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Chapter 12

Urban energy transitions through innovations in green building

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12.1. Introduction

Recent debates on climate change have increasingly focused on cities as strategic spatial scale to implement climate change mitigation and adaptation strategies. Within this context, green building and the way the built environment interfaces with urban structures and services have become significant levers of action for cities to reduce greenhouse gas emissions and become climate change leaders (Bulkeley et al., 2011). Approximately 30% to 40% of final energy consumption is linked to buildings and, as a consequence, the building sector has been identified as one of the most relevant sectors to reduce CO_2 emissions (UNEP, 2011). Although green building is largely associated with technological innovations, building design and the way elements are embedded within the overall urban fabric, a shift towards green building in cities largely depends on modes of sustainable governance. Relevant dimensions include support of and for green policies and incentives, institutional support through resource centres, think tanks, certification bodies, and training, aspects of inclusivity both in the planning process as well as the later use of (and access to) buildings and to a considerable extent on lived sustainability (i.e. the ways individuals interact with and use buildings). This latter dimension

of possibly changing user behaviour and consumer lifestyles seems to be absent from most of the energy scenario studies, as Samadi et al. (2016) revealed in their assessment of a series of internationally influential studies and policy programmes. Like other scholars (e.g. Sachs, 1999; Princen, 2003; Schneidewind & Zahrnt, 2014), they plead for a stronger conceptualization of sufficiently oriented policy approaches and differentiate persuasive instruments (e.g. through education and communication) from incentive based (price/tax policies) and more coercive approaches (limits, bans).

A proper understanding of green building, then, requires consideration of a whole range of aspects, including technological, institutional, procedural and socio-cultural innovations. Against this background, this chapter investigates conditions and drivers behind innovations resulting in green building in selected city regions. The term 'green building' is here used as umbrella term for all activities related to sustainable construction (i.e. the green building sector as a whole). It is thus not limited to the physical building (i.e. a single residential or commercial project/neighbourhood), but applies a more comprehensive understanding of building activities, including the political and regulatory context and all relevant actors and stakeholders involved. This chapter embeds green building transitions within the recent literature on sustainability transitions that pays attention to the spatial dimensions of green transitions, including regional variations and multi-scalar linkages within and between cities and regions (Truffer & Coenen, 2012). Research on sustainability transitions rooted in Transition Studies focuses on technological innovations and modernization processes to understand drivers and processes towards low-carbon economies and societies more generally. The chapter uses the Multi-Level Perspective (MLP) heuristic to understand regional trajectories of innovations in green building based on a more neutral and open understanding of sustainability transitions that seeks to grasps all sorts of more or less beneficial transitions, including parallel and uneven

processes, exclusions and less successful innovations. It does so using a broadened transition studies perspective that breaks free from its technocentric focus. It incorporates green building innovations that go beyond the technical or procedural realm to encompass organizational, social and cultural changes that can play a role in transition processes. The chapter places particular emphasis on the role of both individual and institutional actors as agents of change. As such, knowledge generation, transfers and learning processes amongst practitioners, experts and decision makers, both in the building sector and at the urban policy level, are considered to be central to understanding green building innovations and developments in city regions.

Box 12.1 Sustainability transitions and Geels' (2002) multi-level perspective

The problem: human-induced climate change requires significant rethinking and economic restructuring to achieve reductions in CO_2 emissions. Sustainability transition research analyses how societies can achieve a transition towards a more sustainable future. The core assumption of the approach is that such restructuring requires technological innovations and that these innovations result from an interplay between social and technological processes. Frank Geels developed his multi-level perspective as an analytical framework to understand and explain socio-technical transitions integrating an institutional perspective (including actor groups and framework conditions) with temporal dimensions.

The approach: Geels distinguishes between three mutually dependent levels: niche, regime and landscape. Niches lie at the micro-level and act as test beds for innovations and new socio-technical constellations. They usually consist of spaces that are protected from rules and structures at the higher scales of the regime and landscape (e.g. exemptions from certain regulations or free market forces). The regime level acts as the meso-level of socio-technical systems and describes predominant organizational standards and norms, whereas the landscape describes the macro level, consisting of the most persistent structures such as cultural norms and values. Successful niche innovations can evoke changes at the regime and landscape level, but change can also be triggered by changes at the landscape level (e.g. environmental disasters can lead to an increased environmental awareness of the general public).

Criticism: although the MLP provides a strong heuristic model, a number of limitations have been criticized, including its technocratic focus (i.e. a narrow definition of innovations bound to technology and linked to this limited acknowledgement of socio-political dimensions of (sustainability) transitions). Geographers in particular have criticized the lack of spatial considerations and a tendency to conflate the three levels with spatial scales (e.g. Coenen & Truffer, 2012).

The conceptual framework presented in this chapter (Section 2.1) requires an appropriate methodological design which allows us to reconstruct origins and trajectories of green building innovations. Here, the implementation of the research framework is itself guided by different knowledge exchanges and learning processes. Section 12.2.2 introduces and discusses two specific tools, the World Café and the Delphi approach, that seem particularly well suited for knowledge generation and data collection of complex and multi-actor processes common in (urban) sustainability transitions. Based on practical experiences with the two tools, the benefits and challenges of the methods are critically discussed as well as their potential contribution to critical reflection. In respect to green building, including policies and societal and technological innovations, the two approaches are well suited to help explore new actor constellations and policy arrangements as well as their potential for initiating mutual learning processes between researchers and practitioners but also amongst practitioners themselves (Section 12.3). The latter aspect will be illustrated through case study examples from four city regions (Freiburg in Germany and Vancouver in Canada as leaders in green building and Brisbane in Australia and Luxembourg City in Luxembourg as more recent adopters of green building) and discussed against the backdrop of current debates about the use of participatory action research (PAR).

12.2. Research perspectives and instruments

12.2.1 Transition studies and green building

Over the last two decades, the growing field of Social Studies of Technology (or 'Transition Studies') has resonated increasingly in sustainability related research, notably in the energy and mobility sectors. Initially developed in the field of technological innovation, empirical case

studies of sustainability related issues, and particularly those using Geels' Multi-Level Perspective (MLP, see Box 12.1. and Chapter 6), have proliferated to an extent that Transition Studies are now frequently adopted and used as a normative perspective (e.g. as Strategic Niche Management). In the literature, there is a tendency to assume a directed process (transition) towards a pre-determined finality (sustainability) that runs the risk of ignoring multi-directional and diffuse aspects of transitions (e.g. in the case of the agro-fuel boom in North America and Europe which turned out to be rather questionable in terms of environmental and social sustainability). Further, and with the adoption of the MLP in human geography, scholars have started to criticize the rather 'a-spatial' approach dominating transition studies research (for overviews see Coenen & Truffer, 2012; Rohracher & Späth, 2013; Hansen & Coenen, 2015; Murphy, 2015). Whereas classic case studies in transition studies have focused on national or regional innovation systems, critics have argued in favour of non-essentialist, relational (networked) rather than territorial (nation-states, regions) understandings of space that account for the mobility and 'travel' of ideas and innovations (sometimes over long distances) not only in the form of transferable best practices and cookie cutter models, but also in various forms of knowledge, practices and experiences through very personalized channels (Affolderbach & Schulz, 2016). Whereas processes at the landscape level are often associated with higher spatial scales (e.g. national politics and regulations), there is no spatial hierarchy between the different levels in the MLP. For example, the focus on city regions as discussed in this chapter understands cities as defined by processes and actors within and outside of the city itself which may all co-constitute the landscape, regime and niche level. As such, a city may act as local niche and/or may encompass a number of localized niches that may depend on non-local factors.

Figure 12.1 shows a possible adaptation of the MLP concept to energy-related green building transitions. If one considers the 'orthodox' building sector as the well-established regime and green building initiatives rather as burgeoning niche phenomena, both levels are exposed to overarching changes in the energy sector and in climate change policies (Schulz & Preller, 2016).

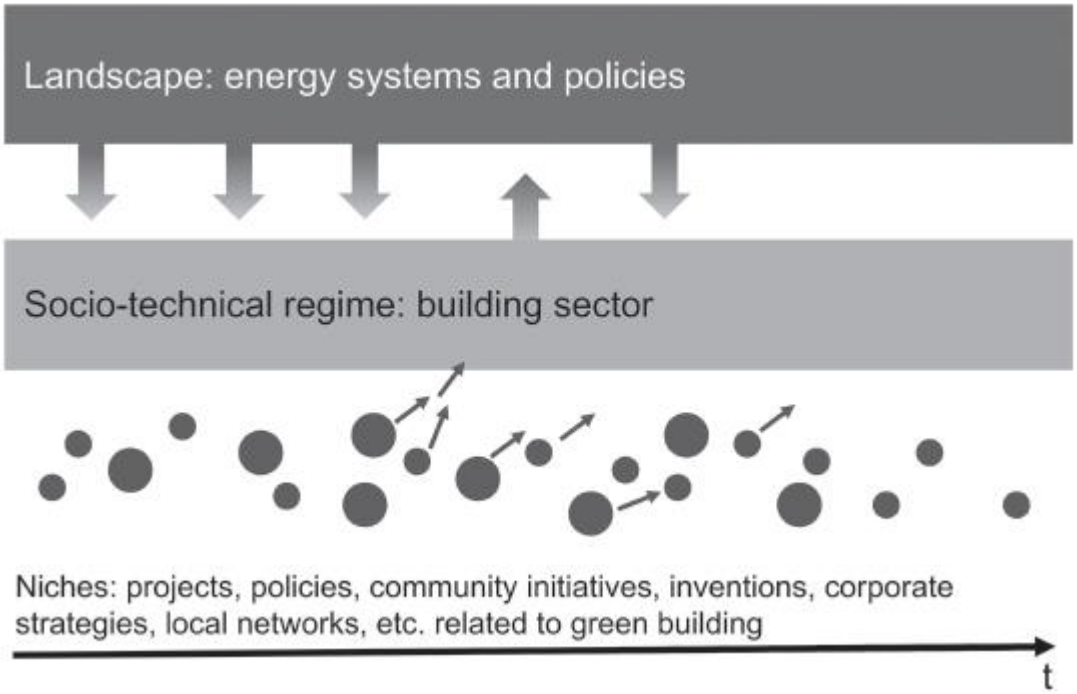

Figure 12.1 The Multi-level perspective (MLP) adapted to the building sector.
Source: Schulz & Preller, 2016, p. 274, based on Geels, 2002, p. 1263.

Recent changes in climate mitigation policies at the European level, for example, have led to substantial changes in the EU energy policy 'landscape' which have an immediate impact on the various socio-technical regimes, in particular, the building sector. The 2010 amendment of the Energy Performance of Buildings Directive (EU, 2010) and the 2012 Energy Efficiency Directive (EU, 2012) have set ambitious goals to be transposed via the member states' legislations. Amongst others, they foresee that all new buildings must be nearly zero-energy buildings by 31 December 2020 (public buildings by 31 December 2018). This new regulation not only puts national governments under pressure to implement these standards within the

given time period; it also causes adaptation processes in the building sector as it challenges many of the current routines that define the mainstream building sector. These standards, however, do not fall from (Brussels') sky but are the outcomes of long negotiation processes, which have partly built on pioneering standards developed in local contexts. The city of Freiburg's stringent low-energy standards, for example, established in the early 1990s and further developed since have been incrementally incorporated into Germany's federal building standards and as such indirectly serve as a reference for the current EU scheme (Fastenrath, 2015). This evolution goes beyond the mere techno-administrative notion of policy upload (usually from member state to EU-level) as it comprises a particular niche context were path-breaking urban policies could emerge and consolidate before they became a role model.

Although the regime–landscape interface is less of an interest here, the focus is on both the emergence of niche initiatives and their articulation with the incumbent regime. This means the research design needs to take into account the related actor constellations and institutional settings at all three levels, including the respective power topographies, barriers and driving forces. The wider understanding of the term innovation broadens the focus to look beyond radical, disruptive changes in the production process, as it might be typical for technology oriented transition studies. Organizational, social and cultural innovations might occur rather incrementally, but not without leading to fundamental changes in the longer run.

As arenas for possible innovations of this kind, it seems suitable to focus on micro-case studies (such as the Freiburg standard) and to reveal their individual trajectories through in-depth investigation. In order to carefully select the most relevant cases for empirical purposes, a narrow interaction with experts and stakeholders involved should be conceived as a participatory research approach. The following section will introduce the basic notions of participatory approaches and will present two promising instruments.

12.2.2. Participatory approaches in urban sustainability research

Recent trends towards more participatory approaches in both policy making and research, which have been coined as "participatory turn" (Aldred, 2011), offer valuable tools to sustainability research. Here, the notion of 'knowledge co-production', understood as collaboration between researchers and 'the researched' at different stages of the research process, has gained particular momentum in the social sciences. It is substantiated by arguments on the complex nature of reality compared to scientific theory (Callon, 1999), practical application or 'utilization' of research (Hessels & van Lente, 2008, p. 741, Martin, 2010, pp. 211–212) and the socially transformative stance adopted by action research (Pain, 2004). It is based on the key premise that knowledge is embedded within the practices and everyday experience of all those directly involved and/or affected, including practitioners and civil society (Bergold & Thomas, 2012; Borg et al., 2012). As such, it challenges traditional concepts of expertise and knowledge generation, predominantly understood as a single-sided knowledge generation in academia and research centres, with practitioners being considered as mere recipients of scientific knowledge produced outside their everyday realm and then 'transferred' from the scientific world for application at a later stage. In contrast, participatory approaches offer promising opportunities for both the researchers and the research participants in terms of knowledge generation in general and scientific advances in particular, specifically when it comes to deliberate co-production schemes. This is especially relevant to environmental policy and sustainability issues, which require "a scientific practice which can cope with uncertainty, with value plurality and with the decision-stakes of the various stakeholders of the problem at hand" (Hessels & van Lente, 2008, p. 744), due to their complex and dynamic interactions with broader social, economic and physical processes (Blackstock et

al., 2007). It also allows insights into motivations behind and actions taken by those involved in sustainability transitions that are highly dependent on the context and situated knowledge, but also on individual trajectories, personal networks and values. In order to better understand green innovations and sustainable transitions, it thus seems necessary to complement 'traditional' qualitative research methods with participative elements.

Participatory action research

Research approaches labelled as Participatory Action Research (PAR) are usually driven by two core motivations: 1) a progressive understanding of the roles of both the researcher and the researched, and 2) the ambition to generate results that have an impact on 'the real world'.

As to the first, PAR deliberately tries to overcome the hierarchical distinction between the researcher's position and the researched community as a study object. That is, it no more sees the researched as a mere source of information to be explored with an appropriate methodology. Rather, it considers the 'researched' as a partner in a collaborative research endeavour (the "P" in PAR) where specific knowledge carried by the researched is recombined with knowledge acquired by the researcher. Both are thus engaging in the co-construction of new knowledge (Hessels & van Lente, 2008; Kindon, 2010).

Second, the wish for relevance in societal debates often comes with a normative stance taken by the researcher, thus engaging with a particular agenda to "make the world a better place" (the "A" in PAR). Not surprisingly, PAR is often practiced in highly politicized fields of research such as development, feminist and environmental justice studies. Frequently, PAR researchers see themselves as parts of a movement (e.g. a dedicated NGO) to which they deliberately contribute their research as a means of empowerment (Kindon et al., 2007; Mason et al., 2013).

This chapter is based on research that has been strongly inspired by the collaborative aspects of PAR (the "P"), whereas the latter, more political dimension (the "A") has been more marginal in framing research on green building transitions. The participatory research approach presented here could be described as 'Interactive Transition Research' (ITR) that acknowledges the key role of the constituencies (here the stakeholder communities within the green building sector) in the co-production of new knowledge which then might have a direct impact on the respective field (for more details on PAR and ITR see Preller et al., 2017).

World Café approach

One of the methods used to co-produce knowledge with the researched communities was to host World Café events with a range of local sustainable building practitioners (Box 12.2).

Box 12.2 World Café

The method was developed in the mid-1990s by Juanita Brown and David Isaacs and consists of a group intervention that encourages an open dialogue between participants by relying on unconstrained and interactive conversations. It is operationalized by splitting participants across tables of four to five where they are invited to tackle a specific question. Participants are then progressing through several conversation rounds with additional questions as they are asked to circulate and mix across the different tables (TheWorldCafé, 2008). The content of each conversation round is further retained and passed on to the next group by a fixed table host and eventually complemented by a final plenary discussion to ensure sharing and connecting of the generated information amongst the totality of participants. Through this "recombination" of knowledge (Brown, 2001, p. 3), reflexive processes amongst participants can be initiated and may lead to a collective understanding of an issue. This includes shared tacit knowledge which may contribute to creating joint "ownership" of the sessions' outcome (Brown, 2001; Fouché & Light, 2010; Prewitt, 2011).

In contrast to other group interventions, the method attempts to create a rather informal setting by conveying the atmosphere of a café through the use of symbolic items like tablecloths, the availability of drinks and food or even more playful tools as the possibility to write or visualize ideas directly on paper tablecloths. This framework is supposed to encourage participants to act as they would during an informal and relaxed meeting at a café (Jorgenson

& Steier, 2013). It aims at fostering the dialogic exchange between participants who should feel less in the role to ‘make their point’ but rather to listening openly and to accept other standpoints in order to engage in a constructive discussion on the given topic.

World Cafés are used by various types of public, private and non-governmental organizations, in rather different contexts, for very diverse purposes, including learning (Anderson, 2011). Their objectives vary and include the following attempts:

- To empower communities through joint learning and the creation of shared knowledge (Fouché & Light, 2010; Sheridan et al., 2010, for a critical discussion see also Aldred, 2011),
- To facilitate collaboration and communication within an organization (Tan & Brown, 2005; Prewitt, 2011),
- To stimulate innovation through networking and relationship building (Fouché & Light, 2010),
- To improve sales of a product (Brown & Isaacs, 2005, p. 31, quoted in Aldred, 2011, p. 68).

Also, different labels are in use to designate similar techniques (e.g. Knowledge Café, Conversation Café or Innovation Café); some organizers even invent individual labels for particular purposes (Prewitt, 2011). Nevertheless, the potential to encourage active participation of a wide range of participants and to help them to overcome their traditional understanding of meeting formats is common to all the different types of ‘Café-style’ methods. All usages allow the temporary suspension of “ordinary interactional routines” (Jorgenson & Steier, 2013, p. 390). This particularly includes hierarchical relationships within an

organization, as, for instance, the application of World Cafés within the Singapore Police Force shows (Tan & Brown, 2005).

The method thus helps to reveal more diversified, inclusive and changing understandings of a specific topic. It explicitly seeks for the diversity of perspectives held by the participants involved "[rather than] over-stating consensuality" (Aldred, 2011, pp. 62–63). Following the four main objectives of World Cafés – constructive dialogue, relationship building, collective discoveries and collaborative learning – the method also allows us to produce highly practical and contextually adaptable outcomes for researcher and researched alike.

Delphi techniques

The Delphi approach shows a series of similarities to the World Café workshops (e.g. interactive approach, composition of expert panels) (Box 12.3). Technically speaking, its main difference compared to the World Café can be found in its incremental, usually two-stage, approach aimed at validating findings from previous rounds of data collection. Usually both rounds are run anonymously, but openings towards more interactive formats are becoming more frequent.

The use of Delphi techniques in the socio-environmental sciences has so far been relatively limited. Among the exceptions are the so-called "spatial Delphis" that use mental maps and interactive Geographic Information System techniques to collaboratively gather expert knowledge about spatial phenomena, environmental impacts, territorial trends and related development strategies (Balram et al., 2003; Vargas-Moreno, 2008; Evrard et al., 2014). Orthodox Delphi techniques, which, over the last years have been applied in multiple fields and in a very flexible manner, can be similarly applied to sustainability transition research. They also allow the combination with other methods such as focus groups, interviews or

document analysis. For example, Landeta et al. (2011) propose a "Hybrid Delphi" when combining face-to-face exploration via focus groups with a more formalized two-stages Delphi based on questionnaires (non–face-to-face).

Box 12.3 Delphi techniques

In methodological terms, the Delphi approach was initially motivated by the search for reliable forecasting techniques in areas of limited knowledge (e.g. technological risks, marketing studies), as a decision-making tool ("policy Delphi") or as a consensus-making procedure among stakeholders (Evrard et al., 2014). Given the variety of uses, Rowe and Wright (2011) prefer talking about "Delphi techniques" instead of a single "Delphi method". The common idea of the various applications is "to obtain a reliable group opinion from a set of experts" (Landeta et al., 2011), be it for scenario building (forecast) or be it for the validation of research results. In both cases, the researchers filter and categorize information obtained to give expert panels the opportunity to comment on preliminary results and to discuss the most intriguing aspects in more depth.

12.3. Case study experience

The green building sector is an emerging, rapidly growing and promising transition field (IPCC 2014) with new actor constellations and institutional arrangements, pioneering initiatives and complex articulations between the corporate, public and civil society realms (Schulz & Preller, 2016). In order to retrace how climate change–led innovations in the building sector occur and become mainstreamed, context-specific learning paths and development trajectories are especially relevant, as are the key factors and actors that have been instrumental to these changes. As indicated earlier, analyses of innovation processes are not limited to technological change and specific building projects, but should consist of a co-evolutionary perspective, taking into account interrelated organizational, procedural, legislative and other innovations bringing together a variety of views and interpretations to analyse the phenomena under study.

This will be illustrated through empirical experiences of transition processes towards low-carbon economies in the building sector in four city regions: Vancouver, Freiburg, Brisbane and Luxembourg.

Research design

The research project on green building involved the two described methods (World Café and Delphi) that were combined in an incremental and cross-fertilizing manner, complementing other methods such as expert interviews and document analysis. To initiate contact as well as to involve as many experts' voices as possible in each case study region, field research was kicked off by four successive workshops – one in each case study region – inspired by the World Café and Delphi techniques that consisted of experts representing different aspects and institutions concerned with green building (Table 12.1). For each workshop, three discussion rounds were set up. Each round focused on a specific dimension of the sustainable building sector following the project's co-evolutionary approach: actors and organizations, building projects and framework conditions (encompassing institutional aspects like legislation, socio-economic aspects, etc.). Following the first workshop experience, a fourth discussion table was added to address challenges and barriers to the development of sustainable building practices, as it had been an important and recurring topic of exchange amongst participants.

Table 12.1 Field of expertise and affiliation of World Café participants

Workshop	**Number of local participants (+ researchers)**	**Sectors represented and participant affiliations**
Vancouver	14 (+5)	Architects, engineer and design firms, developers, think tanks, research institutes, NGOs, municipality, energy provider

Workshop	Number of local participants (+ researchers)	Sectors represented and participant affiliations
Luxembourg	27 (+7)	Architects, engineer and design firms, private and public developers, interest and professional associations, research institutes, NGOs, ministries (sustainability, economy, housing), national energy consultancy
Freiburg	10 (+7)	Architects, engineer and design firms, public developers, research institutes, municipality, energy provider
Brisbane	10 (+5)	Architects, engineering and design firms, research institutes, NGOs, municipality, state ministry, regional administration

Follow-up of the workshops and further communication involved the dissemination of a report summarising the main outcomes to the participants in form of a Delphi-inspired questionnaire, where participants were asked to critically reassess and validate the transition factors that emerged from the workshops. The information from the questionnaires were used as guidance to determine a number of key aspects for in-depth qualitative micro-case studies in each of the four city regions, covering selected green building policies and programmes, influential organizations and actors, as well as built environment projects. This step was backed up through document analysis and semi-directive interviews. The workshops further helped to open doors to relevant interview partners and generated necessary background knowledge and references. The research design thus combined and complemented elements of two participatory methods with more 'orthodox' qualitative research methods. This incremental procedure was designed to assure a high level of reflexivity both of the researchers as well as the researched group. To this end, final workshops were held in Freiburg and Luxembourg allowing the participants of the former rounds to critically reflect on shared knowledge and to validate final interpretations of the data collected. Participants were also encouraged to

disseminate and ensure transmission of the results to eventually allow further utilisation within the researched community.

Obviously, such an approach requires a high commitment of the participants and their availability over the project's life span. In order to facilitate buy-in to the research endeavour, participants of the first Delphi round, as well as later interviewees, were kept informed about the project's progress via newsletters and (partly) personal communication.

Outcome and discussion

The research design described allowed to involve a diverse range of stakeholders in the case study regions at a very early stage of the project. It not only helped to identify the most relevant micro-case studies in each region, but also to develop a first understanding of the individual trajectories and main issues at stake. Without being able to go into further detail, the respective narratives can be summarized as follows:

Vancouver: Early greening initiatives in Vancouver dating back to the 1970s highlight the narratives of strong links between nature and residents. Early environmentalism (e.g. the creation of Greenpeace), geographic distance to political centres of power and the liberal political position of the Canadian west coast led to a progressive/alternative attitude shared by many inhabitants. Most changes have been driven by legislation involving the local up to the provincial scale (e.g. Vancouver's building codes and British Columbia's carbon tax). More recent trends show that Vancouver's current policies in terms of local sustainability and green building are increasingly marked by an explicit aspiration for green leadership at a global scale, actively promoted by the local government and public administration (as, amongst others, illustrated by the municipality's Greenest City Action Plan), but relying largely on public participation and changes at the individual level.

Freiburg: Similar to Vancouver, Freiburg's green building policies are rooted in a particular 'myth', here around the 1970s anti-nuclear power movement which is seen as the nucleus of the subsequent development to becoming Germany's 'green capital'. Drivers and motivations that initially evolved from a focus on energy and housing shortage and included clear social concerns of affordability and liveability have shifted towards a 'green economy' discourse with a strong extrospective and competitive dimension that is now disconnected as Freytag et al. (2014) from its original community roots.

Luxembourg: Although Vancouver's and Freiburg's historical legacies are missing in the Grand-Duchy, the more recent efforts to catch up with international trends in terms of green building have been predominantly triggered by economic motivations. The focus in Luxembourg is largely technology oriented which frames green building as a possible way to further diversify Luxembourg's mono-structured economy. It hence suggests an underlying ecological modernization and green technology logic. The focus is on single lighthouse projects, whereas ecological, urbanistic and social aspects are mostly absent.

Brisbane: The transition pathways in Brisbane's building sector are characterized by ambivalence. Whereas there has been a significant shift towards 'greener' office buildings in the central business district (CBD), there has been comparatively little momentum in the relatively conservative residential sector. With the exception of a small number of cooperatives or NGO-based initiatives, no particularly progressive developments took place in the residential sector, partly due to policy discontinuities. In the office building market, however, building rating tools have proven to be important drivers of sustainability transitions. Rating tools such as 'Green Star', developed by the Green Building Council of Australia, have played an important role as 'green' office buildings are becoming increasingly mainstream in Australia's CBDs. Developers, institutional investors (e.g. pension funds) and public

authorities take Green Star certifications as a guarantee for (economically) sustainable long-term investments.

Challenges in the application of the World Café format related to the generation of an interactive dialogue and the emergence of a shared understanding at some of the tables, where participants' contributions remained quite detached from each other. Some participants expressed the feeling of having repeated themselves between the successive rounds (tables). This might be related to the choice of topics and questions implying quite descriptive and informative responses. Several authors insist therefore on the importance of carefully crafting the Café's questions (Brown, 2001; Prewitt, 2011), as well as of facilitation skills of the Café's host(s), in order to deal with group dynamic (Prewitt, 2011). The maturity of the community dealing with the subject at stake during the Café might also be given explanatory power, as stronger dynamics were at work within the two case studies with a longer record of climate change mitigation within the building sector (Vancouver, Freiburg). Overall, participants provided extremely positive feedback as they perceived the methods as being both inspiring and efficient. Most notably, they appreciated the 'side effect' of informally and openly engaging in dialogues with other actors outside their usual settings and agendas.

Another secondary impact, which occurred quite frequently, involved facilitation with contact requests and matching of potential cooperation partners between the case study regions. At least one senior expert from Luxembourg and one from Freiburg organized fact-finding and networking trips to Vancouver; one senior civil servant from Freiburg asked for advice prior to a consultancy trip to Brisbane. One expert from Vancouver was invited to speak at a high-profile business conference in Luxembourg as a result of his involvement in the research project. These unplanned outcomes contributed to direct knowledge exchange between the case study regions, which could also be framed as "policy mobility" (Peck & Theodore, 2010;

McCann, 2011). The idea of policy mobility was developed by urban studies scholars to better operationalize the relational dimension of city regions and their interconnectedness with global networks of ideas and experts. The concept's potential to strengthen the spatial concepts inherent to current transition studies research in general and the MLP in particular are obvious, but cannot further be outlined here (for an overview see Affolderbach and Schulz (2016).

The closing workshops held in Freiburg and Luxembourg confirmed the participants' strong interest in the findings from the other regions. Moreover, they gave reassuring feedback as to preliminary interpretations of the respective case study findings and indicated current and possible future trends.

12.4. Conclusion

This chapter had two objectives: (1) to argue in favour of a broadened understanding of the transition studies framework and MLP to analyse sustainability transitions and (2) to present useful instruments to implement the approach in research practice. Both points were illustrated using the example of urban green building transitions. The multi-level perspective provides a useful analytical tool for researchers to address sustainability transitions, but more attention needs to be placed on individual actors and spatial dimensions. The brief sketches of green building transitions in Vancouver, Freiburg, Luxembourg and Brisbane reveal different transition pathways in the four case study regions that reflect the interplay between different levels. For example, the landscape level in Vancouver and Freiburg was characterized by relatively strong environmental concern of residents, which provided a favourable climate for innovations in green building. Since the 1990s, this has been systematically taken up by local politicians and helped sharpen Freiburg's pioneering role. Here, the actor-centred perspective also helped reveal motivations, objectives and positions on green building, including actor

networks and knowledge exchanges between different places. It also identified imbalances and biases (e.g. towards energy efficiency while social implications seem neglected). The application of MLP to this sector showed the spatial complexity of interpersonal networks and biographical trajectories, which indicate the potential for more relational perspectives, as it could be provided by the policy mobility approach. As outlined in more detail in Affolderbach and Schulz (2016), recent research on policy mobility (PM) has identified a number of dimensions of knowledge diffusion, learning and innovation that may not only complement with the MLP perspective, but also help to overcome some of the latter's conceptual and empirical limitations.

Apart from the "Where?", that is the aforementioned spatial complexity challenging the mere territorial understanding of MLP and PM's intrinsic relational conception of space, further complementary dimensions include (see Table 12.2): (1) The object of study ("What?"), the creation of new knowledge within specific socio-technical processes (MLP) against PM's interest in the mobility and adoption of already existing knowledge; (2) PM's explicit focus on individual actors and their biographies and trajectories, compared with MLP's stronger interest in the role of structures and formal institutions ("Who?"); and (3) The "How?", that is the aim to understand the respective patterns of radical niche innovations (MLP) and of diffusion and adaptation mechanisms (PM).

Table 12.2 Synopsis of main conceptual dimensions of policy mobility and transition studies
Source: Affolderbach & Schulz, 2016, p. 1950

	Policy mobility	**Transition studies**

What?	Mobility/transfer of knowledge Socio-spatial(-political) processes	Knowledge creation Socio-technical processes
Who?	Individuals & actor groups	Actor networks and institutional structures
How?	Learning, adaptation and mutation	Radical niche innovation
Where?	Relational	Localized

In terms of the presented research approach, the interactive formats, notably the World Café or workshop sessions, proved to be valuable in at least three ways:

A) As a highly efficient means to gather information from key actors which was immediately commented, complemented and thus shared by other participants;

B) As a way to establish robust networks which were helpful in other stages of the project (expert interviews in micro-case studies, validation of findings);

C) As a platform that generated dialogue between stakeholders in a neutral, "non-threatening environment" (Fouché & Light, 2010) where the usual institutional standpoints had not to be defended as it is the case in public forums.

As such, the World Café and Delphi methods can offer effective tools to not only gather a large amount of information, but also as accompanying and strengthening framework for subsequent micro case studies and their in-depth analysis. Further, the techniques can be used to gather, filter, and analyse findings, which – together with the outcome of the micro-case studies – are then resubmitted to participating experts and become subject to critical discussion. These interactive formats go beyond what interviews or group discussions could have revealed. They create their own internal dynamics and help to bring particular facets of a problem to the

forefront that are easily overlooked in more conventional settings. These dynamics tend to persist after the actual event and can lead to ongoing engagement between the researchers and the 'researched' and thus may nurture co-production of new knowledge over longer periods (and can be the starting point for new joint endeavours, e.g. in applied projects).

As with all research methods, a high degree of self-reflexivity and critical evaluation is required to make best use of the methods' potential and to obtain reliable and unbiased findings. For the methods presented, a particular focus has to be placed on adequate moderation approaches and communication skills. In particular, World Café sessions risk failure or yielding only little novel information if conceived and executed inappropriately. Upstream methodological training and accompanying reflection leading to continuous improvement and adjustment are therefore highly desirable, if not a prerequisite, when engaging with these techniques.

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Questions for comprehension and reflection

1. What are the main drivers of green building transitions?

2. How can the MLP approach be applied to sustainability transitions in sectors such as transportation, waste and food?

3. What are some of the reasons behind different forms of stakeholder engagement in urban climate change initiatives around the world?

4. What are the main characteristics of participatory research approaches?

5. What particular role can green building certificates play?

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