Cultural models *of* and *for* urban sustainability: assessing beliefs about Green-Win

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Received: 27 June 2018 / Accepted: 8 August 2019 / Published online: 11 October 2019
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Abstract

Green-Win is the proposal where that government, society, and business can all reap benefits while at the same time playing a vital role in the transition to sustainable development and lower carbon futures. We argue that, while the Green-Win proposition is central to many state and expert models of sustainability transitions, as a construction, it belies more complex trade-offs and cognitive models of sustainability and societal transitions. Cultural models are cognitive representations shared by a community which provide both *models of* the world, which aid in interpreting what is in the world, how it works, what is possible (or not) and why, and *models for* the world, which suggest how to act in it to bring about desired outcomes (cf. Geertz 1973). We surveyed 225 respondents in Shanghai, China, Istanbul, Turkey, and Beirut, Lebanon to assess their basic beliefs about sustainability, specifically whether it is possible to implement concrete practices that realize environmental sustainability goals in conjunction with economic development—the Green-Win proposition. We found important similarities and differences among urban stakeholders’ cultural models of sustainable development. For example, Chinese and Lebanese respondents displayed a strong belief that economic growth and environmental sustainability are compatible, while Turkish respondents showed significant disagreement with this proposition. We argue that such basic notions about the possibility of Green-Win opportunities between environmental sustainability and economic development are important to understand in the context of mitigating and adapting to climate change in critical urban environments. Cultural models *of* and *for* green development may either enable or inhibit transformations in urban systems according to local conditions. Finally, we discuss the potential implications of cultural models’ research for targeting communications and engendering collaborations among diverse stakeholders in order to align perspectives and overcome barriers that may otherwise limit successful visioning, planning, and implementation for transformation towards sustainable development.

This article is part of a Special Issue on Win-Win Solutions to Climatic Change edited by Diana Mangalagiu, Alexander Bisaro, Jochen Hinkel, and Joan David Tàbara

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s10584-019-02518-2>) contains supplementary material, which is available to authorized users.

1 Transformations to sustainability and human cognition

Increasingly, studies on transformative pathways to sustainability are highlighting cultural-cognitive aspects of the environmental perception and conceptualization, beyond simple universalist economic or technical strategies, in catalyzing human behavior change at the societal level (e.g., Jacob et al. 2014). Schultz and Siriwardane, for example, argue, commonsensically, that transformative change has to be located at a “deeper, cultural-cognitive, normative and discursive level of social institutions” (2015: 19), since formal organizations’ capacities to steer transformations may be limited by leadership changes, institutional inertia (cf. Munck af Rosenschöld et al. 2014), or cross-scalar political and economic pressures. At this “deeper level,” we find that all conceptualizations of worldly phenomena, including transformation and sustainability, are based on cognitive cultural models (Bennardo and de Munck 2014), the shared mental representations *of* and *for* the world that inform cognition and behavior in society. This cultural-cognitive aspect of change is thus fundamental because transformation requires the embrace of new codes (Wallace 1956) or ways of thinking by multiple stakeholders to transcend familiar yet unsustainable cognitive models, activities, and development pathways (e.g., perpetual growth). Green transformation at a city or societal level may thus be seriously impaired without the adoption of appropriate cultural models of sustainable development among its citizens. To do this requires better understanding citizens’ existing cultural models of causation in relation to environmental and social change and pathways to alternative, sustainable development futures.

Human adaptation to environmental and social change is unique because it need not arise exclusively from material conditions but also through the logosphere of human thought and imagination of the future. We previously elaborated a sustainability transformations framework (Ma et al. 2018) which assesses deliberate structural or systems change, including through cultural-cognitive “visioning” and other processes that may consciously direct critical socio-economic-ecological systems towards sustainability. Here, we focus on the relevance of more basic shared cognitive representations of the transition to sustainability via a comparison of cultural models in three rapidly developing cities: Shanghai, China, Istanbul, Turkey, and Beirut, Lebanon.

2 Cultural models as tools for assessing Green-Win climate adaptation opportunities

Cognitive models have been used to understand public opinion, reasoning, and responses to a wide range of social and environmental phenomena, including climate change (e.g., Bennardo 2018; Bennardo and de Munck 2014; Quinn 2005; Strauss and Quinn 1997; Shore 1996; Kempton et al. 1995; Holland and Quinn 1987). The concept of shared mental models, or cultural models, of cognition was developed within the fields of cognitive science and anthropology. Kempton et al. (1995:10) define a mental model as “a simplified representation of the world that allows one to interpret observations, generate novel inferences, and solve problems.” Cultural models (CM) may be defined as “Pre-supposed, taken-for-granted models [mental maps] of the world that are popularly shared by the members of a society and that play an enormous role in their understanding of that world and their behavior in it” (Holland and Quinn 1987:4). Existing cultural models commonly are deployed to interpret new phenomena; for example, climate change may be interpreted through cultural models of pollution. When

cultural models are widely shared and deeply entrenched within a population, they can become powerful guides for orienting opinion and motivating behavioral responses, even if their causal logic about Nature (Bennardo 2017) is at odds with scientific reasoning. Like scientific paradigms (Kuhn 1962), cultural models can be hard to modify or overturn, as humans will often dismiss contrary evidence rather than abandon their core models of how the world works. At the same time, the possibility of “promiscuous corroboration” (Rudiak-Gould 2012) is also common, in which a group might believe in a phenomenon such as climate change based on a cultural logic that is different from, or even antithetical to, scientific models of the world (e.g., global warming is God punishing us for our sins). Yet, these disparate models may support similar human *motivations* to reduce anthropogenic impacts on the environment.

Kempton et al. (1995) investigated cultural models of human-environmental relations among Americans, including city-dwellers, based on interviews and propositional surveys. The study found that environmentalism was already integrated with core American values—e.g., parental responsibility, obligation to descendants, religious teachings. It also found that core bio-centric values existed across stakeholder groups, and that cultural models led to reasonable judgments about the environment despite lack of agreement with scientific models. Yet the researchers also discovered that informants’ logics often did not correspond to scientific models of climate change. They found at least four ways in which informants understood climate change based upon cultural models of existing atmospheric phenomena that deviate from scientific understandings of climate change: pollution, ozone depletion, photosynthesis and respiration, and seasonal and geographic temperature variation. Bostrom et al. (1994) obtained similar results in a retest of the same survey instrument, while more recently, Reynolds et al. (2010) found limited “improvement” in alignment with scientific causality, suggesting the persistence of these influential cultural models despite mounting evidence and reporting on the anthropogenic greenhouse gas drivers of climate change from earth system science. Similarly, a 2010 study by the Yale Project on Climate Change Communication surveyed 2030 Americans on their knowledge of climate change and found that, while a majority of Americans correctly link increased burning of fossil fuels to climate change, “majorities...incorrectly believe that the hole in the ozone layer, toxic wastes, aerosol spray cans, volcanic eruptions, the sun, and acid rain contribute to global warming” (Leiserowitz et al. 2010:10).

3 Green-Win opportunities for urban transformation in relation to key enabling conditions

This study is predicated on the fact that ideas, capacity, and opportunity spaces for climate mitigation and adaptation (called Green-Win opportunities) exist within urban environments but are currently not being (fully) utilized for their transformative potential due to limitations in the enabling environment to support them (see Table 1). As the predominant sites of cultural evolution, habitation, growth, consumption, and emissions, cities have a unique role to play in the reduction of anthropogenic environmental impacts contributing to global climate change. Thus, discovering and capitalizing on transformational opportunities toward lower carbon futures in urban environments arguably needs to be a priority.

Regarding the enabling environment for transformation to sustainability, Broto and Bulkeley (2013:92) point out that recent research on urban responses to climate change “has yielded numerous insights including: the multiple modes of governing through which

Table 1 Dimensions of the enabling environment and methods of investigation

Dimension	Scope	Method
1. Visionary	Collective and effective mission building towards a Green-Win future	Analyzing <i>city strategic plans</i> and relevant official documents on city level vision-building activities
2. Cultural–cognitive	Learning and innovation capacity, trust, accountability, transparency, communication, risk-taking, openness to enable Green-Win	Uncovering <i>cultural models</i> through surveys (as introduced below), stakeholder workshops and interviews
3.	Policy-regulatory institutional	Actual policy and regulations, as well as the continuous formal and informal processes of policy and regulation making affecting Green-Win
Mapping and analyzing	Green-Win-related policies and regulations, stakeholder interviews	
4. Organizational	All of the formal and informal, state and non-state, commercial and non-commercial, as well as inter-organizational capacity, multi-level (vertical) and cross-sector (horizontal) governance, partnerships, and network capacity	Mapping the organizational architecture relevant to Green-Win Evaluating the social transformational capacities of the key organizations identified through fieldwork
5. Economic	Availability and quality of financial mechanisms towards climate action and sustainable development, such as carbon trade, green funds (private and public), tax reduction	Identifying and evaluating existing financial mechanisms and business practices towards Green-Win Stakeholder activities and fieldwork investigation

municipalities seek to govern climate change; the importance of institutional capacity, including resources, knowledge and organizational structures; the critical role of individuals, political champions and policy entrepreneurs; and how multi-level governance structures opportunities and limits for municipal action.” Yet, as these authors also point out, this work has limitations in that (1) it is mainly focused on individual cities in the developed world, (2) it has been largely “fixated” on local governments rather than non-state actors (such as NGOs, businesses, and community groups), and (3) with the emphasis on formal policy agendas and government strategies, comparatively less attention has been directed towards initiatives outside of these conventional channels. As a result, a wide range of opportunity spaces and initiatives beyond the government policy sphere have received little attention, despite fertile activity in some of these areas.

This rather myopic vision of the climate change adaptation “opportunity space” itself becomes a kind of cultural model of response, which, in turn, constrains societies’ abilities to realize potential win-win adaptation responses beyond the conventional sphere. Arguably, opportunities for adaptation may be quite limited if cultural models of the world (among stakeholders) are either too rigid or uniform to be adaptable, or too diverse or conflicting as to be coordinated. The latent quality of cultural models makes them not only presupposed, but also a “black box” (“what do we really mean by adaptation?”) and a source of “othering” and essentializing (“*they* just don’t see adaptation and urban transformation the way *we* do”). Yet research on cultural models (e.g., Kempton et al. 1995) suggests that even among ideologically or politically opposed groups (e.g., “tree huggers” vs. “loggers”), there may be a high degree of consensus about the way the world works. This partial consensus, in turn, can serve to build shared “win-win” visions and narratives in shaping societal responses to environmental

problems. Hence, Bennardo (2017) suggests “before carrying out ... [climate change or sustainability] strategies directly impacting these populations, it would be prudent to understand their Cultural Models...of Nature.”

While cognitive models form integrated representations, in some cases they may be built up or broken down componentially and the degree of consensus among models measured statistically within a group. Prototype theory has used this methodology to avoid the essentialist trap of reducing culture to a single worldview or stakeholders to a single unified perspective on complex phenomena like climate change or sustainability. Coleman and Kay (1981), for example, produced a prototype analysis of the American cultural concept of a “lie,” finding that Americans’ model of lying is composed of at least three elements (a falsehood, knowingly perpetrated, with the intent to deceive), though most people do not consciously produce this componential definition when asked to define a lie (with many simply equating a lie with a false statement). Yet, when a sample of students were asked to apply the concept to continuum of behavioral scenarios incorporating none, one, two, or all three of a lie’s conceptual components, respondents placed different weights on each, depending on the context, with “intent to deceive” being the most salient characteristic in judging whether a perpetrator’s utterance constituted lying (thus exposing the nuances of the concept, such as “white lies,” which are not really intended to deceive). Cultural models theory has deployed similar techniques productively within and across groups to reveal shared representations of the world (see Kronenfeld et al. 2011). Once uncovered, these shared models may present opportunities for win-win consensus building in tackling large-scale, multi-faceted collective action problems like climate change and urban sustainability.

4 Methods for uncovering cultural models via Green-Win stakeholder workshops

Following Kempton et al. (1995), we sought to build a profile of cultural models based on stakeholders’ propositions about “their city” in terms of sustainability and social-environmental change. To build these propositions, we used preliminary data gathered from approximately 40 semi-structured stakeholder interviews in China and Turkey in 2016 (although such interviews unfortunately could not be carried out in Beirut) and content analysis of relevant urban planning documents in each city. This data gathering was conducted in the national language of the city by members of the research team native to that country, who worked with the broader team to translate them into English. Next, we extracted key propositions about sustainability and adaptation gathered from coding those sources and grouped them according to how they relate to the enabling environment conditions (vision, cultural-cognitive, formal-institutional, organizational, and economic; see Table 1). We then translated these and created a fixed form survey of 40 statements linking each proposition to a Likert scale (Strongly Agree | Mildly Agree | Mildly Disagree | Strongly Disagree) to gauge respondents’ level of agreement with each statement. The survey was piloted in Shanghai and Istanbul, and in 2017 we extended the survey to Beirut. We targeted sustainability professionals and graduate students in the three cities because they stand at the forefront of sustainability thought and practice in their respective cities, and because their opinions regarding win-win strategies have a high impact on policy and business practice. In each city, we surveyed 75 sustainability professionals and graduate students of similar profiles (e.g., average age 31 in Shanghai, 35 in Istanbul, and 34 in Beirut; 52% female in Shanghai, 61% in

Istanbul, and 51% in Beirut). Despite the limited sample size in relation to total population, we consider the samples in the three cities comparable due to their similar professional and demographic characteristics and the consistent sampling and survey methods applied.

Cultural models need not only be investigated at the (sentence) level of the proposition. Word and discourse level analyses, as well as prototypes, metaphors, scenarios, and the like can also be used to flesh out idealized cognitive framings and shared representations of phenomena among populations. Accordingly, we sought to triangulate the results of our proposition analysis with discourse analysis of the major framing documents of sustainability (especially at the level of government, business, and NGOs) and relevant discourse pertaining to sustainability and Green-Win logics in these contexts, and vis-à-vis conditions on the ground. Participant observation was carried out in urban exhibits, professional meetings, green businesses, and other green development and sustainability forums to further assess and contextualize conceptualizations of Green-Win as models for achieving the transition to sustainability (T2S).

5 Results

The [Appendix](#) includes the fixed form survey questions and displays the results for the survey according to the percentage of responses for each level of agreement/disagreement on the Likert scale. The results reveal important areas of agreement and disagreement in how people conceptualize sustainability and adaptation towards lower carbon futures in the three urban environments. We describe here the results of the survey in terms of related causal propositions enabling T2S. We highlight especially areas where there was either a supermajority of agreement (> 70%) or disagreement (no strong majority) within or between cities. The reasons for these differences are then further discussed based on additional contextual data from interviews, discourse, and analysis of documentary and other sources.

The first two propositions in the survey concern the concept of Green-Win itself, namely whether in a city, (1) environmental quality and economic growth are always in conflict and (2) if there are clear pathways to green growth where people and environment can both benefit. Significantly, the first statement produced opposing supermajority responses according to city: 76% of Istanbul respondents agree that environmental quality and economic growth are always in conflict, while 84% of Shanghai and 65% of Beirut respondents disagree with this proposition. At the same time, 83% of Shanghai and 89% of Beirut respondents agree that there are clear pathways to green growth, while 59% of Istanbul respondents disagree (24% strongly). These results suggest that the logic of Green-Win is not compelling in every urban setting. Istanbul respondents seem to possess a more zero-sum model of economic growth versus environmental quality (i.e., win-lose), while Beirut and Shanghai respondents are more receptive to the logic of win-win propositions between environmental quality and economic growth. The basis of this apparently sharp and fundamental contrast is taken up in more detail in the [Discussion](#) section.

The zero-sum perspective of Istanbul respondents corresponded with their responses to other propositions of Green-Win progressivism. For example, proposition 5, that “my city” will adapt to climate change and proposition 6 that environment of my city will improve in the future, met with dubious responses from Beirut and Istanbul participants (with 91% and 78% disagreeing with no. 5, and 84% and 60% disagreeing with no. 6, respectively), while Shanghai respondents showed majorities in agreement with both propositions, including

86% supporting no. 6, that Shanghai's environmental situation will improve in the near future. Istanbul respondents (71%), on the other hand, were significantly more confident than Beirut or Shanghai respondents that residents would move all or parts of their families out of their city if the environmental situation did not improve. Consistent with their confidence that the environmental situation would improve and that there are win-win possibilities for environment and development, a majority of Shanghai respondents (59%) also agreed with proposition 9, that development has to come before thinking about the environment. In contrast, a supermajority of Beirut (84%) and Istanbul respondents (84%) disagreed with this proposition, maintaining a cognitive model wherein Green-Win can only be achieved when environmental sustainability considerations are foremost.

At the same time, over 90% of Beirut, Istanbul, and Shanghai respondents agree (most, strongly) with proposition 8 that environmental problems like air pollution will hurt a city's competitiveness. A city's competitiveness is seen as a zero-sum equation by most stakeholders. As global C40 (climate action) cities, both Istanbul and Shanghai stakeholders are concerned with their position in the world vis-à-vis competing urban centers. There is a realization in both settings that if the city fails to compete, it will lose stature in the global economy. Consistent with recognition of environmental sustainability limitations, however, respondents in both cities also see the requisite need to transform towards environmental sustainability to avoid undermining their city's ability to compete globally. Thus, supermajorities in both cities (93% in Shanghai and 80% in Istanbul) agree with proposition 23 that transformation towards sustainability is the key means for their city to become more competitive globally. Yet 87% of Beirut residents, despite being a less globally connected city, also agree with proposition 23, betraying similar fears that the unsustainability of its urban systems could weaken its international competitiveness.

Propositions 3 and 4 concern perceptions of threats to urban sustainability. Here, strong supermajorities in all three cities identify pollution as the biggest threat, while natural disasters are perceived as a comparatively minor threat. Yet, supermajorities of respondents in both Istanbul and Shanghai (and 66% of Beirut respondents) agree with proposition 22 that threats from natural disasters, like earthquakes, are more likely to motivate adaptation in policy and practices than threats from climate change. This suggests a common cultural model of the power of nature's forces in general, and natural disasters in particular, to motivate human action towards some Green-Win and T2S pathways.

Propositions 10–20 relate to the general capacities and responsibilities of people, governments and technology to achieve transformation towards sustainability. Supermajorities among Beirut, Istanbul and Shanghai respondents believe urban residents have a higher impact on the environment than their rural counterparts (no. 10), while at the same time showing a supermajority belief (among 80–90% of respondents) that most urban people are not aware of the impacts of their activities on the environment (no. 13). This combination of beliefs concerning urban dwellers' high impact on and low awareness of the environment makes potential Green-Win choices a challenge for cities. Yet, there was no agreement among respondents on more draconian environmental regulatory measures like limiting urban populations (no. 11). A supermajority of Istanbul respondents (71%), for example, think limiting populations is a good proposition, but 79% of Shanghai participants disagree, perhaps due to their experiences with previous government population control measures.

Most respondents, 93% or more across the three cities (100% in Beirut), agree that everyone shares the responsibility to make cities more sustainable (no. 15). Yet, significantly, 93% of Istanbul residents agree with proposition 16 (52% strongly) that making cities more

sustainable should be a responsibility of government, while only 62% of Shanghai participants supported this statement (17% strongly) with Beirut in between. Supermajorities of Beirut (98%), Istanbul (98%), and Shanghai (97%) respondents agreed that a particularly important role of government is to provide the strong environmental regulation for businesses to ensure that their activities do not contribute to climate change or other environmental damage (no. 19). A supermajority of respondents in both Istanbul (86%) and Shanghai (76%) supported proposition 20, that “new technologies will solve our environmental problems,” but only 52% of Beirut respondents agreed with 40% disagreeing, suggesting doubts about techno-fix-only solutions.

Significantly, business is seen as having important capacities for urban transformation in all three cities (propositions 17–19, 21). Supermajorities of respondents in Beirut (92%), Istanbul (93%), and Shanghai (81%) agreed with the proposition (no. 17) that “businesses have a special role to play in reducing the environmental impacts of society because they are the biggest polluters”, and because (no. 18) they “are the most likely sources of innovation in goods and services” (Beirut 96%, Istanbul 97%, Shanghai 94%). However, a strong majority of respondents in all three cities were skeptical of the “green business” label, agreeing with proposition 21 that “When I see a business call itself ‘Green’, I think it is mainly about branding rather than meaningful action.” This result suggests the necessity of government regulation or other accountability mechanisms to ensure that businesses contribute substantively to environmental sustainability.

5.1 Findings regarding enabling environment

The next set of propositions concerns dimensions of what we term the enabling environment (Table 1). The first of these dimensions is vision. We found nearly universal support among Beirut, Istanbul, and Shanghai respondents (91–96%) for proposition 24, that “The lack of a clear vision of a sustainable city prevents necessary transformations to reduce urban environmental impacts.” Given this, it was not surprising to find supermajority agreement among Beirut (75%) and Istanbul (72%) respondents with proposition 29, that “Environmental sustainability is not part of my city’s vision” but more surprising that 83% Shanghai respondents disagreed with this notion, perhaps reflecting a strong tradition of and/or belief in government urban planning. Unlike Beirut and Istanbul, the Shanghai respondents’ perspective seems to be that, while environmental sustainability is a part of the city’s vision, sustainability policies do not synergize to provide an effective model for reducing environmental impacts.

The second dimension of the enabling environment is the cultural-cognitive perspectives affecting individual perception and motivation. In this category, we found supermajority support in all three cities for proposition 25, that “Urban citizens’ values and perceptions are major obstacles to successful transformation to sustainability.” There was also supermajority (Beirut and Istanbul) and majority (Shanghai) support for cultural-cognitive proposition 31, that “Urban citizens tend to follow their past behaviors, regardless of environmental impacts, even when more sustainable alternatives are presented.” This psychology of path dependency stands somewhat at odds with the more aspirational goal of proposition 38, “We have to protect the environment for our children and future generations, even if that means reducing our standard of living today,” which drew near consensus agreement from Istanbul respondents (98%), supermajority agreement in Beirut (78%), but only a weak majority of support (52%) from Shanghai stakeholders.

The third and fourth enabling environment dimensions concern formal policy institutions and organizations. Among the foremost concerns of stakeholders was with formal institutions. It is assumed to be harder to strategize or transition towards climate-win sustainability in a volatile business environment. Correspondingly, 88% of Istanbul, 85% of Shanghai, and 78% of Beirut respondents agreed with the proposition (no. 26) that “Uncertainty in the policy environment is a huge disincentive for businesses to invest in sustainability.” Another concern was that “The lack of political will on the part of the government prevents the city from transforming/ transitioning toward sustainable development” (no. 32), a statement with which supermajorities in all three cities agreed. This lack of faith in governments’ capacities perhaps helped lend more support to proposition 39, that “Developed countries are mostly responsible for climate change and should therefore significantly reduce their emissions and help pay for developing countries’ efforts to mitigate and adapt,” with which 100% of Istanbul, 83% of Shanghai, and 77% of Beirut respondents agreed.

In terms of the organizational environment, 62% of Istanbul and 57% of Shanghai respondents agreed with proposition 27, that “The most powerful organizations in the city are the least likely to participate in the transformation toward urban sustainability because such change threatens their status,” but only 49% supported this idea in Beirut. Yet, while 70% of Istanbul respondents agreed with proposition 33, that “Most organizations (e.g., governments, businesses and civil society organizations) do not have the capacity to make transformative changes toward environmental sustainability,” significant majorities in both Shanghai (62%) and Beirut (57%) disagreed with this statement, suggesting a stronger faith in the capacity of organizations to adapt to environmental sustainability needs. Still there was faith in business, with 86% of Istanbul, 83% of Shanghai, and 66% of Beirut respondents agreeing with proposition 36, that “Green business and entrepreneurs are the main drivers to ensure urban sustainability.”

We linked the fifth component of the enabling environment, the economic sphere, to propositions on finance. Here, strong supermajorities of Istanbul (97%), Beirut (92%), and Shanghai (90%) respondents agreed with proposition 28, that “Financial incentives, including private investment and government subsidies, are necessary to stimulate transitions toward sustainability.” A strong supermajority of Shanghai (81%) and Istanbul (76%) respondents also disagreed with proposition 35 that “My city does not have the funds to support initiatives towards sustainable development,” indicating a strong belief that there is sufficient finance to support transitions to sustainability. In contrast, Beirut opinion on this proposition was more divided (52% disagreement).

Finally, we considered technology, specifically ICT (information and communications technologies) as an aspect of the enabling environment. Proposition 37, “The Internet (ICT) can make cities greener/more sustainable,” drew strong agreement from Shanghai (85%) and Istanbul (71%) respondents, while opinion was more divided in Beirut (53% agreement). Similarly, there was overwhelming confidence in proposition 40, “Global access to Internet is likely to change how governments operate in the city,” with strong supermajority agreement among Shanghai (93%), Istanbul (88%), and Beirut (75%) respondents.

In sum, while cultural models of Green-Win show disagreement among residents of Istanbul versus Beirut and Shanghai about the zero-sum nature of economic growth in relation to environmental sustainability, there is strong agreement on basic propositions concerning the causal conditions for successful transition to sustainability. These include a strong belief in the need for government-led sustainability visioning; the importance of strong environmental regulation, monitoring, and assessment (to insure Green-Win is in fact green and sustainable);

consistent policies; appropriate financing of sustainable transitions; and organizational capacity to effect the T2S. Indeed, there is a solid consensus surrounding the Green-Win proposition embodying these particular enabling environment conditions in the relations between government, business, and society.

We now consider each of the cities' responses in relation to the on-the-ground (dis)enabling conditions that constitute the broader cultural and social-environmental context for urban development in Beirut, Istanbul, and Shanghai.

6 Discussion

Given the varied results of the survey, we attempt here to more fully ground our findings concerning Green-Win models for T2S in a comparative analysis of the national and urban contexts in which these different sets of beliefs evolved. We assumed that there might be a strong intercultural consensus among our sample of graduate students and sustainability professionals concerning green growth and sustainable development models, given their awareness or association with international conservation and sustainability initiatives, such as the sustainable development goals (SDGs). The fact that our samples did not yield uniform results across the three cities, but instead produced some significantly different results, suggests that cultural-cognitive factors, including presupposed models of and for the transition to sustainability are a factor in the Green-Win's interpretation and actualization vis-à-vis local conditions in each city.

Most strikingly, Shanghai stands in marked contrast to Beirut and Istanbul in its strong faith in the compatibility of environmental sustainability and economic growth—the Green-Win proposition. We suggest this is due in no small part to the strong central government visioning of sustainability, as well as the empirical evidence of meaningful exemplars of environment-development win-win scenarios. Prototypical Green-Win projects are important cultural models in themselves; they are existing or historical representations of phenomena (including transitions towards sustainability) which people can use to assess or interpret related propositions (i.e., Green-Win). In the case of China, this prototype is the massive transition that the government has both envisioned and enabled in the renewable energy sector, taking the country from a laggard to a world leader in renewables technology and deployment. Such an exemplar in one area (T2S) can become a model or blueprint for how to effect change in other areas. However, such prototypes, like falsehoods, are at base cognitive images rather than scripted plans, and their entailments with respect to behavior or pragmatic action may be fuzzy in terms of actors' interpretations of the conditions under which they apply (cf. Coleman and Kay 1981). Yet, as it is the case more broadly with polysemous symbols, this does not necessarily detract from their conceptual and communicative force, and instead may enhance it.

The strong support for the Green-Win proposition in our survey reflects the presence of an integrated cultural model for transition to sustainability in Shanghai's distinct urban context compared to other cities. Notably, the Shanghai survey coincided with a major phase of government-planned economic restructuring of China, moving urban environments like Shanghai away from heavy industry and manufacturing-based high economic growth (10–11%) to smarter and more sustainable growth of lower rates (6–7%). Consensus around the efficacy of this structural transition was forged among policy makers and intellectuals by 2015 when the country's economic growth started to slow down. The Chinese leadership proposed

the cultural concept of “ecological civilization” to encompass strong environmental values alongside economic growth as China’s vision for urban development (Geall and Ely 2015). This vision, rooted in traditional Chinese ideas of harmony with nature, readily cascaded down to local levels and was adopted by Shanghai, the preeminent global and innovative city of China, as “ecological development,” and became a conceptual pillar of its current Master Plan (Shanghai Master Plan 2017–2035). Therefore, Shanghai had a more advanced visionary preparedness for the compatibility between environmental sustainability and future economic growth, and an integrated cultural model of Green-Win development, ecological civilization, and sustainability governance compared to Beirut and Istanbul, where strong central visions of sustainability have not been articulated and top-down centralized planning has not been the norm.

Second, as noted above, China has built a track record of successful low-carbon initiatives, especially in renewable energy, which has served as a model for the broader transition to sustainability, feeding confidence in future win-win practices. For example, in terms of energy efficiency, between 2006 and 2010, China effectively reduced energy intensity (an indicator of energy efficiency level for nations) by 19.1% while achieving a 9–10% economic growth rate (Qi et al. 2016). Moreover, the national low-carbon strategy, financed by both state and private capital, has built robust low-carbon industries in key urban development areas, such as building, transport, and industrial parks. As well, China has established itself as the world’s biggest investor in renewable energies, especially solar and wind. This record of material success, combined with the state’s active visioning, targeting, and financing of Green-Win solutions, sends strong signals to citizens that win-win solutions are achievable through government-led organization of political, financial, physical, human, and social capital. Monitoring and assessment, however, have been less successful to date, and a strong collaborative governance model for Green-Win sustainability has yet to be realized across sectors (Ma et al. 2018).

Lastly, China has been pioneering in technological revolutions, especially in the digital economy, engendering optimism that technological breakthroughs will catalyze low-carbon development and urban transformation to sustainability. This belief in techno-fix is closely aligned with China’s cultural model of its historical development as a scientific and technological civilization, but also with the state’s post-Maoist adaptive, solution-oriented pragmatism, as exemplified in proverbs such as Deng Xiaping’s, “It doesn’t matter whether the cat is black or white, as long as it catches mice” (Lieberthal 1995). This logic is embedded in the new cultural model of ecological civilization. In particular, Chinese big-data and app-enabled smart mobility companies have been encouraged to develop innovative, practical solutions to problems of congestion and pollution in urban transport. Notable companies in Shanghai include Mobike, which offers a free-floating bike sharing system, and EVCARD that provides a platform and infrastructure for electric vehicle sharing (Ma et al. 2018). Their disruptive technologies and innovative business models have engendered more widespread public interest in Green-Win propositions as sustainability solutions.

Of course, these models are not without tradeoffs, and more recently, deleterious impacts of these new app-enabled mobility schemes have emerged during the process of scale-up, undermining win-win sustainability claims. It is noteworthy that these negative effects were not widely publicized until approximately 6 months after the survey was conducted in June 2016.

In Istanbul, we suggest that disagreement with the proposition of compatibility between economic growth and environmental sustainability derives from a different cultural model of sustainability, based more on nostalgia and sustainability of a historical sense of place than a

new ecological civilization of the future. Unlike in Shanghai, Istanbul lacks a strong consensus vision and cultural model of how to address environmental and social sustainability concerns in relation to the city's construction sector-driven economy. In the first quarter of 2017, construction constituted 59% of the city's gross fixed capital formation, up more than 10% from 2009 (Turk Stat 2017). Yet, to date, this burgeoning sector has been more concerned with increasing development and densification of the city to accommodate its growing population than with greening urban systems. Thus, environmental and social sustainability are not the guiding principles in Turkey's economic growth. Moreover, civil society is poorly engaged and empowered in the numerous, large-scale seismic resilience-driven urban renewal projects in Istanbul, despite this constituting a Green-Win opportunity space for transition towards lower carbon buildings and energy efficiency. Turkey's national government commands the important planning and funding decisions and therefore shapes the overall direction of Istanbul's development. Typically, national government decisions are made without consultation and often override local decisions in the process. This results in Turkey's President wielding significant influence over cities (Kuokkanen and Yazar 2018; Erder 2009) and makes sustainability-oriented residents cynical about the prospects of linking rapid urban development with sustainability goals. They see the inherent conflicts both in the lack of a strong sustainability vision from the national government and the lack of decentralization in Istanbul's urban decision-making, both of which hinder Istanbul's capacity to lead a sustainability transition. Thus, the strong disagreement with proposition 5, that "My city is adapting to climate change."

Secondly, the Turkish case constitutes a negative example of low-carbon energy development, in contrast to China's renewables revolution. Turkey's economy is among the most energy intensive of the OECD countries (OECD 2018), and energy demand has grown steadily over the last 15 years, bolstered by the country's aims to become the world's 10th largest economy by 2030 (TSV-2023 2008). Rather than a Green-Win opportunity, the international climate mitigation agenda to reduce greenhouse gas (GHG) emissions is seen as an obstacle to economic development. In 2016, Turkey's Minister of Energy and Natural Resources stated the national vision to prioritize its coal resources to support the country's energy demand (Enerji Enstitüsü 2016). Since 43% of GHG emissions currently stem from fuel combustion related to coal use, this does not bode well for the transition to sustainability, despite some investment in hydropower and other renewables. Within these nationalist development priorities, Istanbul has little maneuvering space. The municipality thus only implements voluntary actions with its ongoing Climate Change Action Plan for Istanbul to become a "climate friendly city" (ICCAP 2016), which stand at odds with the nationalist cultural model of development. There are few or no directives and little financing to support transformations towards more sustainable energy production or conservation. This explains the skepticism behind Istanbul stakeholders' strong disagreement with proposition 6, that "The environment of my city will improve in the near future."

Lastly, there is the palpable sense of loss and nostalgia (perhaps even solastalgia; see Albrecht 2007) that Istanbul residents feel for their city. Traditional neighborhoods, communal architecture, and public spaces are disappearing in the face of rapid densification and development. This is likely one impetus for the near consensus perspective (98%) by Istanbul respondents that, "We have to protect the environment for our children and future generations, even if that means reducing our standard of living today" (no. 38). Much of the recent construction consists of poor-quality buildings and the privatization and gentrification of green and communal spaces,

driven by profit motives rather than extending the traditional cultural model of a healthy, safe and livable city for future generations. Consequently, stakeholders from the construction sector generally expressed a sense of hopelessness about achieving a T2S according to the standard Green-Win proposition, given that their cultural model of the majestic, heritage city was being steadily eroded by intensive development.

Beirut is the smallest city in our study, but, as the capital of Lebanon and a major broker of the region, it shares some sensibilities with Shanghai in this respect, more so than Istanbul. Both Beirut and Shanghai were gateways for Western penetration of their respective regions, paving the way for a distinctly less culturally conservative development. Since its independence in 1943, Lebanon's economy has operated without interruption with free markets and a high degree of *laissez-faire* (Gaspard 2003). This cultural model of development aligned with growth and prosperity of the country until the eruption of a civil war in 1975. The civil strife lasted 15 years and destroyed all the constituents of the state. The end of the conflict in 1990 concurred with a worldwide “roll-forward” of neoliberal state governance (Jacobson 2010) which caters for an active restructuring of the political economy to favor “new forms of governance that are purportedly more suited to a market-driven globalizing economy” (Jessop 2002, 454). This approach was promoted by the international multilateral institutions that have helped, and continue to support, the reconstruction of Lebanon and the reconstitution of its institutions. Given the Lebanese *a priori* embrace of the market-driven prototype of urban development, this “sense-giving” (Gioia and Chittipeddi 1991) schema of neoliberalism has not really met any opposition. Moreover, the gradual improvement of the situation since the end of the war has anchored the Lebanese in the belief that it is rather positive and pragmatic to make use of the private sector and the market as the primary engine of sustainable development and modernization.

Beyond the case of Beirut and Shanghai, the question raised by the initial paradox makes it possible also to question the limits of the very principle of Green-Win. The two cities hold diametrically opposed models of governance. Beirut is implementing an almost total *laissez-faire* approach, while in Shanghai the greening process is closely monitored and supervised by the central authorities. This allows the Chinese metropolis to set up ambitious long-term visions, targets, and strategies, such as the ecological civilization plan, at a time when post-conflict Beirut struggles to initiate its first low-efficiency renewable energy source (PV) because of its short amortization period. Non-government investors and users in Beirut are looking almost exclusively at the commodifiable aspect of greening, which singularly limits the sustainability potential of ongoing operations. The market may be agile in the short term but fickle in the long term. The transition to sustainability, however, requires a more robust and enduring model of Green-Win. In Beirut, to date, neither the market nor project-based (e.g., United Nations funded) schemes have provided the enabling environment to sustain the Green-Win proposition. Strong visionary governance is lacking altogether, and for this reason Beirut expresses the strongest doubts about its city's capacities to adapt to climate change (no. 5) and that its environmental quality will improve in the future (no. 6). Similarly, Beirut registers the strongest agreement, beyond Istanbul, with proposition 29, that “Environmental sustainability is not part of my city's vision,” and that, “The lack of political will on the part of the government prevents the city from transforming/transitioning toward sustainable development” (no. 32).

7 Conclusion

Generating compelling models of and for the transition to sustainability in rapidly growing cities represents a major challenge for humanity. While urban development has enabled higher densities of human communities, this has not translated into lower rates of consumption or other sustainable behavior changes, despite the promise of technology and other efficiencies of concentrated city dwelling. Cultural model surveys, when combined with analysis of structural and cultural-historical conditions, provide a means of interrogating complex multi-dimensional concepts of sustainability and its relationship to urban development in diverse world cities. We focused especially on the logic of Green-Win opportunities between cities and businesses to tackle critical urban environmental problems, particularly major cities' contributions to global climate change through consumption and emissions from fossil fuels.

Building on an initial round of stakeholder consultations with professionals in key carbon emission sectors, we produced a fixed form survey of 40 propositions about sustainability and adaptation to climate change using a 4-point Likert scale spectrum of agreement. The results show high levels of agreement about cities' need to adapt, the importance of business as a catalyst for T2S, and of the necessary role of the government as a visionary, regulator, and long-term planner of low carbon, sustainable development. Complementing this data with qualitative interviews and contextual material, a clearer sense of the origin and salience of Beirut, Istanbul and Shanghai's cultural models of and for urban T2S emerge, including some paradoxical differences.

The most striking differences between the cities concerns the Green-Win proposition itself. Istanbul respondents expressed basic disagreement with viability of the Green-Win proposition for sustainable development, while Shanghai and Beirut respondents showed a high level of support for economic development and environmental sustainability being compatible. Further probing the sources of this variation among the three cities, we found the importance of prototypes, or exemplars, as models for transformational change. Such a prototype is evident in the China's rapid government-led transformation towards renewable energy and its explicit and pragmatic model of an ecological civilization for achieving sustainability. Here, we have both a cultural model of and for sustainability. In Istanbul, in contrast, the model of sustainability is more conservative, based on a negative prototype of recent development that has proven incompatible with sustainability and destructive of the city's glorious past, rendering the urban landscape into a denser, more stratified, less green, and less communal environment. Government has been not only been complicit in this degradation (sacrificing sustainability goals in the name of growth) but also has failed to foster a compelling vision of the transformation to sustainability. This has led to poor results in transforming the building and energy sectors, which are critical to the Green-Win proposition, and thus a healthy skepticism towards the concept of Green-Win adheres. Finally, Beirut stands poised in between, more modernist and less nostalgic than Istanbul but lacking China's strong central government-led vision and prototypes for Green-Win futures. Instead, Beirut thrives on the resilience of its capacity for modernization, led by business and project-oriented development, despite civil strife and conflict, which have until recently severely limited its government's capacities. All three cities thus see the model of and for urban sustainability as ultimately being co-created among government, enterprise, and the public, but with critical synergies needed between government and business to envision and enable transformation of urban systems. How the Green-Win proposition—the compatibility of environmental sustainability and economic growth—is understood in the different case study contexts frames/reframes the very possibility

of transitioning towards lower carbon futures. The strong belief in a zero-sum model of economic growth versus environmental quality observed in Istanbul respondents—contrasted with Beirut and Shanghai respondents’ more receptive stance to the logic of win-win propositions between environmental quality and economic growth—will need to be overcome through a different narrative frame.

While our findings are significant, there are limitations to how much we can generalize from this study. Due to time and resource constraints, it was not possible to expand the sample significantly beyond our initial stakeholders, nor to conduct significant ethnographic or cognitive anthropological research beyond interviews and focus groups and limited participant observation, to develop more nuanced cultural models of “Green-Win” transformations in each city. In the future, we intend to do so and to further triangulate the results with other sources of information, including appropriate linguistic, ethnographic, and other instruments for deriving cultural models, such as free-listing, pile sorting, scenarios, and multi-dimensional scaling (see Bennardo and de Munck 2014; Bennardo 2018). Similarly, we did not perform a formal consensus analysis on the survey data, which can boost confidence in cultural model analysis with smaller sample sizes, although we found strong or supermajorities on most of the key propositions discussed in each city, reflecting strong levels of consensus. Finally, a follow-up restudy, as has been done on climate change, would be useful to understand how cultural models of T2S develop and change over time in relation to enabling environment conditions.

Finally, another finding of this study suggests an important implication for further consideration, namely the conceptual fuzziness of sustainability itself. Sustainability can be modeled culturally in many ways, from personal and social sustainment and wellbeing, to economic and environmental sustainability, each with its own logics, images, and stereotypical characteristics. Given this fuzziness, it is easy to see how sustainability can be mapped from one domain (e.g., social sustainability) to another (e.g., energy or environmental sustainability), yet this conceptual elasticity can also obscure contradictions and win-lose propositions between these domains, in effect creating coherence where it may not exist. Historical exemplars of win-win, win-lose, and lose-lose sustainability propositions may become important frames for reckoning this capacious concept, and like cultural models themselves, may be simplifications based on nostalgia or stereotypes. Similarly, concepts such as the Triple Bottom Line (economic, social, and environmental sustainability) are salient and attractive and hence easily framed in win-win and Green-Win terms, when in reality they may mask significant contradictions or tradeoffs between the three domains, especially in the medium-to-long term. Cultural research can address this gap by engaging with local knowledge holders directly responsible for interpreting climate and sustainability risks and Green-Win opportunities and implementing solutions so as optimize messaging and marshal participation for urban transformations towards sustainability.

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Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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