

**UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER** 

WestminsterResearch

<http://www.westminster.ac.uk/westminsterresearch>

Prospects for Standardising Sustainable Urban Development

Joss, S. and Rydin, Y.

This is an accepted manuscript of a book chapter published by Routledge in the Routledge Handbook of Sustainability Indicators, available online:

<http://www.routledge.com/9781138674769>

The WestminsterResearch online digital archive at the University of Westminster aims to make the research output of the University available to a wider audience. Copyright and Moral Rights remain with the authors and/or copyright owners.

Whilst further distribution of specific materials from within this archive is forbidden, you may freely distribute the URL of WestminsterResearch: (<http://westminsterresearch.wmin.ac.uk/>).

In case of abuse or copyright appearing without permission e-mail repository@westminster.ac.uk

Prospects for Standardising Sustainable Urban Development

Simon Joss and Yvonne Rydin

Abstract

This paper goes beyond the well-established debate over how urban sustainability indicator sets should be constructed, and what purposes such indicators might serve, to examine what has actually happened as theory has turned into widespread practice. This involves two levels of analysis. First, there is consideration of how impacts on the ground involve negotiation between shifting networks of heterogeneous actors in particular local settings. Specific examples are given of how the outcomes of adopting sustainable indicator sets are indeterminate until these detailed local circumstances are considered. Second, there is a survey of the available urban sustainability frameworks at the global level, emphasising their sheer variety. Such frameworks are shaped by the proposer's particular agendas and by expectations of their adopter's needs. The field of frameworks is therefore constituted by emergent co-production both at the level of concrete results and of the frameworks themselves. At both levels, real-world innovation is enabled and constrained by divergent systems of motivations; it does not flow in a linear fashion from abstract principles of urban sustainability, however these may be defined. This emphasises the need for ongoing critical evaluation of the practices surrounding the adoption and mobilisation of these frameworks.

Introduction

The 'New Urban Agenda', adopted at the landmark UN-Habitat III conference in 2016, not only reaffirmed urbanisation as a key policy issue at the highest international level, but also underlined the continuing – indeed growing – reliance on indicators, standards and similar tools for implementing urban policy and guiding practice on the ground (UN-Habitat 2016). The adoption of the Sustainable Development Goal 11 (short, SDG11), with its headline definition of 'mak[ing] cities inclusive, safe, resilient and sustainable' (UN Development Program 2016), is significant both in that cities have for the first time been afforded their own category in the official set of UN development goals and that, consequently, the 'New Urban Agenda' has come to be defined through a collection of specific targets and indicator metrics. This rightly draws critical attention to the expanding role of indicators in contemporary urban policy and planning. Apart from prompting empirical questions about how the translation of high-level targets and standardised indicators into variegated local contexts works and what new governance processes and practices result from this, the 'New Urban Agenda' also raises more normative questions about the city as a measurable entity. The observation that SDG11 renders cities a 'development tool' (Biron and Scruggs 2015) reflects a wider trend to conceptualise 'the urban' in terms of assessment techniques, control measures and operating systems (Joss 2015). For Caprotti *et al.* (2017: 2), the 'New Urban Agenda' thus reinforces 'the increasing focus on the city as a "measurable" entity, reducible to data streams and controllable through a range of new technologies', which risks producing a reductionist urban agenda with the potential to privilege some discourses and practices while sidelining others.

Beyond a narrow technical – and already well-established – discussion of how urban sustainability indicators should be constructed (e.g. Bell & Morse 2008; Munier 2011; Pinter *et al.* 2012; Boyko *et*

al. 2012), there is then a wider need to consider how these are deployed, and for what purpose, by various practice communities. This highlights the significance of indicators, standards and related frameworks as governance tools: they variously act as interventions in governing processes for urban sustainability (e.g. Rydin, 2007; Elgert & Krueger 2012; Joss *et al.* 2012; Lehtonen 2015; Elgert 2016; Lehtonen *et al.* 2016). As such, consideration needs to be given to how the application of indicators and standards on the ground involves complex mechanisms of knowledge co-production, collaborative planning, assessment and networking among heterogeneous actors. This also focuses attention on how indicators and standards as governing process relate to, and impact on, particular spatial settings. Furthermore, beyond the local contexts of application, consideration needs to be given to the growing number of diverse organisations driving the design and promotion of urban indicator sets and standards. This reveals differing motivations for, and approaches to, sustainable urban development which, in turn, helps explain the sheer variety of frameworks currently on offer. It also highlights that, while the application of urban sustainability indicators and standards necessarily has to be analysed within particular local settings, at the same time it requires attention to wider governance dynamics resulting from the intervention of external actors and the fashion for cross-comparative 'best practice' performance assessment and benchmarking.

Altogether, these aspects not least also prompt close consideration of the diverse users of these frameworks: from those creating the frameworks in the first place to those adopting them for specific practice purposes, and in between those variously engaged in a mediating and translating role. Here, not only is it key to understanding the particular motivations driving individual actors, but also paying attention to how (well) actors' diverse roles, interests and motivations align and interact around particular framework applications and how, in turn, this shapes and produces urban sustainability practices.

Building on these governance perspectives, this chapter seeks to appraise the emergent theory and practice of urban sustainability frameworks in the following four parts: first, definitional groundwork is laid by outlining key characteristics of frameworks. Second, a global overview is given of the variety of frameworks and standards having emerged in recent years, with particular focus on their different emphasis on governance functions. Third, an analysis is provided of the kinds of issues that can be expected to emerge when frameworks are applied in particular local practice contexts. From this, fourth, some recommendations are offered about the prospects for standardising sustainable urban development. The following discussion is informed *inter alia* by comparative research conducted as part of the Leverhulme Trust-funded International Network *Tomorrow's City Today* (see Joss *et al.*, 2015) and more recent work on city standards.

Key dimensions of urban sustainability frameworks

The term 'urban sustainability framework' is used here as an analytical category, to consider and compare a variety of approaches to standardising the design, assessment and implementation of sustainable urban development initiatives. While the overall picture of emergent policy and practice is one of plurality and diversity, nevertheless some common features are apparent: in particular, frameworks are defined by the interaction of four key dimensions.

First, these replicable frameworks each combine multiple urban sustainability aspects and criteria; as such, they differ from the more conventional approach to defining single indicators in a more fragmentary manner. By bundling together a spectrum of urban sustainability dimensions and related indicators, these frameworks seek to interconnect individual dimensions, thereby prompting a more cohesive approach to sustainable urban development. This emphasis on the integrative relationship of multiple indicators, and thus on a 'whole-system' approach to sustainable urbanism, in itself underscores governance as a core aspect of frameworks. It should also be noted, however, that in some instances frameworks rather mechanistically present long lists of indicators (predictably grouped into 'environmental', 'economic' and 'social' sustainability categories) without much information on their symbiotic interdependence and combined practice applicability. This is countered by some frameworks that innovatively articulate the mutually reinforcing relationship between multiple indicator groups. The *Community Capital Tool* (Roseland 2012) and *One Planet Living Framework* (Bioregional ud) are examples of the latter; they each reach beyond the basic triple bottom-line approach to sustainability by, for example, emphasising the linkage between economic development and social equity and the close interrelationship between environmental resource consumption and urban form. It is also worth noting that, reflecting varying underlying conceptual assumptions or organisational purposes, there can be considerable differences in thematic weight: some frameworks – such as the *Climate Positive Development Program* with its focus on carbon neutral urban development (C40 Cities ud) or the *City Biodiversity Index* with its emphasis on urban biodiversity (National Parks Board ud; Chan *et al.* 2014) – include a more focused set of indicators, while others opt for a more all-encompassing range.

The second dimension concerns the inclusion of various process criteria aimed at guiding the design, planning, implementation, and evaluation of urban sustainability initiatives. This may work at two levels: frameworks typically include a set of governance-themed indicators – a unique feature – alongside various environmental, economic and social criteria. For example, the aforementioned *City Biodiversity Index* features nine (out of 23) indicators relating to governance and management. Moreover, frameworks frequently offer step-by-step guidance on how to implement sustainability initiatives. The *Climate Positive Development Program* includes a multi-stage engagement process, which entails collaborative planning followed by implementation and periodic evaluation, and eventually leading to certification where a programme has been successfully accomplished. *Eco² Cities* (World Bank 2010; Suzuki *et al.* 2010) is another example of a framework which places great emphasis on the process aspect of sustainable development (arguably more so than on specific indicator content), thereby allowing for the alignment of high-level goals and local engagement with a strong social learning element. This process dimension again highlights the often close interrelationship at work between framework proposer and adopter.

The third dimension relates to the spatial configuration which the framework articulates and seeks to affect. Some frameworks are tailored towards well delineated spatial arrangements; for example, the *Climate Positive Development Program* exclusively deals with urban infill developments at neighbourhood level. While this serves to ringfence a given urban sustainability initiative, in practice it nevertheless often requires complex boundary work with the surrounding wider areas (Joss 2015: 222-227). In contrast, other frameworks are defined flexibly for multi-scalar adaptation. The *One Planet Living Framework*, for example, comes in several versions for use at community, city and city-regional levels; and it has even been adapted for use by businesses across different sites (Joss 2015: 227-231).

This dimensions underscores the frameworks' potential for aligning governance approaches with particular spatial configurations.

Finally, the fourth key dimension is the project-nature at the heart of frameworks. By adopting a framework for use in a particular practice context, urban sustainability initiatives become defined as distinct projects. This typically entails sequential development phases (vision-making, design, planning, implementation, evaluation etc.) and tailor-made organisational structures and management processes. This reflects a wider trend of 'projectification' in urban development (e.g. Book *et al.* 2010; Joss 2011), one which is particularly common in the context of public-private partnerships and has been associated with the corporatisation of urban development practices (and as such is often subject to a neoliberal critique). Positively, a project approach can contribute to improved governance capacity by assembling diverse policy priorities and heterogeneous actors around programmatically structured, spatially delineated sustainability initiatives. At the same time, such an approach has its own risks of creating new boundary problems and unintentionally decontextualizing sustainable development from its wider urban context, thus causing novel governance challenges of its own (Joss 2015: 163-201).

Global trends

International interest in the prospect for standardising and replicating sustainable urban development is a relatively recent phenomenon. One global survey, conducted in 2013, counted over 40 diverse frameworks which, with a few exceptions, have all emerged since the millennium and mostly within the last decade (Joss *et al.* 2015). (For comparison, a similar survey identified over fifty urban sustainability rating tools; see Criterion Planners 2014.) This development mirrors the more general trend of growing interest in sustainable urbanism as a topic of research, policy and practice (de Jong *et al.* 2015).

Some of the diversity among current urban sustainability frameworks is apparent from the range of organisations – from international organisations to local government networks, and from professional bodies to social enterprises – involved in their promotion. Notably, international or national agencies only account for a minority of framework promoters (though their reach and influence may be great). In contrast, there is a striking preponderance of professional bodies and non-governmental organisations. Frameworks promoted by professional bodies have in many cases evolved out of standards designed for individual (green) buildings and, therefore, tend to have a relatively technical character, with prescriptive procedures and fixed assessment rationale. On their part, frameworks proposed by social enterprises tend to be defined more obviously by the particular organisational mission – for example, espousing a strong community agenda – and they frequently involve the social enterprises as co-producers of knowledge and practices in close collaboration with local adopters. Altogether, the large proportion of non-governmental organisations of one kind or another, featuring alongside international and national agencies, suggests a burgeoning competitive market for urban sustainability frameworks and prompts attention to the different governance arrangements at work.

From this global picture, four main clusters of frameworks can be identified according to their dominant governance modalities, as follows (for details of the underlying methodology and results, see Joss *et al.* 2015). Representative examples for each are listed in Table 1:

<Table 26.1 HERE>

'Performance assessment' frameworks

The prominence of this type of framework is perhaps unsurprising, since conventionally indicators have been defined mainly quantitatively for the purpose of calculations and testing. Hence, frameworks here entail the measurement of the sustainability of particular places and developments using set criteria, with a view to tracking progress over time and/or enabling comparisons with other initiatives. Such assessment, then, often serve the purpose of allowing cities to benchmark themselves competitively against others, thereby providing a knowledge base for policy-making. The *City Biodiversity Index*, which was initiated in 2008 by the government of Singapore (hence, also *Singapore Index*) and subsequently endorsed by the UN Convention of Biological Diversity, provides a typical example of this type of framework. It is a tool designed for cities to assess and monitor progress on biodiversity conservation over time. It stipulates a methodology for each participating city to assess itself on 23 categories and related indicators, with scores reported alongside a contextual 'city profile' including information such as the city's size, population, and natural features. Apart from its use by Singapore itself, the framework has to date been adopted by over 70 cities around the world and has been used to draw up the scoring criteria for the European Capitals of Biodiversity award scheme.

The *Green City Index* (Siemens 2012) is an example of a industry-based performance assessment framework aimed at facilitating cross-city comparison. The indicator set varies for each global region, to reflect differing conditions and data availability, but typically includes approximately 30 variables across nine thematic categories (CO₂ emissions, energy, land use, environmental governance etc.). Around half the indicators are quantitative; the others require qualitative assessments of policies. To date, using this framework, Siemens has accumulated data for over 120 large cities across five continents; and building on this, the company has developed the *City Performance Tool*, which allows cities to simulate and model the likely environmental and economic impacts of introducing new technologies.

The focus on assessment in this category highlights the importance of auditing, measurement and benchmarking as a means of capturing, verifying and, thus, improving sustainability performance. This function relates to assessment both internally within a municipal governance setting, and externally between cities for the purpose of comparison and competitive benchmarking.

'Certification' frameworks

This second cluster also typically features performance assessment, but this is geared towards certification or endorsement (see also Turcu, this volume, **TK**). Certification schemes normally involve a membership-based multi-stage accreditation process, typically against some fee payment. They can be adopted at the building scale but increasingly also for new city neighbourhoods (Sullivan *et al.* 2014). They appeal to developers and utility companies since the formal accreditation process may assist both in securing third-party investment and in marketing the development with a sustainability 'kitemark'. In this sense, they respond to the needs of actors seeking to promote urban developments or cities

externally. As one might expect, these schemes are mainly championed by professional bodies (e.g. green building councils) and social enterprises, and less so by international government agencies or local authorities. A prominent example in this cluster is *LEED ND* ('Neighbourhood Development'), which was launched in 2010 by the US Green Building Council (undated). Alongside *BREEAM Communities*, which was introduced by BRE (formerly Building Research Establishment) in 2008 and re-launched in 2012 (BRE Global, 2013), *LEED ND* illustrates the evolution of indicator frameworks over time, from a concern with individual buildings to more integrated assessments of urban districts as a whole. It is used to certify developments at different stages, with a focus on green buildings, smart growth and urbanism, including green infrastructure, integrated transport and liveable community. In its multi-stage approach, it is intended to have a strong shaping influence on urban development from the early planning phase onwards.

The *Climate Positive Development Program* mentioned earlier also exemplifies this cluster well. It has been applied in cooperation with development partners in 17 projects across six continents. This is also a multi-stage accreditation scheme, but with a more singular focus on net carbon emissions, focusing in particular on energy, transport and waste. The use of this high-level 'output' indicator, rather than a complex set of prescriptive ones, allows the means of implementation to be determined locally. As such, this also potentially allows it to be used alongside other complementary frameworks, as illustrated by Menlyn Maine, a new-build development in Pretoria, South Africa, which concurrently uses the *Green Star South Africa* (GSSA) framework as well as *LEED NC* ('New Construction') and *LEED ND* (see Joss 2012: 16).

Two certification schemes promoted by social enterprises – namely, the *One Planet Living Framework*, and *Sustainable Communities* (Audubon International, undated) – blend certification with a strong element of community engagement. In order to facilitate social learning, both of these frameworks are relatively prescriptive in terms of the process of certification (including benchmark measurements, stakeholder workshops, action plans, and periodic evaluation), but relatively flexible in the precise indicators used. The *One Planet Living Framework* also includes an open-access version alongside the formal (paid for) accreditation scheme.

Interestingly, certification has more recently also been incorporated into several frameworks by national agencies, including France's *EcoQuartier*, Brazil's *Selo Casa Azul Caixa*; and the UAE's *Estidama Pearl Community Rating System* (see Table 1).

'Design & planning' frameworks

Frameworks in this cluster (which is less prominent than the previous two) have as their main feature the provision of guidance on the *processes* of sustainability planning: here governance orientation is towards supporting the establishment of 'design communities' of different types, with strong emphasis on collaborative decision-making and interactive learning. They normally also incorporate an element of performance assessment, and they may additionally place strong emphasis on community engagement. Notable examples of the latter are the *Community Capital Tool*, UNESCO's *Biosphere Eco-City Programme* and the US Environmental Protection Agency's *Green Communities* (see Table 1).

There is a tendency for such frameworks to prescribe broad principles for sustainability assessment rather than mandate detailed, concrete targets. The *Biosphere Eco-City*, for example, sets only overarching parameters for the types of indicators which participants might consider including. The World Bank's *Eco² Cities* framework deliberately moves away from prescribing specific indicators, on the basis that every city has a unique set of pre-existing economic, social, cultural, institutional and environmental challenges and opportunities. Its key aim instead is to facilitate a process whereby local stakeholders themselves decide and act on priority issues (while also recommending that participant cities adopt a recognised framework of more prescribed indicators alongside this process, depending on their specific requirements). As part of this 'city-based decision support system', it guides local adopters to implement collaborative design and decision processes based on a shared, integrated framework and using various small-scale 'catalyst' pilot projects prior to scaling-up to city-wide adaptations. This and similar participatory, design-based approaches may be particularly relevant in urban settings with limited pre-existing governance capacities, such as rapidly developing urban centres in the Global South. Indeed, the initial pilot cities using the *Eco² Cities* framework are all located in South East Asia (Indonesia, the Philippines, Vietnam).

'Standardization' frameworks

A more recent innovation still is represented by formal standards for sustainable urban development. This category refers in particular to work undertaken by both national and international standardisation bodies. For example, the International Standardization Organisation (ISO) has since 2014 issued a suite of *Sustainable Cities and Communities* standards, with sets of indicators accompanied by descriptive frameworks and practical implementation manuals (see ISO/TC268, undated). Several national agencies, such as the British Standards Institution (BSI) and Spain's standards agency AENOR have published their own sets of standards for domestic application, in close interaction with efforts at international level. These formal standards appear to pursue two distinctive functions: on one hand, they signal the efforts by both national and international bodies to seek to achieve more systematised and regulated guidance on sustainable urban development practice; on the other, they are indicative of a more recent shift towards linking the sustainability agenda with the emergent smart city agenda, by emphasising the importance of (digital) data and information as basis for sustainable development. A case in point is the recent report *Standardized City Data to Meet UN SDG Targets* published by the World Council on City Data (Patava 2017).

In summary, presently the field of urban sustainability frameworks remains open and varied, both in terms of the actors involved and the intended governance functionality. For now, there is no strong evidence of marketplace consolidation in any one direction, but there are pressures for standardisation as different frameworks compete for attention with regard to offering governance solutions for sustainable urban development. It is possible in future that particular schemes will come to dominate different specialist niches; various types of 'gold standard' may emerge which each respond to a particular type of sustainability-related goal. Alternatively, frameworks with more holistic remit may prove to be more successful, depending on their ability to deliver practical innovations and tangible sustainability outcomes on the ground. Either way, the challenges need to be considered arising from the varied experience of implementing frameworks in particular urban contexts.

Governance challenges

The application of a framework in a local context should not be expected to be a straight forward process. After all, as an instrument designed to be replicable for use in multiple settings, the framework's generic guidance – relating to substantive and procedural sustainability aspects – requires local adaptation and integration. This necessitates various processes of negotiation as local actors work to translate a framework into context-specific actions and practices. The following identifies some of the challenges likely to occur in the application of frameworks on the ground and that, therefore, need to be worked through if realistic local engagement with given frameworks is to be achieved.

Boundary work

The way that a governance tool, such as an assessment framework, operates will be influenced by a number of features: the way that it defines the scope of its application; how it demarcates the spatial area to be assessed or transformed; the particular activities assessed; the defined timeframes; and the specified participating actors and institutions. This can give the impression that the operation of a framework is rather tightly constrained by its format.

Yet in practice, this bounded construct, however internally consistent, has to engage with wider external structures and processes resulting in complex boundary work. For example, the spatial boundaries of a framework's application will be porous: air quality, traffic conditions, or economic success, for instance, may depend primarily on what happens elsewhere. Similarly, the operational and jurisdictional dimensions of wider infrastructure or regulatory systems involved may jar against the approach embodied by the framework. Participating organisations may not all work to similar timescales. Thematic or procedural prescriptions may conflict with existing regulatory requirements at different scales.

Consequently, resolving such tensions may necessitate ongoing active boundary work, whereby collaborations or divisions of labour are agreed upon, compromises are reached, and innovative design solutions negotiated. In short, if a given framework is to be an effective governance tool, it needs to be flexible enough to accommodate local adaption. At the same time, it needs to maintain a certain robustness and consistency, to ensure its integrity as a replicable, standardising mechanism for sustainable urban development.

Above all, a framework needs to be legible in different domains. It does not just 'do work' at the boundary but also travels across that boundary. A classification scheme such as BREEAM Communities will be the focus of discussions in planning authorities (amongst both local politicians and professional planners), in project team meetings where a wide range of professionals will be present, and in the economic decision-making of the developer concerned with the cost and value implications of a specific rating. The framework must be an active, workable document and process in these different locations. It can thus function as a 'boundary object' or, in the terminology of Actor-Network Theory, an immutable mobile (see e.g. Star & Griesemer 1989; Holden 2013; Schweber & Haroglu 2013; Schweber 2014).

Community engagement

The urban arena is one where many stakeholders interact (see also Bell & Morse, this volume, **TK**, and Domingues *et al.*, this volume, **TK**). Given the wide range of actors involved in any particular local context, a framework may need to speak several ‘languages’. Those frameworks adopting the more technical discourse of policy-makers, planners, urban designers or property developers may fail to engage wider local communities. This is problematic insofar as initiatives which do not take account of local community needs and aspirations often fail to gain traction. Then again, the alternative approach of following principles of simple language and conceptual accessibility, which some frameworks espouse, may fail to motivate sufficiently private sector actors or municipal authorities seeking to promote urban initiatives based on recognised technical certification.

The difficulties inherent in communicating simultaneously with professional actors and the wider community may be one reason for the emergence of parallel strands of frameworks: some choose to emphasise technical requirements, while others focus more on facilitating inclusive collaborative social learning. Overall, the former currently appear to occupy a stronger position in practice, due to the fact that many have evolved from technical index and certification systems (such as ‘green’ building codes) and the fact that social and cultural aspects of sustainability are still frequently underrepresented in comparison with more technical environmental and economic aspects.

Even for frameworks which are generally considered advanced in terms of embracing social sustainability, the communicative dimension may prove challenging. Community engagement may be well-intentioned and integrated in the framework’s governance process, but it can easily result in perfunctory ‘thin’ participation if insufficient time and resources are made available. What is more, what constitutes substantive, ‘thick’ participation may be difficult to prescribe, not least also because of different cultural meanings and traditions of community engagement.

Furthermore, the requirement to incorporate a community engagement dimension may result in a top-down approach, where the promoters of the project, development or framework seek to encourage such engagement. It does not leave space or necessarily recognise the importance of bottom-up initiatives which have been so significant within the urban sustainability movement (see Roseland, 2012), particularly during the earlier years of Local Agenda 21, but also now with the growth of urban experimentation in alternative urban sustainability pathways (e.g. Baccarane *et al.* 2014; Evans *et al.* 2016; Scholl and Kemp 2016). Given the role of frameworks as a form of knowledge claim, the potential for citizen science initiatives to interface with more expert-led assessment should not be underestimated either. These points emphasise that the practice and potential of community engagement may often go beyond the more limited forms encouraged and envisaged by the frameworks discussed here.

Partnership facilitation

If frameworks anticipate the needs of particular key audiences and imply certain relationships between them, they cannot fully determine the nature and qualities of these relationships. Frameworks, in other words, neither sit neutrally outside local governance arrangements, nor determine them, but work more dynamically as co-producers of relatively unpredictable partnerships between their promoters, adopters,

and other variously empowered local actors. The nature of such partnerships not only differs from case to case, but may shift over time between the different phases of a project (and depending on changes in the political or commercial context). However, a common feature seems to be the necessity of a framework champion working across the partnership relationships.

The importance of such a champion can be understood as a response to the complexity of these partnerships and the networks they represent (see Rydin *et al.* 2003; Rydin 2013). There are transactions costs involved in operating across such networks; these transactions costs rise with the number of actors that are involved, their heterogeneity and how diffuse – as opposed to clustered – that the networks are. A champion can be considered as a network manager, facilitating communication across the network and the commitment to action by various actors. They can reduce transactions costs provided they are centrally located in the network and actively seek to promote collective action, in this case towards the implementation of a framework.

Frameworks offering a ‘fixed’ template or protocol may appear to promise greater certainty by mandating particular relationships, though there is no guarantee that such relationships will be constructive ones. Instead, a more flexible approach in which relationships are negotiated on an ongoing basis among those involved may result in more effective cooperation and practice learning. Then again, such fluid, organic partnership-building may risk obfuscating the relationship between framework champion and adopter, not least where the framework champion acts in a dual role of co-developer and certifier. In response, this suggests the need for an explicit articulation of the framework champion-adopter relationship, and the boundaries between shared and separate responsibilities among actors involved.

Robustness of assessment and endorsement

The fluid hybridity resulting from negotiated partnerships may lead to divergent outcomes, depending on the motivations and resources available to the actors involved at different stages of the process. Although the negotiations and problem solving involved may be viewed in a positive light as fundamental goals of social learning and innovation, they simultaneously raise questions about transparency over decision-making. Rather than based on some agreed, open methodology, the actions emanating from a framework implementation may be more the result of closed discussions and informal negotiations between framework champion and local adopters. This is problematic insofar as it challenges the principle of like-for-like comparison central for performance assessment, benchmarking and certification; and as such could undermine the claim of replicability and standardisation associated with urban sustainability frameworks.

The challenge of marrying the facilitative role of frameworks with the need for robust, standardised assessment may be a further reason why a clustering of frameworks, rather than a unidirectional process of standardisation, appears to be occurring globally. However, the challenge of ensuring robust assessment is not automatically met where frameworks prescribe fixed, technical indicators and detailed methodologies for assessment. The relatively rigorous assessment possible at, say, the building level is much more difficult to replicate at city-wide level, given the complexity and diversity of non-technical

issues at play; and data capture, monitoring and measurement may not be as systematic and accurate in practice as posited in principle.

Altogether, the emergent practice experience of framework application suggests caution against overestimating the potential of standardisation; instead the choice of frameworks currently available points to substantive local adaptation and innovation. The parallel challenges of managing boundaries, engaging communities while motivating public and private sector actors, facilitating constructive partnerships, and ensuring robust assessment procedures even raise the possibility that a universal standard would in fact have limited value. On the other hand, further fragmented growth of the field raises its own set of problems. An unlimited 'pick and mix' approach may imply a 'race to the bottom', with a tendency for less demanding frameworks to be adopted.

In contexts where there are costs involved in adopting a specific framework, there also has to be a demonstrable benefit to the adopter. Ideally competition between alternative frameworks will be based on such benefits, rather than just reduced complexity and costs. Ultimately, though, the viability of individual frameworks may depend increasingly on their demonstrable ability to overcome the challenges of translating abstracted principles into effective transformative action.

Policy and practice lessons

The varied experience of urban sustainability frameworks to date suggests that recommending a one-size-fits-all approach would at this point be inappropriate. The following points, therefore, are intended as broad recommendations in support of further critical work on how frameworks of one kind or another can be conceptualised, designed and developed in practice.

Benefit of variety

Within the last decade, numerous new urban sustainability frameworks have cropped up, promoted by a heterogeneous group of organisations and applied in diverse urban settings and policy contexts. Based on this trend, it may be realistic to expect ongoing variety, not least for the following two reasons: first, conceptually, sustainable urban development is far from a settled matter, with continuous differences in thematic accentuations and priorities; and second, in practice, the multitude of contexts in which sustainable urbanism is applied suggests the persistence of variability. There may, therefore, yet be limitations to the scope for standardisation of urban sustainability, at least when understood rather narrowly as uniformity of content and process. The prospect of continuous diversity, however, need not necessarily be viewed as problematic. On the contrary, it can be embraced positively as a process of collective, experimental innovation and learning. This should helpfully contribute to the growing body of knowledge about sustainable urban development. From a policy perspective, therefore, what at this stage is arguably less needed is a push for uniform standardisation, and instead more of a stance which allows for a plurality of approaches to be accommodated flexibly in the interest of knowledge innovation and social and policy learning.

Clarity of purpose

Within this context of variety, however, those in the business of designing urban sustainability frameworks and those adopting them in practice should strive to be clear about the frameworks' intended contributions to governance processes. This should also help make explicit the motivations of various actors in deploying these frameworks. Concerning the 'performance assessment' cluster of frameworks, these have a comparatively more circumscribed, technical functionality rooted in standardised methods and techniques for measuring and appraising particular sustainability dimension. While this makes for ready integration into a variety of policy and governance contexts, nevertheless careful attention needs to be paid to questions about the robustness and reliability of the methods and techniques in local application contexts. On its part, the 'certification' cluster merits close consideration of how accreditation mechanisms interact with (local) planning and regulations, as well as of the relationship arising between the certifier and the local adopter; neither of these points can be assumed as given. In the case of frameworks in the 'design/planning' cluster, a critical issue is how participants can be effectively incorporated in these broad processes; another is again the ability to align the activities generated by the application of a framework in the wider policy and planning cycles. Depending on these varying governance functions, different communication efforts are required; in any case, communication is a central consideration, from explicating the particular conceptual understanding underpinning the framework to specifying its particular substantive and procedural elements in principle as well as in practice.

A matter of context

While it is essential to probe into how frameworks themselves are internally constructed, it is ultimately to their practice application in particular contexts that one has to turn: it is here that full insight can be gained into their actual contributions to sustainable urban development processes and outcomes. Empirical analysis points to the complex, multiple interactions arising from the application of frameworks in specific urban settings. If one considers the use of a framework as an intervention in governance, then this focuses attention to questions, among others, about: the appropriate moment in the planning and policy process when the chosen framework should be introduced; the mobilisation of relevant existing networks of actors, or the need for convening new networks; the integration of the processes and outcomes generated by the framework into wider planning and policy-making; and the need for oversight and accountability. In short, these and related questions draw our attention to the inevitable boundary work involved as part of the process of applying frameworks in urban governance contexts, and alert us to issues of social and political agency and power, some of the effects of which may well be unintentional, and hence also to the potential for conflict. If using a framework is to be more than a technocratic process, then these governance issues should be considered of central importance in application practice, and they can be expected to co-determine sustainable development outcomes.

Commitment to openness

Given the still relatively nascent state of the theory and practice of urban sustainability frameworks, and ongoing debates about the value of standardising city governance, a commitment to openness seems called for, in the interest of generating relevant knowledge and fostering shared learning. From the conceptual approach to framework design to the selection criteria for framework application, and from the documentation of framework outputs to the evaluation of processes and outcomes, the field would greatly benefit from open source and access commitments to foster innovation and diffusion. Even in

the more sensitive areas of commercial applications and certification, there are notable examples of organisations practising a culture of information transparency and knowledge exchange. However it needs to be recognised that many frameworks operate as a commercial product and that the organisations promoting them need a robust business model to survive. This need not prevent transparency and openness provided the requirement of maintaining viability are also recognised.

Conclusions

The application of replicable urban sustainability frameworks in particular local contexts is designed as an intervention in governance processes: they serve to provide strategic and technical guidance on how sustainable city initiatives are defined, facilitate collaboration and networking among relevant stakeholders, assist with performance assessment, and obtain endorsement, among other functions. The interactions arising from such intervention may inevitably cause some tension concerning what is defined generically, 'top down' as part of a replicable framework, and what is fashioned locally, 'bottom up' reflecting the particular conditions on the ground. What constitutes an appropriate balance between the standard aspects of urban sustainability frameworks and the local variation of particular applications remains an open discussion in need of ongoing conceptual and practical exploration. One way of considering this interaction would be to postulate that replicable frameworks should enshrine global standards pertaining to substantive aspects of urban sustainability: this could, for example, be grounded in the principles of ecological footprint or zero-carbon emissions (as in the case of the *One Planet Living* and *Climate Positive Program* frameworks). Based on these absolute, outcome-oriented global standards, the process-oriented implementation could be defined flexibly by the frameworks, reserved for local determination and adaptation. This would also allow room, depending on individual circumstances, for additional locally relevant sustainability dimensions to be integrated into the overarching global framework. For example, the United Nations Environment Programme recommends such an approach, in what it calls a 'two-layered, nested model combining local and global assessments' (UNEP, 2012: 5). Similarly, Williams *et al.* (2012: 12) suggest that 'developing a set of very few core indicators, supported by city-specific non-core indicators, presents a practical solution to the issue of compatibility and standardised evaluation'. The advantage of such an approach is that urban sustainability frameworks would be defined by absolute, global standards; however, this would require international agreement on what these should be – in the case of environmental dimensions most likely relating to the world's ecological carrying capacity (footprint) and/or carbon emission reduction targets.

Another way of considering the interaction would be to forgo any attempt to standardize substantive aspects of sustainable development and instead centre the definition of frameworks upon procedural dimensions. This would be based on the argument that there exists too much variation concerning what constitutes sustainable urban development across vastly different cities and global regions to be able to expect to arrive at global standards that are meaningful and practical. Instead, the focus should be on facilitating 'good practice' concerning institutional, organizational and social processes to enable actors on the ground – especially in situations with limited existing governance capacity – to engage effectively with sustainable urban development. The strength of this approach is its ability to promote knowledge transfer and common practice learning across different settings; its weakness, arguably, is that it leaves untouched the essential question of what the minimum standards for global urban sustainability should be.

However exactly the balance ends up being struck between the standard aspects of urban sustainability frameworks and the local variation of particular applications – an important but as yet not fully exhausted discussion – the implications of using replicable frameworks within specific local contexts need careful consideration. At present, most of the frameworks are too recent and their applications in practice only at pilot stage to allow a more definitive verdict based on empirical evidence. What is clear, though, is that as practical experience accumulates, these frameworks require closer, in-depth examination to determine their potential and actual contribution to sustainable urban innovations – and the importance of critically reflecting on this development will only grow if certain frameworks come to dominate the field in the future. Far from being a peripheral concern, standardization looks set to become a major – even a decisive – factor shaping the outcomes of sustainable city initiatives, the relationships among various actors, and the process of generating and translating knowledge about urban sustainability.

Acknowledgements

We are grateful to Dr Nancy Holman (London School of Economics), and Dr Elizabeth Rapoport (Urban Land Institute), for their thoughtful comments on an earlier version of this paper. We would also like to acknowledge the contributions by our colleagues in the international research network ‘Tomorrow’s City Today’ (supported by Leverhulme Trust grant IN-2012-102), on which this article is based.

References

Note to editors: to add contributions by Turcu, Bell & Morse, and Domingues et al., all this volume (see TK).

Audubon International (Undated). Sustainable Communities Program. <http://www.auduboninternational.org/sustainable-communities-program> [accessed 31 January 2017]

Baccarne, B., Mechant, P., Schuurma, D., De Marez, L. and Colpaert P. (2014). Urban socio-technical innovations with and by citizens. *Interdisciplinary Studies Journal* 3 (4) : 143-156.

Bell, S. and Morse, S. (2008). *Sustainability Indicators: Measuring the Immeasurable?* 2nd edition. London / Sterling (VA): Earthscan.

TK Bell, S. and Morse S. (20xx). Participatory approaches for the development and evaluation of Sustainability Indicators. This volume (chapter 13).

Bioregional (Undated). *One Planet Living Framework*. <http://www.bioregional.co.uk/oneplanetliving/> [accessed 31 January 2017]

Biron C L, and Scruggs G (2015). Goal 11: The opportunities of the urban SDG, *Devex International Development News*, 25 September 2015. <https://www.devex.com/news/goal-11-the-opportunities-of-the-urban-sdg-86980> [accessed 25 January 2017]

Book, K., Eskilsson, L. and Khan, J. (2010). Governing the balance between sustainability and competitiveness in urban planning: the case of the Orestad model. *Environmental Policy and Governance*, 20: 382-396.

Boyko, C. *et al.* (2012). Benchmarking sustainability in cities: the role of indicators and future scenarios. *Global Environmental Change*, 22: 245-254.

BRE (Undated). *BREEAM Communities Technical Standard*. <http://www.breeam.com/communities> [accessed 31 January 2017]

BRE Global (2013). *BREEAM Communities. Integrating Sustainable Design into Masterplanning*. Watford (England): BRE Global Ltd. [http://www.breeam.com/filelibrary/BREEAM%20Communities/Introduction to BREEAM Communities.pdf](http://www.breeam.com/filelibrary/BREEAM%20Communities/Introduction%20to%20BREEAM%20Communities.pdf) [accessed 30 May 2017]

C40 Cities (Undated). *Climate Positive Development Program*. <http://www.c40.org/networks/climate-positive-development-program> [accessed 31 January 2017]

Caprotti, F., Cowley, R., Datta, A., Castan Broto, V., Gao, E., Georgson, L., Herrick, C., Odendaal, N. and Joss, S. (2017). The New Urban Agenda: key opportunities and challenges for policy and practice. *Journal of Urban Research and Practice*. Published online 9 January 2017 <http://dx.doi.org/10.1080/17535069.2016.1275618>

Chan, L., Hillel, O., Elmqvist, T., Werner, P., Holman, N., Mader, A. and Calcaterra, E. (2014). *User's Manual on the Singapore Index on Cities' Biodiversity (also known as the City Biodiversity Index)*. Singapore: National Parks Board, Singapore.

Criterion Planners (2014). A Global Survey of Urban Sustainability Rating Tools. http://crit.com/wp-content/uploads/2014/11/criterion_planners_sustainability_ratings_tool.pdf [accessed 31 January 2017]

De Jong, M., Joss, S., Schraven, D., Zhan, C. and Weijnen, M. (2015). Sustainable-smart-resilient-low carbon-eco-knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner Production*, 109: 25-38.

TK Domingues A.R., Lozano R. and Ramos T.B. (20xx). Stakeholder-driven initiatives using sustainability indicators: an integrative review. This volume (chapter 27)

Elgert, L. (2016). The double edge of cutting edge: Explaining adoption and nonadoption of the STAR rating system and insights for sustainability indicators. *Ecological Indicators*, 67: 556-564.

Elgert, L. and Krueger, R. (2012). Modernising sustainable development? Standardisation, evidence and experts in local indicators. *Local Environment: The International Journal of Justice and Sustainability*, 17(5): 561-571.

Evans, J., Karvonen, A. and Raven, R. (eds.) (2016). *The Experimental City*. Abingdon: Routledge.

Holden, M. (2013). Sustainability indicator systems within urban governance: Usability analysis of sustainability indicator systems as boundary objects. *Ecological Indicators*, 32: 89-96.

ISO/TC268 (undated). Sustainable Cities and Communities. Standards catalogue. International Standardization Organisation (Technical Committee 268). http://www.iso.org/iso/catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=656906

Joss, S. (2015). *Sustainable Cities. Governing for Urban Innovation*. London: Palgrave Macmillan.

Joss, S., Tomozeiu, D. and Cowley, R. (2012). Eco-city indicators: governance challenges *WIT Transactions on Ecology & the Environment*, 155: 109-120.

Joss, S. (ed.) (2012). *Tomorrow's City Today: Eco-city Indicators, Standards & Frameworks: Bellagio Conference Report*. London: University of Westminster (International Eco-Cities Initiative) ISBN: 978-0-9570527-2-7.

Joss, S. (2011). Eco-city Governance: a case study of Treasure Island and Sonoma Mountain Village. *Journal of Environmental Policy and Planning*, 13 (4): 331-348.

Joss, S., Cowley, R., de Jong, M., Müller, B., Park, B-S., Rees, W., Roseland, M. and Rydin, Y. (2015). *Tomorrow's City Today: Prospects for Standardising Sustainable Urban Development*. London: University of Westminster (International Eco-Cities Initiative) ISBN: 978-0-9570527-5-8.

Joss, S., Tomozeiu, D. and Cowley, R. (2012). Eco-city indicators: governance challenges. *WIT Transactions on Ecology & The Environment*, 155: 109-120.

Lehtonen, M. (2015). Introduction: indicators as governance tools. In: *The Tools of Policy Formulation: Actors, Capacities, Venues and Effects* (Jordan, A. J. and Turnpenny, J. R., eds). Cheltenham: Edward Elgar.

Lehtonen, M., Sébastien, L. and Bauler, T. (2016). The multiple roles of sustainability indicators in informational governance: between intended use and unanticipated influence. *Current Opinion in Environmental Sustainability*, 18: 1-9.

Munier, N. (2011). Methodology to select a set of urban sustainability indicators to measure the state of the city, and performance assessment. *Ecological Indicators*, 11(5): 1020-1026.

National Parks Board (Undated). Singapore Index on Cities' Biodiversity. Singapore: Singapore Government. <https://www.nparks.gov.sg/biodiversity/urban-biodiversity/the-singapore-index-on-cities-biodiversity> [accessed 31 January 2017]

Patava, J. (2017). *WCCD ISO 37120 Standardized City Data to Meet UN SDG Targets*. Report presented at UN World Data Forum, 15 January 2017. Toronto: World Council on City Data. https://undataforum.org/WorldDataForum/wp-content/uploads/2017/01/TA2.13_Patava.City-Data-for-SDGs-Cape-Town-Presentation-NO-VIDEO.pdf [accessed 22 June 2017]

Pinter, L., Hardi, P., Martinuzzi, A. and Hall, J. (2012). Bellagio stamp: Principles for sustainability assessment and measurement. *Ecological Indicators*, 17: 20-28.

Roseland, M. (2012). *Toward Sustainable Communities: Solutions for Citizens and their Governments*. 4th edition. Gabriola Island, BC: New Society Publishers.

Rydin, Y. (2007). Indicators as a governmental technology? The lessons of community-based sustainability indicator projects. *Environment and Planning D: Society & Space*, 25: 610-624.

Rydin, Y. (2013). The issue network of zero carbon built environments: a quantitative and qualitative analysis. *Environmental Politics*, 22 (3), 496-517.

Rydin, Y., Holman N. and Wolff, E. (2003). Local Sustainability Indicators. *Local Environment* 8 (6): 581-589.

Scholl, C. and Kemp, M. (2016). City Labs as Vehicles for Innovation in Urban Planning Processes. *Urban Planning* 1(4): 89-102.

Schweber, L. (2013). The effect of BREEAM on clients and construction professionals. *Building Research and Information*, 41 (2): 1-17.

Schweber, L. and Haroglu, H. (2014). Comparing the fit between BREEAM assessment and design processes. *Building Research and Information*, 42 (3): 300-317.

Siemens (2012). *The Green City Index. A summary of the Green City Index research series*. Munich: Siemens.

Star, S.L. and Griesemer, J. R. (1989). Institutional ecology, 'translations' and boundary objects: amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19 (3): 387-420.

Sullivan, L., Rydin, Y. and Buchanan, C. (2014). *Neighbourhood Assessment Frameworks: a literature review* UCL USAR Working Paper. <https://www.ucl.ac.uk/usar/wps/USARWPS01-Sullivan-Neighbourhoods-PDF> [accessed 31 January 2017]

Suzuki, H., Dastur, A., Moffatt, S., Yabuki, N. and Maruyama, H. (2010). *Eco2 Cities. Ecological Cities as Economic Cities*. Washington DC: The World Bank.

TK Turcu, C (20xx). Sustainability indicators and certification schemes for the built environment. This volume (chapter 10).

US Green Building Council (Undated). *LEED v4 Neighbourhood Development Guide*. <http://www.usgbc.org/guide/nd> [accessed 31 January 2017]

UN Environment Program (2012). Working Paper: Framework Elements for Assessing Urban Environmental Performance. <http://www.unep.org> [accessed 27 June 2014]

UN Development Program (2016). Sustainable Development Goal 11: Sustainable Cities and Communities. URL: <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html> [accessed 25 January 2017]

UN-Habitat III (2016). The New Urban Agenda. URL: <https://habitat3.org/the-new-urban-agenda> [accessed 25 January 2017]

Williams, C., Zhou, N., He, G. and Levine, M. (2012). *Measuring in All the Right Places: Themes in International Municipal Eco-City Index Systems*. Pacific Grove, CA: American Council for an Energy-Efficient Economy.

World Bank (2010). *Eco2 Cities Brochure*. Online source: http://siteresources.worldbank.org/INTEASTASIAPACIFIC/Resources/Eco2_Cities_Brochure.pdf [accessed 9 January 2014]

Table 1: Exemplars of urban sustainability frameworks categorised according to key governance functions.

Performance assessment	Certification	Design & Planning	Standardization
<ul style="list-style-type: none"> — CASBEE for Urban Development/Cities — City Biodiversity Index ('Singapore Index') — CityGrid — Eco-City Development Index System — European Common Indicators — Global City Indicators Facility — Global Urban Indicators — Green Cities Challenge — Green City Index — International Ecocity Framework and Standards — REAP for Local Authorities — Sustainable Cities Index 	<ul style="list-style-type: none"> — BREEAM Communities — Climate Positive — EcoDistricts — EcoQuartier — Estidama Pearl Community Rating System — Enterprise Green Communities — IGBC Green Townships Rating System — LEED ND — Living Building Challenge — One Planet Living — Star Community Rating — Sustainable Communities 	<ul style="list-style-type: none"> — ASEAN ESC Model Cities — Biosphere Eco-City — Community Capital Tool — Eco2 Cities — Green Climate Cities — Green Communities — Urban Sustainability Indicators — Reference Framework for Sustainable Cities 	<ul style="list-style-type: none"> — ISO 37100 Sustainable Cities and Communities — ISO 37120 Sustainable Development of Communities — ISO 37122 Indicators for Smart Cities — ISO 37123 Indicators for Resilient Cities — Related national standards by e.g. AENOR (ES), AFNOR (FR), BSI (UK), DIN (DE)

Source: Joss *et al.* (2015)