less than 30% of LAC respondents provided social resilience framings as compared to over 60% for US cities, with Syracuse being a notable exception with only 41% social resilience framings. Only about a quarter of organizations integrated two or more dimensions, and less than 5% of organizations framed resilience in terms of all three SETS dimensions (Fig. 6b). All 25 responses integrating the three SETS dimensions came from US cities; SETS resilience framings from LAC cities were notably missing.

6. Discussion

Our analysis across cities and sectors identifies varying interpretations of resilience, but the contrast is not as stark as in academic debates (discussed in section 2.1). Collectively, more responses aligned with resilience as a system property than with resilience as an outcome or process. Similarly, most respondents framed resilience with respect to both shocks and stresses. This suggests that, in practice, there is a confluence of framings and that different conceptualizations of resilience, in fact, co-exist. The coexistence of diverse frames is consistent with other studies showing that practitioners combine multiple interpretations and priorities in their resilience framings (Borie et al., 2019). Although some scholars suggest that it is precisely this malleability of the concept that makes resilience a useful boundary object that brings heterogeneous actors and agendas together (Brand & Jax, 2007), boundary objects can sometimes mask value systems, epistemologies, and development visions (Borie et al., 2019).

As such, we believe that urban resilience can be a useful boundary object to the extent that it is part of a negotiated process that unpacks these divergent framings and channels them towards constructive co-production of pathways for transformation.

6.1. Are cities moving beyond bouncing back?

When it comes to pathways of change, our analysis shows divergences in the ways that urban resilience is framed. City practitioners largely appear not to have moved beyond bouncing back and rarely think of resilience in transformative ways. This raises concern about the transformative potential of resilience framings for cities. Most respondents invoked engineering notions of resilience, with the majority of responses defining resilience in terms of resisting or withstanding

disruptions or change, or bouncing back to a previous state, as opposed to bouncing forward or transforming in the face of shocks or stresses. This alignment of respondents with bouncing back is consistent with Meerow and Stults' (2016) finding in their study of US practitioners and Walker's (2020) observation that return to the previous state is the most common misconception of the term resilience. Additionally, elements associated with transformation, including equity, anticipation, and SETS, were rarely included as part of definitions of resilience, providing another indication of an interpretation of resilience as a means for maintaining system conditions.

We do not argue that actions to resist or to bounce back have no place in resilience planning and policy for cities. Indeed, as cities experience an increase in severity and magnitude of extreme events, strategies will be needed that allow for immediate recovery and functioning of critical services following a disruptive event. In a post-disaster emergency, individuals must have the ability to protect their properties, and utilities need to be able to restart their operations quickly to restore power and water. As we have noted, however, planning based on disaster-driven responses or building specific adaptive capacities alone can result in inefficient and even maladaptive pathways in the long term (Eakin et al., 2014). Responses that ‘harden up’ through technological solutions in the short term, for example, can undermine transformations and create path dependencies that will result in greater long-term vulnerabilities. Planning for urban resilience and transformation, therefore, requires balancing these multi-scalar approaches and their trade-offs (Chelleri et al., 2015). Decision-makers will need to discriminate more systematically between strategies aimed at maintaining performance under short-term episodic shocks and policies oriented toward transformation in the face of long-term stresses (Smith & Stirling, 2010).

6.2. Enhancing the transformative potential of resilience

Across the cities and actors in our study, resilience was not commonly defined as (or used characteristics of) sustainability and transformation. This distinction supports calls to keep the terms separate (Redman, 2014; Elmqvist et al., 2019). We caution, however, that using resilience alone, as it was most commonly conceptualized in our study, will likely fall short in providing the type of large-scale radical changes in social, ecological, and technological dimensions that many cities need to overcome persistent challenges and inequalities in the face of extreme climate events. As long as cities continue making resilience a goal for policies and planning, it will be important that the concept incorporates opportunities for deliberate transformation in the face of stresses or shocks. We agree with Walker (2020) that resilience and transformation should be viewed not in opposition, but as complementary concepts, in this case to help cities navigate to a sustainable trajectory.

To provide opportunities for urban transformations, practitioners and researchers alike need to pay more attention to equity, anticipation, and SETS when they incorporate resilience concepts into city planning. We argue that the observed lack of attention to anticipatory, or long-term, thinking is a missed opportunity in urban planning. Anticipatory approaches allow communities to explore the implications of competing frames and visions of resilience, as well as the trade-offs among strategies, over extended time horizons. This opportunity is especially important when the future is open-ended and unpredictable and where ‘radical’ departures from the current system state can be conceived (Iwaniec et al., 2019). Similarly, it is critical to foreground equity in negotiations over what needs to be changed or transformed in cities to enhance resilience now or in the future (Harris et al., 2018). We find it problematic that equity concerns were only marginally present in practitioners’ frames of resilience. More work is clearly needed to explicitly address and integrate equity in resilience efforts and enhance procedural, recognition, and distributional justice.

If cities are to achieve transformation through their resilience practice, we argue that they need to re-think of cities as SETS in order to explicitly identify and address the social, ecological, and technological

dimensions that demand transformation. Just as many researchers are siloed in disciplines or departments, so, too, are practitioners in departments or bureaus. Our findings suggest that when city practitioners do make it clear that they are thinking from a systems perspective, they focus on social systems rather than technological or ecological systems. We hypothesize that this emphasis on social systems is likely to prioritize resilience assessments that are informed by social data (i.e., social indicators) as well as social strategies, capacities, and investments. This is not necessarily a problem if it leads to positive systemic social change. However, as SETS scholars have proposed, overlooking ecological or technological system domains may miss important sources of vulnerability or adaptability. Because social, ecological, and technological systems are highly interconnected and self-reinforcing, greater attention to one domain at the expense of others can result in unintended consequences at multiple system levels (Markolf et al., 2018).

6.3. Divergence in the context of Latin America and Caribbean cities

Of all the cities, we find that respondents in the LAC cities—Hermosillo, Valdivia, and San Juan—more commonly espouse a particular framing that aligns with resilience as a system property and with coping or adaptation. The words most commonly used in these cities to describe resilience (e.g., ‘enfrentar’, ‘lidar’, ‘soportar’, ‘tolerar’) relate to the ability to cope and deal with constant change and threat. The LAC cities also share the fewest mentions of sustainability and equity among all the cities surveyed. These findings, however, contrast with LAC literature that discusses resilience in terms of community resilience and is strongly influenced by social and human development fields (e.g., Menanteux-Suazo, 2015; Villagra, 2019). In addition, the cities in our sample—Valdivia, Hermosillo, and San Juan—do not have city resilience plans to provide us with insights on the origins of local conceptualizations of resilience, and it is difficult to generalize based on three cities. On the other hand, Portland and New York City have had resilience plans in place for at least five years and were the cities whose resilience frames most aligned with transformation and equity. One explanation for this could be that cities where resilience is in the public discourse and part of planning processes are more advanced in their thinking than cities that have not formalized resilience plans. If cities that have long incorporated resilience concepts into public discourse and planning are thus embracing transformative framings, perhaps more traditional thinkers will be inspired as they develop resilience plans for their cities and work through the diverse meanings of the concept.

The differences in framings we found across the cities and actors point to variations in the way resilience is conceptualized and the extent to which they incorporate elements of transformation, especially among LAC and US cities. However, more in-depth analysis is needed to establish what kinds of changes these framings promote, and to understand the specific cultural and political factors that explain the variation. Additionally, we recognize that our coding and analysis is guided by resilience conceptualizations as developed in literature stemming from Global North perspectives. As such, more empirical research across more cities is needed to understand resilience framings from a LAC perspective, and more generally, the factors shaping varying conceptualizations, uses, and support of urban resilience strategies in different contexts.

7. Conclusion

Over the last decade, resilience has rapidly emerged as a major focus of urban research and practice. As cities grapple with climate change, climate-related extreme events, and other unprecedented shocks and stresses, they often make it a goal to become more resilient. Yet, we know little about what urban resilience means to city practitioners. While conceptual diversity and tensions are fruitful to advance resilience scholarship, it is crucial that we also examine how the term is used in practice so that the plurality of ideas, expectations, and solutions

across diverse societal actors are exposed and negotiated.

This paper explores how resilience is framed in different cities in the US, Latin America, and Caribbean and by various types of actors across cities. We found that across all nine cities, resilience framings tended to converge with common engineering conceptualizations of resilience as the ability of a system to resist, cope with, or bounce back from disturbances. We caution that this framing will likely fall short in providing the type of large-scale fundamental changes that many cities need to overcome persistent challenges and inequalities in the face of extreme climate events. Ultimately, regardless of how we define urban resilience, if resilience remains a major goal for city planning into the future, it should include transformative solutions framed in a more anticipatory, systemic, and equitable way.

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Appendix A. Description of governance survey methodology

The Governance Survey is one of several assessment tools of the Urban Resilience to Extreme Events Sustainability Research Network (UREx SRN), aimed at understanding how climate resilience efforts are governed in diverse cities. Formed in 2015 with an award from the National Science Foundation, the network includes researchers and practitioners from six cities in the U.S. (Baltimore, Miami, New York, Phoenix, Portland, and Syracuse) and three cities in Latin America and the Caribbean (LAC) (Hermosillo (Mexico), San Juan (Puerto Rico), and Valdivia (Chile). The goal of the UREx SRN is to improve the resilience of cities as social-ecological-technological systems (SETS) in the face of the growing challenges that climate change poses to urban areas. The cities in the network are affected by extreme climate events, including floods, heatwaves, and droughts, and represent diverse populations, infrastructure, and climates. Each city has an interdisciplinary city team, with natural and social scientists, engineers, and city practitioners from diverse backgrounds and with experience working together to address urban sustainability and climate issues in their respective cities.

A.1. Survey design and data collection

The survey served two functions for the UREx SRN: As a planning tool for scenario development and an analytical instrument. We drew on stakeholder assessment approaches (see Prell, Hubacek, & Reed, 2009; Yang, 2014; Muñoz-Erickson & Cutts, 2016) to define our criteria for stakeholders and the sampling strategy for selecting survey respondents. We defined stakeholders as those actors (organizations or groups) with interests, responsibilities, or power over urban and climate planning and policies, and those that are most affected by (or that work for those affected) the outcomes of climate policies and actions or that are most vulnerable to climate hazards.

As an analytical instrument, we used the survey to better understand current governance contexts and diagnose the extent to which stakeholders, and their framings, knowledge, capacities, and visions, are steering governance in support of resilient, sustainable, and equitable pathways. We drew on multiple strands of sustainability science for our governance analytical framework including sustainability pathways (Leach et al., 2010), knowledge systems and co-production (Muñoz-Erickson, 2014; Miller & Wyborn, 2018), and adaptive and anticipatory

governance (Olsson et al., 2006; Boyd, Nykvist, Borgström, & Stacewicz, 2015). This analysis of existing governance conditions became a baseline for a number of research projects of the UREx SRN in addition to the scenario development. The survey consisted of a combination of open- and closed-ended questions (45 total; survey instruments can be accessed from UREx SRN, 2021) structured around the following six components of our governance analytical framework:

(1) Framings, in terms of problems and solutions to address extreme events in our cities, including flooding (coastal and urban), heat, and drought, and how resilience is conceptualized;

(2) Networks, in terms of the relationships between actors collaborating in climate resilience initiatives and producing knowledge related to climate change in the region

(3) Knowledge systems, in terms of the types or sources of knowledge that stakeholders use to learn about and evaluate risks and uncertainties related to climate change;

(4) Visions, in terms of how actors describe the very long-term future they desire for their city,

(5) Capacities, in terms of the existing adaptive and anticipatory capacities necessary to plan and prepare for the future; and,

(6) Background information about the organization, including organization type, areas of expertise, climate resilience activities that the organization works on, and the spatial and institutional scales that they work on.

We implemented the survey in nine of the project cities between February of 2017 and August of 2019. Following [Dillman's tailored design method \(1999\)](#), the lead contact from the city team first sent an email invitation with a description of the project and a link to the survey. The survey was distributed through the Survey Monkey online platform. Most city teams sent approximately four email reminders over the course of an average of six months, although some city teams also used phone reminders instead where online surveys are not a common practice; for example, in Hermosillo and San Juan. We used Spanish versions of the survey for Hermosillo, Valdivia, and San Juan (UREx SRN, 2021). For all cities, we had volunteers (e.g., students, staff, colleagues, etc.) take the survey to test and adapt the survey language to the

local vernacular of a particular city.

A.2. Sampling procedure

Following our definition and criteria for stakeholders described above, we built a list of survey recipients based on a combination of purposive sampling and the snowball method ([Etikan et al., 2016](#)). For the purposive sampling, we worked with the city teams to build an initial list of actors (organizations and groups) that met our criteria for stakeholders. We augmented this list with other lists provided by local municipal and civic organization partners. Additional organizations and groups were invited to participate through snowball sampling, provided they met the sample criteria. Some of the city teams used tools like the Stakeholder Circle methodology ([Yang, 2014](#)) as a means for the team to identify and prioritize actors to include in the list using their professional expertise, previous experiences, and existing relationships. The snowball sampling involved reviewing responses to the question on collaboration networks (*Please list up to 5 organizations or groups with which you regularly collaborate on projects or programs related to climate change in < city > . If possible, please provide the complete name of the organization or group.*) once the survey was deployed, allowing the city team to verify if our list missed any organizations/groups mentioned by survey participants. Following our snowball sampling approach, the cases of missed organizations/groups were then added to our list and a survey invitation sent. Through this iterative sampling process, we updated and rigorously validated the list with all members of the city team.

Appendix B. Resilience codebook

We developed a codebook that reflects the various definitions and tensions around the concepts of resilience and transformation in the literature. [Table B1](#) provides the code label, description, and a key reference in the resilience literature for each individual code. The full citations for the key references used to build the codebook are provided in the References section.

Table B1
Detailed descriptions of the codes used in the data analysis.

Code Label	Code Description	Source
System property	Overall focus of the statement is what the city should be able to do (e.g., ability to withstand disruption). Resilience is described as a characteristic of the system, not as a goal or process. Typically coded if it includes "capacity to" or "ability to" do something without a clear goal or vision of the city.	Moser et al. (2019)
Outcome	Overall focus of the statement is what the city should be (or what to aim at). Resilience is described as a goal or outcome. Expresses a vision or value statement of things they want to see. Outcome definitions of resilience may use some system properties.	Moser et al. (2019)
Process	Overall focus of the statement is on how the city should be managed or governed. Resilience is described as a process.	Moser et al. (2019)
Shocks	Resilience is described in the context of rapid-onset disruptions (e.g., storms, heatwaves, climate events, drought, disasters, earthquakes, etc.)	Meerow and Stults (2016)
Stresses	Resilience is described in response to chronic problems (including climate change, heat, sea-level rise, economic inequality, slow-onset disasters, etc.)	Meerow and Stults (2016)
Resistance	Resilience is described as resisting or avoiding disruptions, change, or disasters. Shocks or stressors do not affect the system(s). No impact.	Walker, Holling, Carpenter, and Kinzig (2004)
Bouncing back	Resilience is described as (the capacity for) returning to a previous or normal state following a disruption (event/disaster) or some form of stress. Returning back to the status quo.	Meerow and Stults (2016)
Bouncing forward	Resilience is described as (the capacity for) improving or positively transforming as a result of a disruption. When we go through the impact/event/disruption but come out better and thrive.	Meerow and Stults (2016)
Coping	More closely related to adaptation where some impact is felt, absorbed, accepted, but we muddle through it, survive, weather the storm, and deal with it.	Pelling (2010)
Transformation	Fundamental or radical departure of structure and function to a new system state. Social change. Thriving in a new state – not in the same state.	Pelling (2010)
Resilience of Social Systems	Resilience is described in terms of social systems, such as equity, affordability, rules and regulations, economic and financial systems, governance, values, behavior and decision-making, education and communication, employment and recreation, public health, community cohesion, culture.	Adger (2000)
Resilience of Ecological Systems	Resilience is described in terms of ecological systems, such as air, water, or soil quality, ecosystem health, natural resources, biodiversity, stable weather/climate, wildlife habitat, ecological or ecosystem services, land use practices.	Holling (1973)

(continued on next page)

Table B1 (continued)

Code Label	Code Description	Source
Resilience of Technological Systems	Resilience is described in terms of technological systems, such as water, transportation, energy infrastructure or systems, buildings, industrial systems, cyber systems, ICT systems.	Markolf et al. (2018)
Sustainability	Specifically mentions sustainability or sustainable systems, sustainable development.	Redman (2014)
Equity	Resilience described in terms of fairness, justice, equitable access, distribution, processes, affordability of services so everyone can access them.	Meerow et al. (2019)
Anticipatory	Actors are conscious of climate change and its effects. Aware of challenges and opportunities to address climate change effects. Using or integrating information about future conditions and alternatives in planning and decision-making. Critical examination of 'who wins', 'who loses', and 'who is represented' from processes and actions. Long-term thinking, embracing the unknown, and acting without complete knowledge.	Quay (2010)

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