



Size does matter: City scale and the asymmetries of climate change adaptation in three coastal towns



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ABSTRACT

Globally, it is smaller urban settlements that are growing most rapidly, are most constrained in terms of adaptive capacity but increasingly looked to for delivering local urban resilience. Data from three smaller coastal cities and their wider regional governance systems in Florida, US; West Sussex, UK and São Paulo, Brazil are used to compare the influence of scale and sector on city adaptive capacity. These tensions are described through the lens of the Adaptive Capacity Index (ACI) approach. The ACI is built from structuration theory and presents an alternative to social-ecological systems framing of analysis on adaptation. Structuration articulates the interaction of agency and structure and the intervening role played by institutions on information flow, in shaping adaptive capacity and outcomes. The ACI approach reveals inequalities in adaptive capacity to be greater across scale than across government, private and civil society sector capacity in each study area. This has implications for adaptation research both by reinforcing the importance of scale and demonstrating the utility of structuration theory as a framework for understanding the social dynamics underpinning adaptive capacity; and policy relevance, in particular considering the redistribution of decision-making power across scale and/or compensatory mechanisms, especially for lower scale actors, who increasingly carry the costs for enacting resilience planning in cities.

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1. Introduction

If equity is a consideration of climate change adaptation policy, then investing to enhance adaptive capacity requires approaches that can measure and diagnose its unequal distribution (Ziervogel et al., 2017). The Adaptive Capacity Index (ACI) has been developed to provide a theoretically grounded measurement tool and coupled analytical framework that can help practitioners and researchers surface the negotiated pathways through which adaptive capacity accrues and is deployed within administrative regimes. The tool can be deployed to explore differences between parts of an organisation, between organisations in a community of practice and between sectors in an administrative regime. Analysis presented in this paper works through the tension

between administrative scale and the informal relations of this shadow system that work across scale to reproduce uneven speed and level of adaptation.

Small and medium sized cities, with between 300,000–500,000 and 500,000–5 million population (Birkmann et al., 2016) are home to most of the world's vulnerable urban populations and yet have received less research and policy attention than large and mega cities (Wisner et al., 2015). This is a result of limited data, political power, personnel, and resources (Birkmann et al., 2016). Overcoming the disproportionate risk faced by smaller cities is argued to require approaches that can strengthen local organisational and institutional as well as physical and engineering structures – local governance as well as sea walls (Birkmann et al., 2014).

Scale clearly impacts of adaptive capacity and action observed through city size. Within climate change adaptation scholarship and planning, scale is also becoming recognised as a principle

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characteristic that shapes resilience (Sage et al., 2015) disaster losses (Marks and Lebel, 2016) and the governance of disaster risk (Blackburn, 2014). Prevailing critiques present decentralisation, localism and resilience as incomplete governance projects where the shifting of responsibility from central towards local actors has not been accompanied by adequate human or financial resource. Associated with broader critiques of neoliberal state restructuring (Wakefield and Braun, 2014), control is retained in the centre while responsibility is pushed down and out to the local (Coaffee, 2013). Moore (2008) calls for work to move beyond describing to explaining the existence and operation of scalar relations. While accepting these as scaled processes with implications for the distribution of administrative and bureaucratic authority the ACI approach is interested also in reflecting the power organisations and individuals have to work across scales and potentially to flatten scale (Marston et al., 2005) as alliances are brokered to achieve or block adaptation.

Responding to the desire for an indicator framework that can respect both the scaled fixity of administrative systems and the flattening effects of socially constructed and relational interactions between actors we draw from Giddens's structuration theory (1984) and work on shadow systems (Pelling et al., 2008). This allows the index framework to respect the social drivers of adaptive capacity in nested governance contexts. In this case – smaller towns. Here local organisational agency is constrained by higher levels of administrative authority, and both are mediated by informal and formal institutions. The paper presents the Adaptive Capacity Index (ACI) approach and draws out an actor centred analysis of the formation of adaptive capacity in three liberal(ising) administrative hierarchies: Broward County, Florida, USA; Selsey, West Sussex, UK; Santos, Sao Paulo State, Brazil. Broward County and Santos were defined as medium sized settlements while Selsey represented a small urban settlement (Birkmann et al., 2016).

Elsewhere, structuration theory has been deployed to successfully analyse the relationality and power flows between actors and structures in constraining (Pelling and Manuel-Navarrete, 2011) and building (Arnall, 2015) adaptive capacity and resilience. By emphasising asymmetric interactions between actors and their constraining social structures, a structuration lens helps to move beyond the limits of social ecological systems thinking which has tended to steer adaptation research towards an interest in efficiency rather than equity (Taylor, 2015; Brown, 2016). Structuration in this way allows a fixed notion of administrative scale (Hoogesteger and Verzijl, 2015) while recognising the role of relational actions in the performance and practice of scale – through the administration of law, mandate, and budgets.

The ACI (Pelling and Zaidi, 2013) has three components: (1) the index – a quantitative expression of adaptive capacity; (2) qualitative policy review, and (3) an interactive learning tool – respondents can use the conversation through which the tool is delivered to reflect on current practice, goals and procedures. These components are complementary, combining the communicative power of a quantitative index with the more nuanced analytical possibilities of policy analysis and an opportunity for participants to reflect on personal and organisational capacity for change. This paper presents the conceptual and methodological frameworks of the ACI before discussing empirical results and conclusions for building adaptive capacity in small and medium sized cities.

2. Urban scale and adaptive capacity

2.1. Scaled adaptation

To help overcome challenges and barriers to adaptation at a sub-national level, a variety of networks including C40 Cities

Climate Leadership Group, Rockefeller 100 Resilient Cities, the Compact of Mayors, and the Regional Learning Network-Latin America have been established. While these networks have been shown to provide opportunities for social learning, knowledge transfer and policy innovation, recent research demonstrates that they are limited as most cities, especially the majority – smaller – cities, lack the institutional architecture (Krellenberg et al., 2014) or resources (Shi et al., 2016; Preston et al., 2010) to participate (Bulkeley, 2010). In this light, the most relevant entry point for work on urban adaptation is that of smaller towns where decision making power is often limited, resources of all types are either restricted or restrictive and yet where expectations and responsibilities for building adaptive capacity to enhance resilience are rapidly increasing (Revi et al., 2014).

There are numerous structural barriers that local authorities face when attempting to mainstream adaptation (Moser and Ekstrom, 2010; Picketts et al., 2014). These encompass events beyond the reach of smaller cities to influence, but that impact greatly on resource levels and governance practices at the sub-national level, such as national policy responses to the global economic downturn of 2008. Economic logics of efficiency or austerity administrative and policy mandates can preference larger cities with greater concentrations of economic and human assets and higher political visibility, effectively isolating smaller and satellite settlements from the policy mainstream (Bentley and Pugalis, 2013; Davies and Pill, 2012). This results in perceptions of abandonment and increased burden at the local level. Policy isolation is compounded for many local governments that also need to respond to the devolved mandate of adaptation which has moved from central to local government responsibility under agendas of localism, decentralisation or self-reliance (Measham et al., 2011; Baker et al., 2012). This movement is often without concomitant transfer of financial or human resource (Gupta et al., 2007; Eakin and Lemos, 2006) and often forces local authorities to examine the trade-offs with other capacities, imperatives, and initiatives that also fall within their mandates such as education, health and social welfare. These trade-offs can not only result in serious justice implications for especially for vulnerable populations, but are often made with incomplete access to data or decision support mechanisms.

In response to these challenges, the production of local level capacity can be seen as a necessary outcome of the lack of support of, and/or lack of capacity within, higher order agencies and institutions. Local capacity reacts to changes in the policy and organisational architecture in which local actors must operate (Dovers and Hezri, 2010). This reactive state in turn establishes the need to assess adaptive capacity as a status that continuously evolves as it devolves across scale. This opens questions on the extent to which organised local action can feedback on higher levels of governance. Analytically, connection points – institutions and practices as well as organisational forms, and asymmetries in power acting across scale in negotiating responsibility for and deployment of adaptive capacity, become important.

2.2. Adaptation as structuration: the interplay of social structure, agency and intervening institutions

Adaptive capacity is a relational property determined by the complex inter-play of multiple scaled variables (Vincent, 2007). The adaptive capacity of collective social systems, such as organisations, depends on their ability to act in common purpose in the face of multiple threats (Smit and Wandel, 2006; Young, 2010). In this understanding, adaptive capacity is determined by the interplay of social structures such as organisational form and function, with the agency of individuals or sub-groups of the social system of interest. Structure and agency coproduce each other

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