Cities 63 (2017) 58–69

Contents lists available at ScienceDirect

Cities

journal homepage: www.elsevier.com/locate/cities

Preparing for disruptions: A diagnostic strategic planning intervention for sustainable development

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ARTICLE INFO

Article history:
Received 13 May 2016
Received in revised form 8 November 2016
Accepted 24 December 2016
Available online xxxx

Keywords:
Strategic planning
Sustainable development
Diagnostic
Urban water
Water sensitive city
Fishermans bend

ABSTRACT

Despite the emphasis on sustainable development in some of the contemporary planning and policy rhetoric, we face an implementation deficit in practice. The impediments to the widespread adoption and successful implementation of sustainable infrastructure in cities' critical sectors—such as water, energy or transport—are varied and complex. Although the scholarship has made some attempts to understand and categorize those impediments, not much has been said about *how* to identify them in a specific practical context. This study proposes a model for a diagnostic intervention in the ongoing process of strategic infrastructure planning, as a way of revealing context-specific impediments. The diagnostic intervention incorporates an explicit and reflexive consideration of short-term barriers and long-term disruptors into the strategic planning process, and assists with drafting the required coping strategies. The intervention has been tested in water infrastructure planning for one of the world's largest urban renewal areas in Melbourne, Australia. This trial application provided promising outcomes for addressing the implementation deficit of sustainable development: it created a platform for various stakeholder groups to engage in explicit discussions on their confronted problems, which often have trans-organizational causes and impacts; it enabled reflexivity within the ongoing planning process; and, it helped to consider a large portfolio of future uncertainties to provide an enabling condition for more robust decisions to be made. Moreover, the trialed intervention provided empirical evidence in support of the scholarly discourse which contends that sustainable infrastructure delivery is not only about the development of technical solutions, but is also about the development of processes and tools that support the widespread adoption and successful implementation of those solutions in the face of wide-ranging impediments.

1. Introduction

Almost three decades after the rise of sustainable development as a grand vision, we are facing an implementation deficit in practice (Holden, Linnerud, & Banister, 2014; Newton, 2012).Worldwide, in critical sectors such as water, energy and transport, investments in conventional infrastructure predominate, and the adoption of sustainable alternatives often remains too slow (Negro, Alkemade, & Hekkert, 2012; Rijke, Farrelly, Brown, & Zevenbergen, 2013; Walsh, Glendinning, Castán-Broto, Dewberry, & Powell, 2015).

Scholars agree that the shift in infrastructure delivery in today's cities toward sustainable solutions would be a radical change (Pickett et al., 2013; Truffer, Störmer, Maurer, & Ruef, 2010), requiring cumulative capacities built into strategic planning processes. Currently, a range of impediments across different sectoral and geographic contexts tend to delay, divert or stop the desired transformation (Brown & Farrelly, 2009; Negro et al., 2012). Strategic planning literature often refer to those impediments as *barriers* (e.g. Ferguson, Brown, & Deletic, 2013; Hunt & Rogers, 2005). Innovation literature refer to them as *systemic problems* (e.g. Wieczorek & Hekkert, 2012) or *systemic failures* (e.g. Klein Woolthuis, Lankhuizen, & Gilsing, 2005). They include a range of political, economic, social, institutional and technological issues, such as: lack of political will, insufficient capital resources, limited community engagement, fragmented institutional frameworks and technological failures (Brown & Farrelly, 2009; Klein Woolthuis et al., 2005).

While there have been some academic attempts to categorize the impediments to the adoption and successful implementation of sustainable infrastructure solutions, not much has been said about *how* to identify them systematically in a practical context (Wieczorek & Hekkert,

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http://dx.doi.org/10.1016/j.cities.2016.12.016
0264-2751/

2012). More importantly, it is not well understood how strategic planning methodologies can incorporate an explicit consideration of those impediments, and assist planners and decision makers in designing the required resolution strategies.

To address the implementation deficit of sustainable development, however, such an understanding is crucial. As Voß and his colleagues argue, in steering for sustainable development universal solutions may not work; instead, we need to be able to identify and deal with particular problems within their concrete empirical contexts (Voß, Newig, Kastens, Monstadt, & Nölting, 2007). Similarly, other scholars warn against generalized solutions or blueprint approaches and emphasize the need for diagnostic analyses in dealing with complex problems (Edquist, 2011; Moser & Ekstrom, 2010; Ostrom, 2007). Malekpour and colleagues highlight this with specific reference to planning, and call for the development of diagnostic approaches that help with the systemic and empirical identification of problems and barriers as part of the strategic planning process (Malekpour, Brown, & de Haan, 2015).

Against this backdrop, this paper puts forward a model for a planning intervention to assist the systemic diagnosis of impediments to sustainable infrastructure delivery within their practical contexts. Broadly speaking, strategic infrastructure planning in the context of sustainable development starts with developing a vision, followed by designing strategic pathways/options to achieve the vision (Ferguson, Frantzeskaki, & Brown, 2013). Our diagnostic intervention targets those strategic planning and decision-making processes that have already envisioned and intended sustainability, to be achieved through innovative infrastructure options. The intervention would then assist planners and decision makers to explicitly and reflexively identify a range of challenges and barriers to realizing the vision and strategic options as part of the strategic planning process. It also helps with drafting coping strategies, in order to remove, circumvent or ameliorate the identified impediments.

The diagnostic intervention we propose may be considered as a member of a broader family of approaches that deal with high uncertainties in long-term planning and aim at increasing the robustness of planning decisions in the face of future challenges. Examples include Assumption-Based Planning (Dewar, Builder, Hix, & Levin, 1993), Robust Decision Making (Lempert, Popper, & Bankes, 2003) and Adaptive Policymaking (Walker, Rahman, & Cave, 2001). However, what we propose is not a grand planning framework or methodology. It is indeed an intervention that aims at capacity building within the ongoing processes of strategic planning for more robust outcomes toward realizing sustainable development.

The paper also reports on the trial application of the proposed intervention in water infrastructure planning for one of the world's largest urban renewal areas (approx. 500 ha) located in Melbourne, Australia. This empirical application provides insights into the details of the implementation challenge, as well as a potential roadmap, for delivering a *Water Sensitive City*—a vision that encapsulates sustainable, liveable and resilient urban water systems. The methodological approach and the insights derived from the trial application are relevant and potentially useful for both academic scholars and practitioners who aim to achieve sustainable development in infrastructure sectors.

2. Conceptual underpinnings of the planning intervention

Infrastructure planning in industrialized countries is often undertaken at multiple scales and levels across national, state and local governments; bureaucratic planning bodies; and water, energy, transport or communication utilities (Furlong, De Silva, Guthrie, & Considine, 2016). Infrastructure planning frameworks are often used to guide the process and provide the required steps for identifying infrastructure solutions. Most existing frameworks vary both within and across nations. However, at the strategic planning level, they often share a number of fundamental steps (Furlong et al., 2016). These include: setting the vision or goal, identifying infrastructure options, evaluating the options, and selecting the options.

There is widespread agreement that conventional approaches to option identification and evaluation are not suited to deliver sustainable infrastructure outcomes (Lienert, Schnetzer, & Ingold, 2013; Malekpour et al., 2015; Truffer et al., 2010; Wright, 1996). Conventional approaches have been underpinned by the rationality paradigm and dominated by a linear optimization thinking (Alexander, 1984; Voß, Smith, & Grin, 2009). The rational model prescribes systematic identification and evaluation of alternative solutions and selection of the one with the best expected/optimal outcomes (Alexander, 1984). The optimal outcomes are typically based on the assumption of the most likely future, or a narrowly defined set of future conditions (Walker, Haasnoot, & Kwakkel, 2013). Such mainstream practices often rigidly and restrictively quantify or objectify strategic infrastructure planning into a set of 'tick boxes' and normative requirements—for the sake of efficiency—thus constraining innovation and exploratory thinking among planners (Leach et al., 2015). Narrowing down on uncertainties and complexities may even be favored by planners and decision makers (Enserink, Kwakkel, & Veenman, 2013; Mulvihill & Kramkowski, 2010), who often lack sufficient time, resources, information and enabling tools to handle the highly dynamic sociotechnical environments surrounding infrastructure decisions (Störmer et al., 2009).

Long-term planning in the context of sustainable development, however, involves redirecting the trajectories of development, introducing new structures and practices and nurturing innovative solutions (Voß et al., 2009). It deals with uncharted pathways that unravel over time as they propagate into the future. Effective outcomes result from the interplay of diverse political, economic, social, institutional and technological factors (Voß et al., 2007). Such a complex planning endeavor cannot proceed with predictive approaches, linear analyses and mechanical steering. Instead, it would require a great deal of exploration, reflexivity, learning and adaptability (Mulvihill & Kramkowski, 2010; Steurer & Martinuzzi, 2005; Walker et al., 2013).

As uncertainties, complexities and interdependencies within urban environments increase, and as the impacts of urban infrastructure extend beyond their immediate temporal and spatial boundaries, the role of planners need to expand (Rogers et al., 2014) to include—among other things—an exploratory analysis of various infrastructure solutions under a range of short-term and long-term circumstances. Multivariability and unpredictability of planning outcomes in the context of sustainable development imply that the search for robust solutions needs to replace the traditional quest for optimal solutions (Rogers, Lombardi, Leach, & Cooper, 2012). Indeed Walker and his colleagues argue that a sustainable plan is not only a plan that fulfills certain economic, environmental and social criteria, but is also a plan that is robust against changing circumstances (Walker et al., 2013).

The journey toward sustainability is a long-term journey, involving high levels of uncertainties (Mulvihill & Kramkowski, 2010). There are examples of infrastructure strategies perceived as sustainable and endorsed by decision makers, which were later derailed due to changing conditions (e.g. change of government or economic downturn) or unintended consequences, ending up with unsustainable investments in practice (see Hurlimann & Dolnicar, 2010; Victorian Auditor-General, 2008). This implies that, not only the present/short-term impediments to the adoption of sustainable infrastructure strategies need to be identified and dealt with, a more proactive orientation toward anticipating future disruptions is also required. This thinking will need to diffuse among a whole range of actors involved in infrastructure planning, including engineers, architects, regulators, developers, and politicians.

To prepare for future disruptions resulting from severe uncertainties, Goodwin and Wright suggest that planning processes need to i): provide conditions to challenge planners' thinking and improve anticipation, ii): assist with designing protection strategies against undesired circumstances (Goodwin & Wright, 2010).