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To cite this article: B erence Preller, Julia Affolderbach, Christian Schulz, Sebastian Fastenrath & Boris Braun (2017) Interactive Knowledge Generation in Urban Green Building Transitions, The Professional Geographer, 69:2, 214-224, DOI: [10.1080/00330124.2016.1208104](https://doi.org/10.1080/00330124.2016.1208104)

To link to this article: <http://dx.doi.org/10.1080/00330124.2016.1208104>




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Published online: 22 Aug 2016.



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# Interactive Knowledge Generation in Urban Green Building Transitions

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Knowledge coproduction between practitioners and scientists offers promising opportunities for the emerging research field of the geography of sustainability transitions. Drawing on experiences from an international research project on urban green building transitions, this article explores the potentials and challenges of interactive and collaborative knowledge generation methods in understanding sustainability transitions. Our results show that ongoing engagement with local experts and practitioners through interactive World Café workshops and follow-up exchanges allows for a better understanding of the research context and knowledge exchange to all participants involved in the research process. **Key Words:** green building, knowledge coproduction, sustainability transitions, World Café.

实务者和科学家之间的知识共同生产，对于可持续发展变迁地理的新兴研究领域，提供了具有前景的契机。本文运用一项城市绿建筑变迁的跨国研究计画之经验，探讨互动和协作知识生产方法在理解可持续发展变迁中的潜能和挑战。我们的研究结果显示，透过互动性的全球咖啡馆工作坊，持续与在地专家和实务者进行参与及后续交流，促成了研究过程中的所有参与者对于研究脉络和知识交流的更佳理解。 **关键词:** 绿建筑，知识共同生产，可持续发展变迁，全球咖啡馆。

La coproducción de conocimiento entre practicantes y científicos ofrece oportunidades prometedoras para el emergente campo de investigación de la geografía de las transiciones de sustentabilidad. A partir de las experiencias de un proyecto internacional de investigación sobre transiciones en construcciones verdes urbanas, este artículo explora los potenciales y retos de los métodos interactivos y colaborativos de generación de conocimiento para entender las transiciones de sustentabilidad. Nuestros resultados muestran que el compromiso en curso con expertos y practicantes locales por medio de talleres interactivos del Café Mundial e intercambios de seguimiento permiten un mejor entendimiento del contexto de la investigación y el intercambio de conocimiento para todos los participantes involucrados en el proceso investigativo. **Palabras clave:** construcción verde, coproducción de conocimiento, transiciones de sustentabilidad, Café Mundial.

**S**ustainability transitions are widely discussed and promoted in both policy and academic debates (Hansen and Coenen 2015; Murphy 2015). Although definitions and interpretations differ, they usually postulate far-reaching changes to existing modes of production and consumption toward more environmentally friendly (low-carbon) and socially just alternatives (e.g., Markard, Raven, and Truffer 2012). Similarly broadly accepted are assumptions that these transitions can only be achieved through active

engagement with a wide range of actors bringing together the expertise and knowledge of scientists, practitioners, civil society, and government representatives. These developments are linked to recent trends toward more participatory approaches in both policymaking and academia, termed a *participatory turn* (Aldred 2010) or *communicative turn* (Pelzer, Geertman, and van der Heijden 2015).

Although participatory and interactive research methods are not new, the recent changes within the

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policy and scientific communities mark a shift in objectives of and expectations toward knowledge coproduction and interactive learning. The role of many academics and experts and the work they do has shifted from being one of knowledge generation (in its own right) to one of translating research into practice (Pain, Kesby, and Askins 2011); for example, by empowering communities in the more classical sense of participatory research or by generating impact following more recent lines of argumentation. In both cases, one of the central goals of participatory research methods is to minimize power differences between researchers and research participants using a range of techniques and activities that allow the participants to become creators and cocreators of knowledge (Boylorn 2008).

In respect to complex topics such as environmental change and sustainability research, participatory methods can help incorporate diverse perspectives and knowledges into the research process and its translation and implementation. This article postulates the adoption of interactive and participatory methods as tools for knowledge generation and coproduction within more traditional subdisciplines such as economic geography and innovation studies that have recently developed strong interest in sustainability transition research. It uses the World Café method to highlight different dimensions of knowledge coproduction and learning processes for and within urban green building transitions. Evidence was gained from a research project focused on identifying innovations and trajectories of sustainability transitions in green building in four case study regions: Freiburg, Germany; Luxembourg; Vancouver, Canada; and Brisbane, Australia.

Sustainability transitions are usually understood as longer term processes that require time to fully transform (see, e.g., Geels 2010). In respect to green building,<sup>1</sup> the design, construction, and occupation of individual buildings involves a diversity of actors and usually requires long time frames, particularly with respect to generating evidence of success (e.g., postoccupancy studies). Sustainability research, however, is usually bound to short funding periods and limited availability of researchers, highlighting the need to improve knowledge generation and exchange among actors, particularly those involved in planning and implementing elements within sustainability transitions. In spatial terms, sustainability transitions are shaped by their specific context. Both dimensions are relevant to understanding the emergence, implementation, and spread of innovations in green building from the introduction of specific green technologies, design, and policies to the lived sustainabilities of people in their homes, workplaces, and other living environments.

The next section gives a brief overview of the origins and changed objectives of participatory research and knowledge coproduction including different traditions within subdisciplines. It discusses the relevance and value of knowledge coproduction and interactive knowledge generation within sustainability transitions more generally and introduces the main characteristics

of the World Café method. We then discuss the potential for knowledge coproduction in the green building sector and its possible role in sustainability transitions. After that, we discuss how the World Café approach can be used as a technique to mobilize stakeholders and engage in a reciprocal interaction on concrete topics. It further presents our practical knowledge gained during the application of the World Café format and reveals the value added provided by this participatory approach. The concluding section summarizes the main results and discusses potential shortcomings of and challenges for collaborative techniques.

## Participatory Research and Knowledge Coproduction

Over the past decades, knowledge coproduction—here understood as collaboration and reciprocity between researchers and nonacademics—has gained particular momentum in the social sciences. Motivations and justifications for the incorporation of different methods of knowledge coproduction at different stages of the research process have been largely driven by the objective to generate impact and relevance to “the real world” (Demeritt 2005; Pain and Kindon 2007; North 2013) and to report back and offer practical application or “utilization” to real-life challenges (Kindon, Pain, and Kesby 2007a; Hessels and van Lente 2008; S. Martin 2010; Mason, Brown, and Pickerill 2013). Collaborative research has been substantiated by different arguments ranging from the complex nature of reality compared to scientific theory (Callon 1999) and the existence of multiple epistemologies (Rydin 2007; Pohl et al. 2010) to more emancipatory and socially transformative positions adopted by (participatory) action research (PAR; Brydon-Miller, Greenwood, and Maguire 2003; Kindon, Pain, and Kesby 2007b). The latter, in particular, have been linked to critical reflections on the positions of researchers and research participants and underlying power imbalances. The very different motivations and starting points for participatory research have resulted in a variety of methods (Delphi discussions, World Cafés, future workshops, backcasting, etc.).

The World Café method developed out of spontaneous small table conversations that replaced traditional large-circle discussions (World Café 2016). It provides a group environment that encourages an open dialogue between participants by relying on unconstrained and interactive conversations. Participants are split across tables of four to five (The World Café 2015) where they are invited to tackle a specific question. Participants then progress through several conversation rounds with additional questions, as they are asked to circulate and mix across the tables. The content of each conversation round is 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 information among the totality of participants. This “recombination” of knowledge (Brown 2001, 3) stimulates reflexive processes among participants, progressively leading to the emergence of shared patterns. The group’s collective understanding of an issue can thus be mobilized, including tacit knowledge, allowing ownership of the results (Brown 2001; Fouché and Light 2011; Prewitt 2011).

The originality to other group interventions lies within the method’s attempt to convey the atmosphere of a café setting through the use of symbolic items like tablecloths, the availability of drinks and food, or even the more playful possibility to visualize ideas directly on paper tablecloths (see Vida Estacio and Karic [2015] for a detailed account of a World Café implementation). This framing encourages participants to act as they would during an informal and relaxed meeting at a café (Jorgenson and Steier 2013), enhancing a dialogic process of “shar[ing] openly, listen[ing] without judgement and . . . accept[ing] diverse opinions” rather than mere discussions, whose “purpose . . . is to make a point, convince others or win a verbal battle” (Prewitt 2011, 190–91). Admittedly, the challenge of creating a “relaxed” atmosphere varies with the conflictuality of the topics at stake.

World Cafés and other participatory methods are anchored in different epistemologies and are bearing different normative underpinnings and legitimation, which presents challenges to researchers who seek to select appropriate approaches (Cook et al. 2013; Mason, Brown, and Pickerill 2013; North 2013; Wynne-Jones, North, and Routledge 2013; Saija 2014). Inspired by work in related disciplines, participatory approaches were significantly taken up in human geography around the mid-2000s. In their work, Kesby, Kinson, and Pain (2007; Kesby 2007; Kinpaiby 2008) have promoted contributions to “participatory geographies” in response to (poststructuralist) critics of power and tyranny in participatory approaches (see also Cameron and Gibson 2005; Enns, Bersaglio, and Kepe 2014). Calling on critical geographies, political engagement of researchers, and researchers turned activists (Chatterton, Fuller, and Routledge 2007; Chatterton 2008), contributors have argued in favor of a reflexive engagement with the political place embeddedness of participation, to “conscientize” the participants (and the researcher) on “the forces affecting their lives” (Kinson, Pain, and Kesby 2009, 90).

Collaborative research builds on a variety of disciplinary traditions and methodological approaches, mainly used in critical and engaged research (Hagey 1997; Brydon-Miller, Greenwood, and Maguire 2003; Kinson, Pain, and Kesby 2007b; Reason and Breadbury 2008). Development and feminist studies share a long history of critical engagement with the role of the researcher in relation to the “researched” community. In development geography, collaborative approaches have especially been assessed with regard

to governance and intercultural dimensions (overviews in Kapoor 2005; Enns, Bersaglio, and Kepe 2014), contributing to vivid discussions and early adoption of the decisively more normative approach of PAR, which is purposively seeking to empower and improve the lives of local communities. Corresponding scholarly debates on the methodological implications particularly include reflections on social justice and ethical aspects of the interaction with indigenous communities (e.g., Johnston-Goodstar 2013; Pyles 2015) as well as facets of depoliticization (Korf 2010).

Feminist theories similarly share a long history of critical engagement with the role of the researcher—usually perceived as predominantly male—within the process of knowledge generation and associated values, perceptions, knowledge, and interpretations (Gibson-Graham 1994; Gatenby and Humphries 2000; Cameron and Gibson 2005). With the commitment to empower women and other disadvantaged and marginalized groups, feminist research has strengthened participatory approaches through an emphasis on diversity and equity (e.g., ethnicity, sexuality, class), stressing the political dimension of participatory research (Reinharz 1992).

Outside of the academy, expectations of the role and contribution of research have similarly shifted toward increased collaboration between researchers and research participants. Over the past few years, government agencies and the larger funding community have increasingly demanded statements of impact and transferability of research as part of funding proposals (Demeritt 2005; Pain, Kesby, and Askins 2011; North 2013). Participatory approaches including interdisciplinary collaboration and engagement of researchers with nonacademic constituencies are seen as central elements to generating impact in particular in respect to wicked problems and major challenges, such as global climate change. For example, the German Advisory Council on Global Change (WBGU), the International Energy Agency (IEA), and the Organisation for Economic Cooperation and Development (IEA/OECD 2013) have argued that collaboration among government, academia, industry, and citizens is essential to the generation of “systemic, reflexive and anticipative knowledge” (WBGU 2011, 321) and a transition toward low-carbon economies.

This understanding of research obviously draws on sustainability sciences’ call for a different “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 and van Lente 2008, 744; Brundiers, Wiek, and Kay 2013). Due to sustainability’s complex, dynamic, and uncertain interactions with broader social, economic, and physical processes (Funtowicz and Ravetz 1993; Blackstock, Kelly, and Horsey 2007; Lang et al. 2012), proponents have argued for research favoring pluridisciplinarity and social learning objectives, understood as “knowledge produced in the course of acting” (Steyaert and Jiggins 2007, 727). In this sense, knowledge has to be

generated through interactions and dialogue between diverse experiences, values, and worldviews (Kates et al. 2001; Blackstock, Kelly, and Horsey 2007; Steyaert and Jiggins 2007; Lang et al. 2012). Accordingly, research participants are not just considered as holding situated knowledge but also as political actors representing specific and at times conflicting stakes in the issue at hand (Funtowicz and Ravetz 1993; Lang et al. 2012; Seijger et al. 2015).

### Coproduction in (or for) Green Building Transitions

The sustainable building sector is a rapidly growing and promising transition field (IEA/OECD 2013; Intergovernmental Panel on Climate Change 2014). Green (or sustainable) buildings have been identified as one of the most significant, cheapest, and fastest approaches to reduce greenhouse gas emissions at the local scale (Cidell 2009; United Nations Environment Programme 2011). In most industrialized countries, the energy consumption of buildings accounts for approximately one third of greenhouse gas emissions alone (e.g., Noble [2004] on Australia) and this is not accounting for building materials and CO<sub>2</sub> emissions during construction. Transitions in green buildings are driven by the adoption of green technologies (e.g., lighting, insulation in walls, high-efficiency windows); experiments with zero-carbon, passive, and energy-plus houses; and design strategies but also by new institutional arrangements including regulatory innovations (e.g., building codes), incentive schemes, other support mechanisms, and changes in user behavior.

To understand how green innovations in the building sector emerge and become mainstreamed, we focus on context-specific (local) learning paths and development trajectories; that is, the coevolution of diverse factors and actors that have been instrumental in the materialization of sustainable building trajectories in particular places and over time. We look more specifically at four selected city regions, including Freiburg and Vancouver, with longer histories of green building, and Luxembourg and Brisbane, which are more recent actors in green building transitions.

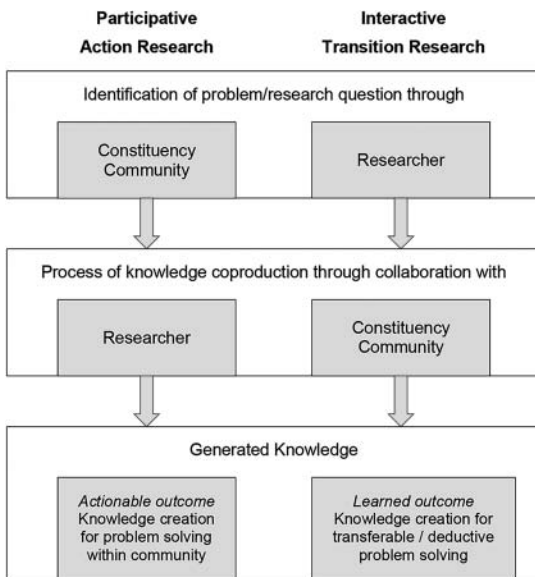
Green building transitions involve a wide range of actors from the corporate, public, and civil society realms. Although the multiplicity of interests, and sometimes competing interpretations, at work in sustainable transformations are characteristic to many other sectors (see, e.g., Bawden [1997] on agricultural systems; Cook et al. [2013] on water catchment management), the fast-growing literature on urban sustainability transitions has emphasized the sheer number of greening strategies and approaches taken by different groups of actors within and between cities (Guy and Marvin 2001; Bulkeley et al. 2011; North 2013). Sustainability research needs to take into account this plurality of perspectives and knowledges to understand the drivers behind green building

transitions—the how(s) and why(s) of specific developments in different places. An important aspect here is to avoid general assumptions of transferable, definite, and linear path developments often generated through vested interests and political strategies in sustainability debates (e.g., city marketing) and consider contingencies and contestations including a multiplicity of actors (Affolderbach and Schulz 2016).

As previously highlighted, participatory research methods promise to generate more rich and diverse knowledge that offers higher social accountability of the research in terms of transparency, problem orientation, and tangible societal relevance. They can offer valuable tools for sustainability transitions in general and green building research more specifically as they “open up for many voices in knowledge construction” (Borg et al. 2012) and hence account for different realities, interests, and strategies but also technical complexities and knowledges involved. Seen as a more inclusive and socially just approach, participatory research corresponds with contemporary understandings of sustainability even though—comparable to different forms of sustainability (e.g., weak to strong)—objectives, intensity, and inclusivity of participation might vary (Blackstock, Kelly, and Horsey 2007; Kindon 2010; S. Martin 2010; Wynne-Jones, North, and Routledge 2015).

Participatory research offers not only a more “engaged” approach to research but also requires a different attitude and behavior of the researcher(s), including ethical obligations on raised expectations and returns toward the researched community (Kindon, Pain, and Kesby 2007a; Kindon 2010; Mason, Brown, and Pickerill 2013). The researcher–researched relationship develops from generating knowledge on to knowledge created with or even by research participants. In addition, it allows room for transformative reflexivity “in which both researcher and ‘researched’ reflect on their (mis)understandings and negotiate the meanings of information generated together” (Kindon 2010, 264).

With respect to our research objectives, we were challenged with the task of gaining a detailed and pluralistic understanding of the sustainable building context in each of the studied city regions. This required a critical review of the respective achievements and agendas of different public, private, and nongovernmental institutions to accurately identify and map factors of the past and ongoing transition processes, avoiding the trap of linear predetermined representations. Our need to include a large range of actors in each case study region to grasp the more diffuse relationships and connections, but also diverging views and interests between them, drew us toward more collaborative and interactive research methods. In contrast to participatory approaches in their more normative and emancipatory sense (as in PAR), where researchers are joining particular communities with which they coproduce knowledge to serve practical needs, we



**Figure 1** Imperatives and objectives in participative research and interactive transition research.

started from an inverse logic (Figure 1) aimed at achieving a learned outcome but also critical and pluralized outcomes through *interactive transition research* (ITR).

As such, we applied a research-driven, learning, and knowledge-generating perspective rather than the normative “development driven [empowerment] approach” (Borg et al. 2012, 729, quoting A. Martin and Sherington 1997, 197) that is central to PAR. This allowed us to broaden and pluralize the views and interpretations obtained in the data to effectively analyze and retrace the phenomena under study, and it further ensured platforms for encountering and reporting back to and within the participating community. In both the PAR and the ITR approach, knowledge is not evenly distributed among the participating individuals. Asymmetries in individual knowledge and a varying willingness to share particular parts of that knowledge might lead to biases in the knowledge cogenesis process. The latter might thus be influenced by the role of knowledge brokers, intentionally or unintentionally directing the topical agenda setting and dominating the discussions.

Our approach also differs from the primarily normative and social change orientation of transition management research, in which the researcher and the researched use collective foresights and participative vision building to initiate a desired change (Loorbach 2007; Wittmayer et al. 2013), with techniques like backcasting, scenarios (e.g., Elzen et al. 2004; Eames and Egmore 2011), or “experiments” aimed at socially embedding sustainable innovations (Kivisaari, Lovio, and Väyrynen 2004).

Research participants thus turned from an object of study, or key source of information, to collaborators who cocreate and benefit from new knowledge through

interaction with the researchers but also with their involved peers. This allowed us to establish a positive, nonhierarchical relationship with what Sheridan et al. (2010, 34) called “local intelligence” in a way that would avoid feelings of “unreciprocal . . . knowledge extraction” (Newton and Parfitt 2011, 76). Despite the frequently criticized tendency to “value-ladenness” of participatory approaches (Weingart 1997) and potential problems related to language incompatibilities between researchers and practitioners (Kieser and Leiner 2012), we see promising collaborative tools when tackling sustainable development policies, as the methods allow us to reach further than with traditional interview or focus group techniques, keeping in mind that “they are not a substitute for more in-depth social research methods” (Kendon 2010, 272). To coproduce knowledge with our researched community, we hosted workshops with a range of local sustainable building practitioners in the form of World Café events.

### Knowledge Coproduction at the Coffee Table: The World Café Approach

With the exception of a few reflexive contributions (Aldred 2010; Prewitt 2011; Jorgenson and Steier 2013), the relatively low number of publications on the World Café method provides descriptive accounts of its application to specific projects. This leaves the reader with a rather “fragmented” (Aldred 2010, 57) and patchy impression: World Cafés are used by public, private, and nongovernmental organizations in very different contexts and for diverse objectives. Different aims include learning (Anderson 2011); empowering communities (Sheridan et al. 2010; Fouché and Light 2011; for a critical discussion see also Aldred 2010); facilitating collaboration and communication within an organization (Tan and Brown 2005; Prewitt 2011); stimulating innovation, networking, and relationship building (Fouché and Light 2011); or even improving sales of a product (Aldred 2010). The versatility and adaptability of the World Café approach is further illustrated by the different labels in use to designate variations of the method, including, for instance, the Knowledge Café, Conversation Café, or Innovation Café. If these different applications highlight the method’s popularity and success among practitioners, they also illustrate its appropriation within what Aldred (2010, 62) called the “participation industry.”

Despite these critiques and reflecting on our experience using the method, we would like to advocate for a flexible use of different Café-inspired research methods, bearing in mind its key premise and objectives. The common denominator of the different usages of Café-style methods within the literature resides in its potential to encourage effective participation of a diversity of participants by breaking with their cognitive understanding of usual meeting forms (Prewitt 2011; Jorgenson and Steier 2013). More specifically, it

allows “ordinary interactional routines [to be] suspended” (Jorgenson and Steier 2013, 390), most notably hierarchical relationships (see Tan and Brown’s [2005] account of the use of World Cafés within the Singapore Police Force), thus opening the way toward more diversified, inclusive, and changing understandings of a specific topic. Our experience shows that participants tend to leave their usual “role” more easily in a World Café than in a more formal setting. It is important to keep in mind that these methods are rooted in constructivist philosophy. The aim of using such group intervention is to grasp the diversity of perspectives held by the involved participants, thus “construct[ing] distinctive versions of the ‘lay views’ [rather than] over-stating consensuality” (Aldred 2010, 62–63).

As the broad range of applications illustrates, the World Café method offers room for adaptation to different research and practice objectives. The practical and contextual knowledge generated allows for a range of potential follow-up utilizations for researcher and researched alike. We join Fouché and Light’s (2011) pledge to open up the discussion to the “value” of the World Café and its four main objectives:

1. Applying constructive dialogue principles allows access to more tacit forms of knowledge, offering an effective way to collect data.
2. Bringing together a diverse population with a shared interest in specific topics can eventually have integrative effects on participants, fostering the emergence of a shared culture in an organization or initiating the building of networks and connections useful to a specific community.
3. Collective discoveries through “cross-pollinating” ideas (Tan and Brown 2005, 84) and identifying larger patterns can lead to innovative solutions and ease the way toward consensus building.
4. Collaborative learning through sharing insights can offer interesting potentials in terms of capacity building.

These objectives or effects are central to but not exclusively covered by the World Café approach. Other participatory methods such as future workshops, planning cells, and open spaces bear the same potential but were considered less suitable for the purpose of our research mostly for practical reasons, such as moderation skills, feasibility, and size of the events.

In the specific context of our research project on green building transitions, we invited a range of local experts, including practitioners and scholars in the field of green building, to attend a locally held World Café workshop to define meaning and understand various facets and underlying mechanisms of sustainable building. Our main objectives were as follows:

- To gather different understandings of the transition toward sustainable building.

- To identify common patterns in terms of particularly significant factors.
- To capture tacit knowledge, harder to grasp through document analysis.

For each workshop, we set up three discussion rounds, respectively focused on a specific dimension of the sustainable building sector following the project’s coevolutionary approach: actors and organizations, building projects, and framework conditions (encompassing institutional aspects like legislation, socioeconomic aspects, etc.). Following returns on the first Café experience, we added a fourth discussion table addressing challenges and barriers to the development of sustainable building practices (Table 1).

We encountered some difficulties in reaching an interactive dialogue at some of the tables, where participants’ contributions remained quite detached from each other. Some participants even expressed the feeling of having repeated themselves between successive rounds. Both issues might relate to the thematic proximity of the chosen discussion topics, which could be difficult to avoid. Brown (2001) and Prewitt (2011) emphasized the importance of carefully crafting Café questions and the central role and facilitation skills of the Café host(s), to manage emerging group dynamics. The maturity of the community dealing with the subject at stake during the Café might also be given explanatory power, as we noticed stronger dynamics at work in Freiburg and Vancouver, which were characterized by a longer record of climate change mitigation in the building sector.

We followed up on the World Café exchange through the dissemination of a report summarizing the main outcomes in form of a questionnaire, asking participants to critically reassess and validate the transition factors that had emerged. We used the input to identify a number of key aspects for in-depth qualitative case studies in each of the four city regions, covering selected green building policies and programs, influential organizations and actors, as well as specific built environment projects. The selection was backed through document analysis (e.g., policy programs, strategy and position papers, and media reporting) and semistructured interviews with key individuals. The World Cafés further provided us with a list of relevant interview partners, necessary background knowledge, and contact to central figures in our research field, which proved helpful in accessing further interview participants. Toward the end of the research project, outcomes and results of these steps were presented in Luxembourg and Freiburg, inviting all experts solicited, notably to critically assess, review, and validate findings but also to disseminate and ensure transmission of the results to eventually allow for further utilization within the community.<sup>2</sup>

Collaborative research thus requires a high commitment of the participants and their availability over the project’s life span (North 2013). To facilitate buy-in to our research endeavor, participants of the World Café

**Table 1** *Composition and themes of research project's World Café workshops*

Workshop	Number of participants (+ researchers)	Sectors represented/ affiliations	Key topics/focuses
Vancouver 8 November 2013	14 (+5)	Architects, engineer and design firms, developers, think tanks, research institutes, nongovernmental organizations, municipality, energy provider	<ul style="list-style-type: none"> <li>● History of environmental activism and advocacy (e.g., Greenpeace, David Suzuki) resulting in an environmentally aware public</li> <li>● Strong influence through individual leaders particularly linked to the University of British Columbia</li> <li>● Vancouver-specific urban design and planning</li> <li>● Recent political leadership with strong environmental agenda</li> </ul>
Luxembourg 29 January 2014	27 (+7)	Architects, engineer and design firms, private and public developers, interest and professional associations, research institutes, nongovernmental organizations, ministries (sustainability, economy, housing), national energy consultancy	<ul style="list-style-type: none"> <li>● Key role of legislation on energy efficiency (especially European Union directives)</li> <li>● Strong technological and innovation focus</li> <li>● Need for increased streamlining and coordination among (public) actors and procedures</li> <li>● Numerous private and corporate initiatives</li> <li>● Call for better advertisement of achievements (building projects)</li> <li>● Overall top-down, policy-led approach</li> </ul>
Freiburg 12 February 2014	10 (+7)	Architects, engineer and design firms, public developers, research institutes, municipality, energy provider	<ul style="list-style-type: none"> <li>● Key role of environmentally sensitive and engaged population</li> <li>● Good connections and exchange platforms between a wide range of actors (public, nongovernmental organizations, research centers)</li> <li>● Early (1990s) energy efficiency legislation and consequent application in two public developments (Vauban &amp; Rieselfeld) as key motors</li> <li>● Call for thematic renewal and enlargement of green building understanding and especially a more visionary approach from the policy side</li> </ul>
Brisbane 27 March 2014	10 (+5)	Architects, engineering and design firms, research institutes, nongovernmental organizations, municipality, state ministry, regional administration	<ul style="list-style-type: none"> <li>● Policy discontinuity on different policy levels (policy changes after government changes)</li> <li>● Short-term "thinking" of different industry actors (builders, developers, investors)</li> <li>● Market-based changes toward "greener" office buildings in and around the central business district</li> </ul>

were kept informed about the project's advances and were solicited when strategic decisions were taken, major methodological problems had to be overcome, and preliminary findings were available for evaluation. We used the method not only as a first step to gather a large amount of information but also as accompanying and strengthening framework for subsequent case studies and their in-depth analysis, relying on the techniques to gather, filter, and analyze findings, which were then fed back to participants and became subject to critical discussion.

## Discussion and Outlook

Coproductive methods offer an effective way to access a large amount of relevant and diversified information within the time constraints of funded research projects. The dialogic processes of World Café techniques allow the generation of diverse knowledges that undergo critical and reflexive review from the participating experts while being collected. Traditional inquiry methods

could not have provided similar insights within a single research step. Although our research design was originally driven by an interest in knowledge production from a researcher's perspective, our project experience confirms mutual benefits for researchers and participants alike, as it is precisely through coproduced reflections in changed researcher-researched relationships that opportunities to produce differentiated and relevant knowledges emerged. On the one hand, "classical epistemological realms and corresponding roles of academic and non-academic actors" (Pohl et al. 2010, 269) became blurred in the workshop settings. On the other hand, this led to new insights and generated new knowledge for all sides, including new connections of knowledge exchange among the four case study regions.

Knowledge production evolved from a one-directional provision of information to the research team toward more interactive exchanges encouraging social learning processes. One challenge for us was to maintain ongoing information flow and engagement. For example, due to time constraints (both of the researchers and the project funding period), workshops to



feedback preliminary findings were only held in Luxembourg and Freiburg. In one of our case studies, the relatively novel emergence of the sustainable building sector implied a large number of actors, without clear organizational patterns and established networks yet. In this case, Café participants were especially keen on discussing obstacles to sustainable building transitions and used the event and consequent report produced by the researchers as an exchange platform to bring together positions and formulate action points, hence building capacities among participants and producing directly actionable knowledge. In Freiburg and Vancouver, the dialogic and unconstrained atmosphere of the events triggered critical and self-reflective discussions within the already well-connected practitioner community on the need for renewal and strengthening of local sustainable building practices; for instance, through increased social benefits. Accordingly, geographical differences between the case studies became evident through identification of local specificities and geographically specific developments as highlighted in Table 1 (last column).

One hurdle encountered in the process related to the selection and representativeness of participants. Notwithstanding our efforts, the nongovernmental sector proved surprisingly difficult to engage within one of our case study regions, where many invited workshop participants showed “symptoms” of being overly solicited given the international interest in this case. This definitively limited the representativeness of the workshop’s composition, despite the method’s participative and constructivist premises, and rejoins theoretical discussion about the “power effects” and “tyranny” of participation (Cameron and Gibson 2005; Kesby, Kindon, and Pain 2007; Kinpaisby 2008; Enns, Bersaglio, and Kepe 2014). Similarly, the ability of researchers using collaborative research approaches to facilitate and mediate to ensure that discussions remain truly open to all participants should not be underestimated. The risk of individuals dominating conversations and leaving less room for expression to others can be easily circumvented in World Café settings, however, by encouraging participants to move across tables. The combination with follow-up questionnaires further offered participants another opportunity to express aspects they might not have had the chance to articulate during the event. Although the discussed approach generated knowledge, including successes and failures of green building transitions, it did not directly provide actionable outcomes. It rather laid foundations for collaborative problem solving through the creation of exchange networks that could be used in the future; for example, through joint projects focused on solving identified problems.

Collaborative methods have much to offer to sustainability research that inevitably involves a wide range of (at times contested) interests and stakes over long periods of time. Although participatory methods in their most comprehensive definition are focused on problem solving through identifying ideal scenarios

(e.g., Delphi, scenario planning), community building, and actionable outcomes ready to be applied, the proposed interactive, research-driven approach can help identify opportunities and challenges in green building transitions and generate knowledge and understanding relevant to future decision-making challenges. Interactive research can offer numerous tangible benefits, including new platforms of knowledge exchange, stimulation for differentiated understandings through cross-pollination, and higher reflexivity and robustness of findings through numerous feedback loops between researchers and the researched. ■

## Acknowledgments

We would like to thank all research participants in Brisbane, Freiburg, Luxembourg, and Vancouver for sharing their valuable time and insights.

## Funding

GreenRegio, National Research Fund Luxembourg, and the German Research Foundation. This article is based on experiences and insights collected as part of the GreenRegio research project (<http://greenregio.uni.lu>) jointly funded by the National Research Fund Luxembourg and the German Research Foundation (INTER\_DFG/12-01/GreenRegio, 07/2013-06/2016). We would like to thank the two institutions for their financial support.

## Notes

<sup>1</sup> We use *green building* as an umbrella term for all activities related to sustainable construction; that is, the green building sector, including the political and regulatory context. It is thus not limited to the physical building (i.e., a single residential or commercial project or neighborhood). The plural *green buildings* is used to refer to the material outcome of green building processes.

<sup>2</sup> Due to time constraints of project collaborators, no workshops were held in Vancouver and Brisbane.

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