Sustainable urban design with people in mind: A framework revisited

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ABSTRACT: This paper provides a critical view of the Sustainable Urban Design Framework proposed by Nico Larco in 2015. It problematizes its embedded top-down/expert approach and argues for the use of the alternative understanding of sustainability as a social phenomenon proposed by the Circles of Sustainability as a theoretical reference. The paper proposes adjusting the framework in two ways: explicitly including social aspects of sustainability and including the temporal dimension of sustainability. The first one will help to overcome issues of index standardization on the one hand and to more closely connect with local contexts on the other. The second one will directly address issues of place-making and identity by embedding history, current conditions and future expectations of specific communities as fundamental elements for any urban intervention that strives for sustainability.

KEYWORDS: Social sustainability, Urban Design, Framework

INTRODUCTION

The physical manifestation of cities results from a combination of a variety of phenomena, some of which are under the control of specialists in the design and organization of procedures within the realm of urban design. A broad definition of urban design entails the participation of numerous contributors from different disciplines in a complex operation aimed at producing the backdrop of life for the increasing number of people living in urban areas (Carmona, 2010). By transforming physical aspects of cities, urban design should contribute to achieving sustainable urban environments that provide equitable opportunities for all groups in society.

In 2015 Nico Larco proposed a framework for the design and evaluation of urban design practice. The framework provides a roadmap to help urban designers/researchers understand the elements and issues to be considered when addressing sustainability through urban design. Larco states that although theoretical, historical and methodological issues related to urban sustainability, urban design, and sustainable development have been tackled by researchers, a holistic framework that explicitly guides urban design practitioners to achieve sustainable design was still missing. According to Larco, the well-established link between urban design and sustainability manifests primarily through the effect of urban form on the following focus areas (discussed in greater detail in the next section):

1. Energy use and GHG emissions (based on transport related issues)
2. Water quality and recharge
3. Habitat and ecological quality
4. Energy use and production (based on non-transport related issues)
5. Equity and health

Larco's Sustainable Urban Design framework matrix include primary and related metrics for each of the five focus areas and provides a breakdown of metrics at different scales of intervention. Most of these metrics are objective measures of physical conditions, like *percentage of pedestrian and bike friendly streets* or *urban land consumption/compactness,* which corresponds to the claim of urban design as the discipline that deals with the physical manifestation of urban areas. This framework represents primarily a top-down/expert approach to incorporating sustainability issues in urban design practice. Assuming that enhancing people's quality of life is an important goal of urban design (Jenks, M. and Dempsey, N., 2016), it seems pertinent to include user-centered measures of the impact of urban design on sustainability. We assert that Larco's framework is missing an explicit space to account for people's desires, expectations and needs to have a better life in urban areas.

It is our contention that a holistic framework for sustainable urban design should include measures of social sustainability, especially as urban design deals with issues of everyday life and provides options/solutions that could enhance people's quality of life. Failing to do so would only increase the gap and disconnection

that is claimed to exist between designer's intentions and people's actual needs and expectations (Smith et al., 1997).

This paper highlights the importance of weaving in the social dimension of sustainability into Larco's framework (2015) to balance out its top-down/experts approach. The argument uses the Circles of Sustainability as the supporting theory (James, 2015) emphasizing the understanding of sustainability as a social phenomenon. The paper concludes with suggestions for incorporating social dimensions of sustainability in Larco's framework.

1.0 Larco's framework

1.1. The proposed framework for Sustainable Urban Design

Larco's framework is based on a review of literature produced by researchers and practitioners who have proposed a number of concepts, issues, and elements that constitute sustainable development and its subset urban design from 1984 to 2010. It draws from the work of Hough (1984), Calthorpe (1993), Frey (1999), Wheeler (2000), Wheeler and Beatley (2004), Jabareen (2006), Kenworthy (2006), Farr (2008), Ritchie and Thomas (2009), and Condon (2010). Larco identifies that this body of literature investigates theoretical, historical and methodological underpinnings of sustainable development that need to be decanted into a framework that can be useful for urban design practitioners and researchers. The framework Larco proposes also draws from rating systems at urban scale such as LEED-ND (2018), BREEAM Communities (2012), STARS (2012) and SITES (2014), the best-known rating systems to guide and/or assess the design of urban design projects in developed countries.

Focus areas	Primary metrics	Related metrics
Energy use/GHG (transp. related)	GHG production	Vehicle miles/km traveled
	Transp. energy consumption	Mode split Density Land use mix Percentage of ped/bike friendly streets Urban land consumption/compactness
Water quality and recharge	Recharge rate	Percent piped (vs. direct recharge) Percent permeable surface
	Water quality (pollutants, particulates, temperature, and speed)	Drainage concentration time Water velocity urban land consumption/compactness
Ecology/habitat	Species diversity/strength	Amount of habitat Grade of habitat Health of indicator species Urban land consumption/compactness
Energy use/production (non-transp.)	Non-transp. energy production/ Consumption	Street lighting energy use Heat island effect Building typology split Urban land consumption/compactness
Equity and health	Accessibility Affordability Safety Physical activity	(related metrics of energy use/ghg) Housing/unit type, transport access Crime rates, accident rates Access to open space, connectivity

Figure 1: Sustainability primary and related metrics. Source: (Nico Larco 2015)

The five focus areas of the framework are briefly described next:

Energy use and greenhouse gas (GHG) emissions (transport related): urban transportation remain the most energy consuming and GHG emitting activity (Schafer and Victor, 1999) in urban areas, particularly in the United States. Urban design can influence travel modes by providing favorable conditions for less energy intensive modes such as walking, biking and transit.

Water quality and recharge: according to Larco, not all water systems are of direct concern for urban design practice. Potable water, wastewater, greywater and rainwater are systems that other disciplines deal with. The main focus of urban design is the management of stormwater by first reducing run-off and second by mitigating the run-off that is created. It also addresses the typical challenge of urban areas that have a high proportion of impervious surfaces that reduce the rate of direct recharge of stormwater into the earth.

Habitat and ecological quality and extent: urban areas by definition are a disruption of natural ecosystems. Urban design is challenged to manage and limit the negative effects of urban development creating areas that preserve, protect and incorporate healthy ecologies and habitat.

Energy use and production (based on non-transport related sources): this focus area deals with three non-transport related sources of energy use in urban areas: building energy use (heating, cooling, lighting and ventilation), energy use through street lighting (also parking, parks and public space lighting in general) and embodied energy of infrastructure (the total energy required to produce, transport and install any material or product).

Equity and Health: urban design impacts accessibility, affordability, safety and degree of physical activity. Accessibility refers to how easily individuals can reach goods, activities and services in urban environments. Affordability includes housing, transport, and utilities costs based on their distribution and availability. Safety covers three primary areas related to urban design: safety from crime, safety from accidents and safety from pollution and toxins. Finally, physical activity is directly impacted by urban design through increased access, size and attractiveness of places for recreation and the design of systems for utilitarian physical activity mainly related to transportation modes.

Larco presents the framework as a tool to help address design related issues by organizing critical elements of sustainable urban design by scale and resource goals while attempting to be clear about the relationships between elements and specific sustainability goals. Four out of five focus areas deal primarily with environmental issues with the fifth focusing on equity and health.

All the metrics included in the framework are informed by objective measures. Larco conceptualizes metrics as primary or related. Primary metrics are those that can be directly measured, while related metrics are used as proxies for more than one primary metric and come from well established studies on the matter usually serving purposes beyond the realm of urban design. For example, *density* is a measure that is used in urban planning, urban economics, architectural design and social science research in urban environments. Similarly, *water velocity* is a measure that informs landscape architecture design, a variety of civil engineering projects such as aqueducts, roads design, etc., and the work of ecologists, plant scientists and earth scientists to name a few.

The framework addresses the spatial dimension of urban design through a matrix that establishes relationships between the focus areas of sustainability and the traditional geographical scales of UD (regional, district/neighborhood, block/street, project/parcel). The corresponding elements of sustainable urban design at different scales intend to help practitioners and researchers to account for the complexity involved in designing and/or assessing urban design interventions while keeping track of the relationships between them at different geographic scales.

1.2. The shortcomings of the framework

The framework proposed by Larco does an excellent job of culling from a wide and dispersed literature on different facets of sustainable development pertinent to the urban design process. However, in the process of distilling the five focus areas of the framework from the literature, it does not pay attention to the conceptual tenets of the sources, leaving an open question as to what extent there might be fundamental contradictions between them, or whether that would matter whatsoever. To begin with, a framework for sustainable urban design should clearly declare the underlying sustainability understanding it adheres to. Sustainability is a widely debated and often abused concept due to its vagueness (Daly, 1996) that requires a contextual definition to avoid loose interpretations.

For example, the best known definition of sustainability was tightly connected to development which was understood as economic growth (Mebratu, 1998). This iconic definition “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, Our Common Future, 1987) sees development (economic growth) as the way out of poverty and the environment as something to be managed. Another definition emphasizes people’s accountability by stating that sustainability is about “transforming our ways of living to maximize the chances that environmental and social conditions will indefinitely support human security, well-

being and health." (McMichael et al., 2003). Yet another definition of sustainability conceptualizes it in terms of an expected outcome: "I define sustainability as the possibility that all forms of life will flourish forever." (Ehrenfeld, 2005). In the case of the proposed framework for sustainable urban design, such a definition is missing leaving an open door to freely assess the success of an intervention according to the lens it is looked through.

Since the framework also draws from the best-known rating systems for sustainable urban design, it embodies an understanding of sustainability underlying their conception. These rating systems are, in varying degrees, industry lead, market-driven efforts to convey sustainability thinking within the established status quo of the profession of urban design and more broadly sustainable development practice. Many of the guiding tools offered by the rating systems encourage technologically driven solutions to issues greatly bound within environmental concerns. Some of these rating systems are taking important steps towards assessing performance instead of only assessing design but these efforts do not permeate the proposed framework. To illustrate this point, SITES only awards the certification after performance data is collected in areas such as *Site Design - Human Health & Well Bein*g or *Education & Performance Monitoring*, shifting the emphasis from prescriptive guidelines to design decision making aware of every day people-environment interaction.

The framework is conceived within a top-down/expert approach that relies on hard measures of objective matters. As a result, it does not account for people's beliefs, attitudes and expectations regarding sustainability goals. This has the unintended consequence of augmenting the chances of increasing the gap that is claimed to exist between designer's intentions and people's actual needs and expectations (Smith et al., 1997).

Even though Larco's framework acknowledges the limitation of insufficient research linking different aspects of urban design to sustainability, the overall approach fails to explore the reasons behind the weak links between aspects of sustainable urban design as well as their link with overall sustainability. We think that in part the disconnect between aspects of urban design and sustainability come from the understanding of sustainability as a combined "capital" that operates in a trade-off system. In this system, environmental, economic and social capitals participate in often unbalanced operations that emphasize one dimension over the others resulting in biased assessments and interpretations that reveal the interests at stake.

Simply put, this trade-off system works as arithmetic operations between metrics of environmental, economic and social aspects of sustainability. For example, if an urban design intervention in a given neighborhood of a city increases green surface area (environmental aspect) and provides more areas for new businesses (economic aspect) but overlooks the need of the community for a safer place for kids (social aspect), it still can be considered as sustainable urban design because two out of three facets of sustainability yielded positive numbers. As far as the cumulative result shows improvement, the given operation is considered a success. The proposed framework for sustainable urban design is heavily invested in environmental issues (four out of five focus areas) informed by objective primary and related metrics.

The social aspects of sustainability in the framework are comprised largely in the focus area called Equity and Health. Although the author acknowledges the importance of place making and identity, there is no explicit place for measures that contribute to this aspects in the framework. For example, in assessing levels of *accessibility* the framework could incorporate measures of continuity, walkability, proximity, etc for different groups especially disadvantaged/vulnerable groups; in assessing levels of *engagement in activities* it could use measures of vitality and usefulness; in assessing levels of *comfort* the framework could incorporate measures of safety, cleanliness, attractiveness, etc. from stakeholders of the project. All these and other metrics can come from both qualitative and quantitative data.

The economic dimension of sustainability does not have a place in the framework either, arguably because of the framework's declared focus on the physical manifestation and design of urbanized areas. We assume that this omission also derives from the combined capital understanding of sustainability where economic aspects are regarded as an abstraction and not as one aspect of social life. The economic dimension influences and is influenced by the physical reality of urban environments. For example, the design of mixed-use urban areas not only contributes to decrease commuting time but also incentivizes economic transactions, which in turn can provide livelihoods to residents of a neighborhood. In a similar manner, housing typology is also tightly connected to economic aspects not only in terms of affordability but also expressed as projected property value in urban areas as a result of strategic operations of mixed use (which allows small scale income generating activity) or keeping single housing typology.

The fact that Larco's framework does not declare its affiliation with a specific understanding of sustainability is problematic. It leaves the door open to interpretations as to what sustainability means to urban design practice. It doesn't seem to have a critical stance over the mainstream understanding of sustainability known as the Triple Bottom Line. The framework seems to accept that sustainability can be broken down into dimensions that are ultimately given variable weights according to the interests at hand regardless of the potential unbalance between them.

2.0 Sustainability as a social phenomenon

Sustainability is by definition a holistic concept only compartmentalized for epistemological and practical reasons. Epistemologically, the concept of sustainability is broken down into dimensions that allow in-depth investigation of the aspects that influence such dimensions. It also serves the purpose of contextualizing each dimension and its corresponding aspects and measures in specific times and places. The practical reasons behind the compartmentalization of the concept of sustainability have to do with providing an organized break down of its complex and interrelated aspects to prevent confusion and unnecessary reiterations when defining tools or during field research. The break down of the concept of sustainability into dimensions also serves the purpose of giving different emphasis to particular aspects in specific moments and places as long as not a single dimension of sustainability is discarded and there is always a recomposition of the whole.

While Larco's framework offers urban design practitioners a useful checklist of metrics to aim for, its approach fails to guarantee a truly holistic understanding of the problem at hand due to the unbalanced presence of aspects from the different dimensions of sustainability; privileging environmental aspects over economic and social ones. Such an unbalanced framework is likely to do little to advance the sustainability of communities targeted by urban design interventions, especially disadvantaged communities with limited control over processes that impact their quality of life.

One alternative to get closer to the recomposition of the whole while giving emphasis to one dimension of sustainability is to re-think the way we understand sustainability. So far the three dimensions of sustainability have been considered as separate domains. We don't question whether there should be these three dimensions or the way they actually address the issues of living in this planet now and in the future. Researchers from the Institute for Culture and Society at Western Sydney University, Sydney, and the Senate Department for the Environment, Transport and Climate Protection, Berlin, in association with Metropolis, the World Association of Major Metropolises (Barcelona and Montreal), reformulated the understanding of sustainability to counteract the ease and manipulative accommodation of the three domains to almost every aspect of life. They proposed an understanding of sustainability that positions the social as an integral part of every domain: sustainability as a social phenomenon (James et. al., 2015).

Moreover, this alternative understanding of sustainability presents it as a component of the bigger construct of *social life* where it intersects with other social conditions such as resilience, liveability, adaptation, innovation and reconciliation. Thus, understanding the social as the reference and ultimate goal, sustainability reformulates its domains as four quadrants in what the authors call The Circles of Sustainability (ibid). The four domains are *ecology, economics, politics and culture*.

> *Economy* is defined as "a social domain that emphasizes the practices, discourses and material expressions associated with the production, use and management of resources." (ibid. pg. 53) It is one more aspect of social life and not the one that rules them all.
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> *Ecology* is defined as "a social domain that emphasizes the practices, discourses and material expressions that occur across the intersection between the social and natural realms." (ibid. pg. 53) It goes beyond a series of metrics that describe the state of nature and establishes the availability of resources; it understands that humans are part of nature and should live within its limits.
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> *Politics* is defined as "a social domain that emphasizes practices and meanings associated with basic issues of social power as they pertain to the organization, authorization, legitimation and regulation of social life held in common." (ibid. pg. 54) It deals with social relations in general going beyond the conventional understanding of politics as activities associated with the governance of a country.
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> *Culture* is defined as "a social domain that emphasizes the practices, discourses and material expressions, wich, over time, express the continuities and discontinuities of social life held in common." (ibid. pg. 54) It is aimed to understand how and why people do what they do at this moment and place making specific both the spatial and temporal dimensions of sustainability.

Urban design interventions have the ultimate goal of contributing to enhancing the quality of life for inhabitants of urban environments. Quality of life is a composite index that includes material living conditions (income, consumption, and material conditions), productive or human activity, health, education, leisure and social interactions, economic and physical safety, governance and basic rights, natural and living environment, and overall experience of life (Eurostat, 2015). The metrics of all these dimensions are often oversimplified and/or isolated for comparison purposes through the lens of standardized global indexes like the GDP. As a consequence, comparison for example of absolute GDP numbers do not convey much about quality of life of specific communities. Neither does comparing material living conditions of two communities with different cultural background or from very different climatic areas.

The urgency to compare realities often uncomparable tend to deviate attention from the actual reason to come up with indexes and metrics: we want to know how people are doing in their lives as urban residents of particular cities. In that regard it is important to underline that urban design practice has the ability to impact many of the measures of quality of life by transforming the built environment where human activities occur. It also has the obligation to find out what people think, want and need as well as the values they hold before making any decision regarding the transformation of urban places. A comprehensive framework for urban design practice and research must include explicit consideration of subjective perceptions from local people to inform project design and sustainability assessment.

3.0 Adjusting the framework

3.1. Incorporating the social

A sustainable urban design framework should incorporate social aspects of sustainability by using metrics that directly reflect human perception, attitudes and beliefs. Each one of the focus areas proposed in the framework of sustainable design has embedded human activity to some extent. For example, in the focus area of water quality and recharge, it would be important to find out the perception regarding water quality, affordability, and accessibility of different residents and user groups. At a minimum, everyone holds a position regarding water quality, energy use, and ecological issues in their locality. Urban design practitioners would be taking important steps towards engaging the community by acknowledging the various points of view about particular issues in specific places and times. This would also provide the opportunity to find out reasons behind certain attitudes and behaviors that might interfere with the sustainability objectives of a given intervention.

Moreover, qualitative data captured directly from the users of the urban area under study helps to better understand hard measures of GHG production, water quality and recharge rates or the health and level of conservation of natural habitats. Urban design practitioners should investigate and interpret people's perceptions, beliefs and expectations about urban environments when striving for sustainability to increase the levels of community engagement in the process of transforming urban places. Community engagement is a measure of sustainability associated with bottom-up approaches that contributes to strengthening identity, ownership and capacity building to project urban interventions into the future.

A framework for urban design practice should be guided by a balance between top-down and bottom-up approaches as a strategy to reconnect goals and processes towards sustainable urban environments. The apparent irresolvable quandary between the two approaches can be solved by shifting the focus from the *what* and the result to the *how* and the process. Processes aimed to enhance the sustainability of urban places can engage experts and communities merging global concerns on one hand with local realities, values and interests on the other through urban design interventions. The resulting indexes to assess the success of the intervention should be selected by a group the that includes both experts and community members to keep comparability with global indicators as well as remaining locally relevant for the communities being impacted.

3.2. Incorporating the temporal dimension

Urban design interventions happen at specific points in time and place. At the same time, they are part of the continuous process of urban transformation, the physical manifestation of that process. Larco's framework matrix addresses issues of urban design concerned with the spatial dimension (different scales from the region to the parcel) but fails to address issues concerned with the temporal dimension (present, near-future, far-future).

The different spatial scales involved in urban transformation processes interlink and interact with each other yielding different indices of sustainability at local and global scales. The accuracy of the process of assessing the success of a given intervention benefits from evaluating it throughout the different scales

traditionally used in urban design practice. For example, a project to design a pedestrian path along a river as it crosses an urban area has local impact in the immediate micro habitat of the river shore, helps the citizens understand the benefits of having a healthy river and contributes to the conservation of the water system it belongs to at regional scale while connecting with global concerns about water quality and availability.

However, the success of such interventions must also include the temporal dimension of sustainability. It is often overlooked that time is essential to sustainability as a concept. For urban design practice and research it is fundamental to understand the history of a place, its culture (past). It is also important to operate within the current set of conditions, resources and possibilities. But perhaps more importantly, urban design interventions must address people's future expectations; understanding the values, attitudes and beliefs residents/user groups hold to avoid neglected urban areas and guaranteeing the sustainability of places. Following up with the pedestrian path along the river example, a successful design can only be fully accomplished when it is contextualized, when careful investigation of the meanings, beliefs and feelings about water is carried through, and the hopes and expectations of the target and expanded communities are interpreted through the design. When discussing sustainable urban design, the long-term viability of any intervention is crucial. Maintenance and upkeep are aspects of a project that are intrinsically linked to buy-in from local partners and organizations. This is possible when local partners are an integral part of the process from conception, planning, implementation, use and maintenance.

Places are socially constructed, and time is at the core of the spirit of societies. Investigating and understanding people in their temporal context, from cultural background, current conditions and future expectations become a key part of any urban design process intended to be sustainable.

4.0 Conclusion

Any framework is grounded on theories and conceptual understandings of the matters it intends to provide a reference for. A framework for urban design practice and research is an important tool that helps to organize strategies and processes of grand complexity. Larco's framework presents a good starting point to begin incorporating sustainability issues into urban design practice. However, by failing to declare the conceptual tenets upon which this framework for sustainable urban design rests, it can result in misled interventions and skewed and/or incomplete assessments.

Given the role of urban design as an important contributor to enhancing quality of life for urban residents, a sustainable urban design framework must include metrics that account for the user's perspective to assess and propose urban design interventions. The Circles of Sustainability provides a starting point to include issues pertaining to social sustainability into all aspects of sustainable urban design practice.

Any framework to assess sustainable urban design practice and research should incorporate the temporal dimension to account for the history, current conditions and future expectations of residents of a given locale. This can come from incorporating bottom-up approaches to the process that help increasing the sense of belonging by engaging and participating in the definition of the future of their own urban environment.

5.0 References

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