Shaping Sustainable Business through Living Labs: Collaboration and Knowledge Sharing Practices influencing Firm Representatives' Sustainability Perceptions

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Abstract

In the last decade, the number of living labs focusing on environmental sustainability has risen in order to cope with the need for environmentally sustainable innovation. Although these multi-actor approaches allow for innovation, this alone does not suffice a society's transition to becoming environmentally sustainable. Organizations should focus on innovation internally as well, but in practice, this lacks often because environmentally sustainable values are not integrated into the organizational policy. Living labs could influence the organization's policy regarding environmental sustainability. Qualitative findings based on eight interviews, observations, and additional relevant documents from a living lab gave insights into this process. Overall, this study found that organizations take part in living labs for several reasons. First, firms wish to stabilize their business model in the long-term and lower risk on future claims. Second, the living lab's aim for collaboration in order to implement environmentally sustainable approaches in the supply chain attracts firms. Finally, firms expect to gain business and market demand in the living labs. Additionally, the embeddedness and proximity of firms in the living lab makes participating in the living lab more attractive when firms consider joining a living lab based on the previously mentioned reasons. Once participating in the living lab, team dynamics, and knowledge sharing practices change firm representatives' perceptions regarding their attitudes towards environmental sustainability and the feasibility to implement environmentally sustainable practices. This change in perception is translated to the firm of the participant, where firms' policies are adjusted. Based on this research, implications for organizations, governmental policymakers, and living lab facilitators are provided as well as suggestions for future research.

Keywords: living labs, interorganizational collaboration, environmental sustainability, drivers, knowledge sharing practices, policy adjustment

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Introduction

In 2016, the Paris Climate Agreement was signed by 195 countries with the understanding that changes have to be made in response to the threat of climate change (United Nations (UN), 2015b). This agreement to work to an environmentally sustainable planet can only be reached when society, including the public and private sector, knowledge institutions, and customers, change their way of functioning to reach those goals (Scalia, Barile, Saviano & Farioli, 2018).

Coping with this change, firms should aim at developing environmentally sustainable products, services, and business models (Maxwell & van der Vorst, 2003; Nijhof, Bakker & Kievit, 2019). Incentives to do so are mainly to cope with external pressures, such as regulation (Elkington, 1997), and to expand business (Nijhof et al., 2019). Currently, multiple transitions are unfolding in the private sector, such as the clean-energy transition and the development of a circular economy. Completing these transitions requires interorganizational collaboration because of the complex interdependencies between organizations (Loorbach & Wijsman, 2013). The Paris Climate Agreement emphasizes this by drafting article 7.7a: "Sharing information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies and implementation in relation to adaptation actions." (UN, 2015b, p. 10) which is translated to Sustainable Development Goal 17: Partnership for the goals (UN, 2015a).

The encouragement of collaboration in the face of complexity gave rise to interorganizational innovation collaborations (Bocken, Short, Rana & Evans, 2014; Breuer, Fichter, Lüdeke-Freund & Tiemann, 2018). Living labs are one of these collaborations, defined by Edwards-Schachter, Matti, and Alcántara (2012) as:

> "approaches that facilitate user-driven open innovation within real-life rural and urban settings and communities in which users collaborate with multiple committed stakeholders (NGOs, small and medium-sized firms, industry, academic- and research institutes, governments, or donors) in one or more locations to become co-creators and co-designers of innovative ideas, processes, or products within a multidisciplinary environment." (p. 682)

The co-creation between users and producers of innovation makes living labs a unique form of interorganizational innovation collaboration (Maas, Van den Broek & Deuten 2017). Living labs are founded by diverse actors to improve business, societal issues, knowledge

creation, or every-day life problems, usually in a specific region (Leminen & Westerlund, 2012).

Multiple studies have focused on these living labs and are highlighted in the literature (Hossain, Leminen & Westerlund, 2019). For example, scholars pinpointed the methodology or research infrastructure of the living lab approach (Edwards-Schachter et al., 2012; Mulder et al., 2007), the potential or impact of living labs (Alam & Porras, 2018; von Geibler et al., 2014), and living labs as governmental instrument (Bakici, Almirall & Wareham, 2013; Schuurman & Tõnurist, 2017). However, Hossain et al. (2019) state that there are still limited studies on the intersection between living labs and the influence on organizations regarding sustainable development.

Living labs emphasize innovation, and through this, living labs focused on environmental sustainability are responsible for significant ecological effects (Hossain et al., 2019). In the last decade, living labs brought a significant number of innovations targeted at the development of a wide variety of environmentally sustainable products, systems, and services (Hossain et al., 2019). Although this innovation makes a positive contribution to sustainable development, this is, by all means, not sufficient to reach societal goals regarding environmental sustainability, such as the Paris Climate Agreement. In order to reach those goals, organizations must develop and implement environmentally sustainable practices outside living labs as well.

Kirchherr et al. (2018) argue that hesitant corporate cultures form one of the main barriers that block organizations from developing or implementing environmentally sustainable products, services, and business models. "Environmental sustainability is not integrated into the strategy, mission, vision, goals, and key-indicators of organizations" (Pheifer, 2017, p. 10). Living labs focused on environmental sustainability could influence organizational policies to integrate environmentally sustainable values in these organizational aspects. By doing this, living labs do not only develop environmentally sustainable applications but also encourage participating organizations to innovate concerning this matter outside the living lab context. Weber and Waeger (2017) state that external influence on organizational policy is usually brought into the organization by individuals who act as a bridge between the organization's external and internal environment. Therefore, it is presumable that organizational policy regarding environmental sustainability could be influenced by living labs through the representative of the organization participating in the living lab. The current study, therefore, pursues an answer to the following research questions: "What are the drivers of organizations to participate in living labs focused on environmental sustainability?" and "How do living labs focused on environmental sustainability influence organizational policy?"

Advancing existing knowledge of what drives organizations to participate in living labs in the first place and how these organizational policies are influenced by this living lab gives significant insights into the external influence of this interorganizational innovation approach. These insights are especially relevant as they can contribute to a better understanding of the impact of living labs on individual organizations. Therefore, understanding what drives organizations to the living labs and how participation could lead to more environmentally sustainable firm policies could help living lab management and policymakers to encourage more environmentally sustainable development among the private sector.

The remainder of this thesis proceeds as follows: The first section addresses more information about circular economy. Basic knowledge about this subject helps the reader understand the results of this study. Next, the theoretical background of this study is described following a case description and the methodology used to execute this research. Then, a narrative is described to give a clear view of the setting where the data is collected. Eventually, the results are shown, and finally, these results are discussed while considering previous work.

The circular economy

This case study is built on the Living Lab Regio Foodvalley Circulair. This living lab is focused on developing circular economic applications in products, services, and business models. The circular economy is seen as an environmentally sustainable economic framework (Korhonen, Honkasalo & Seppälä, 2018), and therefore, this living lab was an appropriate case to answer the research questions. However, to interpret this study's results appropriately, it is necessary to have a basic understanding of the circular economy. This chapter provides this basic knowledge before the study is presented.

In recent years, the circular economy has gained increasing attention from international and national governments, companies, NGOs, and policymakers (UN Economic and Social Council (ECOSOC), 2018; Korhonen et al., 2018). It is seen as a tool that presents solutions to some of the world's most pressing crosscutting sustainable development challenges, which brings economic growth within the borders of sustainable environmental development (ECOSOC, 2018; Korhonen et al., 2018).

The circular economy is seen as a transformation of the traditional economic system, the linear economy (Korhonen et al., 2018). A linear economy is based on the "take-make-dispose model" whereby companies extract raw materials, apply energy and labor to manufacture a product, and sell it to the end-consumer, who discards it as waste when it no longer serves its purpose (Ellen MacArthur Foundation, 2012). This production of waste harms

the environment through the removal of natural capital and the reduction of natural capital caused by the pollution of waste, such as the harm that plastic causes to sea-life (Murray, Skene & Haynes, 2017; Ellen MacArthur Foundation, 2019). Additionally, the linear economy leans on the assumption that natural resources are limitless while natural resources shrink in volume (Korhonen et al., 2018). This shrinkage cannot only be linked to the mining of natural resources but also to ecological and demographic phenomena such as desert expansion, sea-level rising, population growth, and consumption growth (Korhonen et al., 2018). This take-make-dispose model has, therefore, become unsustainable.

In response to the ecological risks and the dependency on natural resources of the linear economy, a circular economic model has been developed. The Ellen MacArthur Foundation (2012) defined a circular economy as:

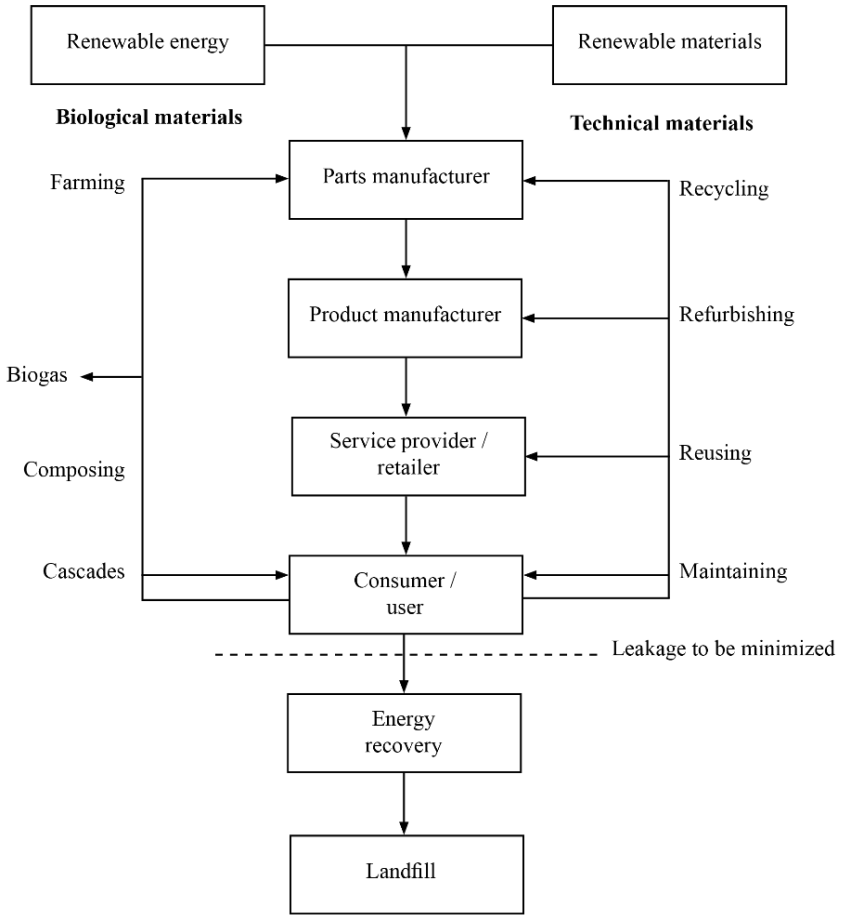
> "an industrial system that is restorative or generative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models" (p. 7)

The circular economy is based on five fundamental principles. First, products should be designed for disassembly and refurbishment. Second, companies should think in systems. Systems are assemblages of complex interdependencies between multiple actors (Scott, 2003). Elements should be considered in their relationship with their infrastructure, environment, and social contexts. Third, products should be modular, versatile, and adaptive since technical and natural systems evolve fast. Fourth, systems should aim to run on renewable sources. Finally, waste should feedback, through the smallest non-toxic and restorative loop possible, into production systems or the biosphere, as illustrated in figure 1 (Ellen MacArthur Foundation, 2012). Firms strive to keep ownership of the products they provide by renting products-as-a-service to establish these feedback loops (Korhonen et al., 2018). Besides, ownership makes firms responsible for the waste the product causes and the costs during usage. This responsibility is an incentive to produce robust products with a long life-cycle (Ellen MacArthur Foundation, 2012).

In the last decade, the development of a circular economy has gained momentum. Countries, e.g., Denmark, the United Kingdom, and the Netherlands, are making progress in adopting this new economic system (Škrinjarić, 2020). Furthermore, the European Union has included the transition from a linear economy to a circular economy in the European Green Deal (European Commission, 2019). To do this, they formulated a circular action plan stating:

Figure 1

Butterfly Diagram



Note. Model copied from Ellen MacArthur Foundation (2012, p. 24)

"The circular economy action plan will include a 'sustainable products' policy to support the circular design of all products based on a common methodology and principles." (European Commission, 2019, p. 7). Even though it is estimated that the COVID-19 crisis has put some delay in signing and implementing the green deal, the EU is still determined to implement this policy (Colli, 2020). Besides, the UN has linked the circular economy to its solutions for several sustainable development goals (SDG's) (Murray et al., 2017; Schroeder, Anggraeni & Weber, 2019).

Also, enterprises are developing circular economic products, services, and business models (Bassi & Dias, 2019; van der Linden, 2018). Moreover, financial institutions and consultancy firms adjust their services to the circular economic transition, and researchers from multidisciplinary fields pay investigate the roots, principles, limits, models, and implementation

on different levels (Mähönen, 2019). Therefore, the circular economy has become an emerging subject in different societal fields.

Literature review

Adopting environmentally sustainable products and services

In the last decades, business enterprises started to develop and implement an increasing number of environmentally sustainable products and innovations. Scholars have investigated this phenomenon from an institutional theory perspective and explained it through the institutional pressure and organizational agency angle.

Institutional pressure

Business enterprises experience increasing social, legal, and economic pressures to develop environmentally sustainable products and services (Campbell, 2007). Multiple stakeholders of organizations have attended to the pursuit of environmental sustainability, such as community groups, customers, and regulators (Iarossi, Miller, O'Connor & Keil, 2013; Maignan & Ralston, 2002). These stakeholders pressure firms to behave in ecologically responsible ways (Maignan & Ralston, 2002). Oliver (1991) states that organizations seek a fit with their environment to obtain legitimacy and stability. Legitimacy demonstrates the social worthiness perceived by the environment in which organizations need to survive (Oliver, 1991). An organization without this fit is deemed illegitimate by its institutional context. Organizations could be sanctioned by these institutions (DiMaggio & Powell, 1983), for example, by a loss of revenue and damage to the corporate image and reputation (Butler, 2011).

Institutions, e.g., government laws, societal norms, and values, can thereby constrain and influence organizational decision making (Oliver, 1991). Organizations are attempting to comply with environmentally sustainable practices demanded by their stakeholders to obtain this legitimacy and stability (Elkington, 1997). Therefore, when the institutional environment puts pressure on organizations to develop environmentally sustainable products and services, firms could respond in order to become legitimate in the perception of their stakeholders.

Oliver (1991) states that when organizations respond to these environmental pressures, they respond in divergent ways. At one extreme, organizations manipulate stakeholders when organizations participate in symbolic action (Oliver, 1991; Scott, 2003). Greenwashing for example, which is disinformation disseminated by an organization to present an environmentally responsible public image (Ramus & Montiel, 2005).

At the other extreme, organizations acquiesce with the environmental pressure, which is called substantive behavior (Oliver, 1991). Organizations comply with the institutional pressure by implementing practices that are in line with the values of the pressure sources. This research focuses on organizations that respond with substantive behavior to institutional pressures since the organizations are already enrolled in a living lab aimed to implement environmentally sustainable applications.

Organizational agency

Research focused on institutional pressure overlooks the active agency of organizations (Bührman, 2011). Until the 1990s, many institutional theorists emphasized institutional pressures and the conformity of the organization to its environment as the core driver of organizational change (e.g., DiMaggio & Powell, 1983; Oliver, 1991). Thompson, Scott, and Zald (2008) state that organizations conform to their institutional context, but this is a strategic choice to ensure the organization's continuity (DiMaggio, 1988; Scott, 1991). However, organizations do not only conform to institutional pressures but also change because of self-interest and agency focused on, for example, competitive advantage (van der Linden, 2018; Bührman, 2011).

Some organizations see the implementation of environmentally sustainable applications as a way to improve their competitive advantage and see those applications as business propositions (Carayannis, Sindakis & Walter, 2015). Nijhof et al. (2019) state that environmentally sustainable products and services could lead to attracting high-end segments of existing markets to the firm, distinguishing the business model of competitors, and reaching new customer segments. Furthermore, a unique business proposition comes about through environmentally sustainable products and services: Customers find it attractive to become allies with the firm to achieve a common goal (Nijhof et al., 2019).

Besides focusing on market share expansion, firms could voluntarily adopt environmentally sustainable business cases because of cost reductions (Schaltegger & Wagner, 2006). Energy savings and the reduction of material flows are positive outcomes of these cases (Schaltegger, Lüdeke-Freund & Hansen, 2012). Furthermore, organizations see business opportunities in environmentally sustainable business models. Scholars state that an increase in profit margins, brand and reputation value, and attractiveness as an employer are benefits of those business models that make organizations adopt them (Porter & van der Linde 1995; Ehnert, 2009). Finally, firms adopt environmentally sustainable business models because of the capability to innovate (Schaltegger et al., 2012). Through developing sustainable products and

services, firms learn to think in diverse dimensions and explore more diverse knowledge sources which encourages innovation (Schaltegger & Wagner, 2011).

Environmentally sustainable application adaptation and obstacles

As illustrated, external and internal drivers make organizations adopt environmentally sustainable applications. When organizations are developing these practices or have already implemented those, they experience various obstacles (Epstein, 2008). First, there is much uncertainty about the implementation of environmentally sustainable business cases. Kirchherr et al. (2018) found that a critical barrier for companies regarding the transition to a circular economy is the difficulty of implementing business cases. There is a lack of customer interest because the price of circular products is often not competitive compared to the lower prices of raw material that competitors use (Kirchherr et al., 2018). This lack of market demand makes the firms corporate hesitant towards circularity, which leads to the conservation of the linear economy and aversion for high upfront investment costs (Kirchherr et al., 2018).

Second, the lack of technological know-how hinders the implementation of environmentally sustainable products and services in the firm. Rizos et al. (2016) state that: "Transforming business-as-usual operations would require new sustainable production and consumption technologies to be integrated into current business models, and competent professionals be able to manage them." (p. 5). Winston (2010) claims that technological implementation barriers exist because of the limited knowledge and expertise, as well as the lack of conceptual clarity on the nature of environmental sustainability. Furthermore, environmentally sustainable tools and techniques develop quickly and by a large number (Fenwick, 2007). There is a lack of knowledge about which tools and methods are appropriate to make products and services environmentally sustainable (Fenwick, 2007; Windolph, Schaltegger & Herzig, 2014). Accordingly, organizations struggle to determine which tools and techniques are "right" to implement (Boiral, 2002).

Third, the lack of governmental support and effective legislation is widely recognized as a barrier to invest in environmentally sustainable business models (Rizos et al., 2016). The absence of a coherent, concrete, strict, and legislative framework impedes firms from developing such business models because of the uncertainty accompanied by this absence (Rizos et al., 2016; Laukkanen & Patala, 2014). For example, the Dutch Government has released a government-wide program showing that the government wants to finish the transition to a circular economy in 2050 (Government of the Netherlands, 2016). However, translating this vision into governmental regulation or interventions has not taken place yet. A proper

governmental regulative framework is essential to encourage innovation and investments: "Too loose regulation does not motivate, but too strict regulation at the early phase of development discourages to develop rival innovations." (Laukkanen & Patala, 2014, p. 13). In the meantime, governmental innovation policies are not focused on integrating new environmental business model opportunities (Rizos et al., 2016). For example, the adoption of policy instruments is not focused on behavioral change in the market, but on the entitlement of established wasteful behavior (Al-Saleh & Mahroum, 2015). Governments have obstructing laws and regulations, and there is a lack of global consensus in the governmental regulative framework (Kirchherr et al., 2018).

Last, environmentally sustainable business models and innovations are often characterized by a systemic nature; organizations are interdependent in reaching environmental sustainability goals (Konnertz, Rohrbeck & Knab, 2011). Authors frequently emphasize that the successful implementation of circular economic products or services requires the collaboration of all parties across the supply chain (Rizos et al., 2016; Kirchherr et al., 2018). Bicket et al. (2014) state that this collaboration is not often reached because of a lack of trust, the absence of complementarity in the strategic approach of partners, unbalanced power relations, and the absence of parties who can coordinate collaboration. In the case of a circular economy, collaboration in the supply chain is even more critical since materials should flow through feedback loops back in this chain. Therefore, Kirchherr et al. (2018) point out that the limited willingness to collaborate in the supply chain is another major barrier to implement circular business models.

Environmentally sustainable application adaptation and collaboration

In order to respond to these barriers, organizations cooperate on common platforms where organizations can discuss the barriers (Konnertz et al., 2011). Firms want to create a shared understanding of drivers and barriers regarding the implementation of environmentally sustainable business models in these platforms and think in systems (Baden-Fuller & Morgan, 2010; Breuer et al., 2018). This integration with diverse stakeholders such as partners, competitors, and governments, gives organizations access to diverse sources of knowledge through which the different parties can develop environmentally sustainable business models (Breuer & Lüdeke-Freund, 2016; Breuer et al., 2018). Networks of NGOs, scientists, firms, and public authorities evolve wherein environmentally sustainable products, services, and business models are developed through interaction (Lüdeke-Freund, 2010).

The link through which firms interact with these diverse actors for innovation and development is provided by the innovation system concept (Laukkanen & Patala, 2014). Innovation systems can be considered as institutional structures that support innovation (Laukkanen & Patala, 2014). Examples of innovation systems are experimentation with new technologies, pilot projects, workshops, conferences, and collaborative resource mobilization (Laukkanen & Patala, 2014). Policymakers, public authorities, and consumer-movements could be involved in innovation systems, which gives opportunities to exchange and solve barriers regarding governmental regulation, industrial standards, supply chain collaboration, and market demands (Laukkanen & Patala, 2014). Besides overcoming obstacles, organizations can co-create in innovation systems (Koen, Bertels & Elsum, 2011). Organizations in these innovation systems share and create knowledge regarding environmentally sustainable products and services jointly through individuals who represent the participating organizations (Musiolik, Markard & Hekkert, 2012).

Innovation systems exist in diverse approaches, including living labs (Levén & Holmström, 2008). Living labs differ in the degree of co-creation and experimental space. Based on this diversity inherent to living labs, Maas et al. (2017) defined four basic types of living labs, as shown in table 1. Field labs are primarily used to increase the competitivity of firms, exchange and create knowledge about technological applications, and overcoming barriers to implement those (Maas et al., 2017). Therefore, the remainder of this section focuses on field labs.

Table 1

Basic types of living labs

Collaboration initiative	Involved parties	Degree of co-creation	Experimental space
Open scientific research facilities	Knowledge institutions and firms	Low	Physical
Field labs	Governments, knowledge institutions, NGOs and firms	Medium	Physical
Commercial urban test-facilities	Governments, knowledge institutions, NGOs and firms	Medium	Field
Pure living labs	Governments, knowledge institutions, NGOs, firms and customers	High	Field

Note. Table based on Maas et al. (2017, p. 8)

Living labs as field labs

Field labs could be seen as learning alliances, where organizations from different fields are involved. Maas et al. (2017) claim that field labs are collaborations where businesses, knowledge institutions, NGOs, governments and/or customers co-create to generate solutions regarding complex societal challenges and transitions. This collaborative approach between these parties seems to be successful (Lozano, 2008b; Windolph et al., 2014). Through this form of collaboration, environmentally sustainable technologies accelerate the implementation of environmentally sustainable practices and diffuse sustainable innovation (Van Tulder, Seitanidi, Crane & Brammer, 2016). Field labs influence organizations to adopt environmentally sustainable practices in different ways, for example, stakeholder dialogue, conformity pressure, information spillover mechanisms, and the offering of information about management tools (Windolph et al., 2014). These mechanisms catalyze learning in organizations concerning environmental sustainability and lead to the implementation of environmentally sustainable practices (Iarossi et al., 2013).

Lee and Pennings (2002) state that the adaptation of these practices depends on the organizational members who represent the organization. The representatives receive information from the field lab and could bring this information to the organization and act, therefore, as the bridge between the field lab and the focal organization (Lee & Pennings, 2002). Bansal and Roth (2000) emphasize this power these representatives have and state that the perception of these individuals regarding environmental sustainability is a significant factor in firm adaptation of environmentally sustainable practices. Based on this perception, the representative decides if he or she should share the learned information with the firm that he or she represents (Bansal & Roth, 2000). This role of organizational members within field labs coincides with the open polity perspective (Weber & Waeger, 2017). Looking to field labs from the open polity perspective could give valuable insights into how living labs can influence organizations to adopt environmentally sustainable practices.

The open polity perspective

Literature mentioned earlier in this theoretical review describes the relationship between the institutional environment and organizations based on institutional theory. Institutional theory is seen as an evolution of the open polity perspective (Weber & Waeger, 2017). Both institutional theory and the open polity perspective try to explain how the external environment influences organizational policy. The main difference between institutional theory and the open polity perspective is the view of an organization (Weber & Waeger, 2017). Institutional theory

sees an organization as the unit of analysis and assumes an organization-level calculus of responding to external demands (DiMaggio & Powell, 1983; Oliver, 1991). The assumption is made that an organization changes unanimously to cope with pressure and change in the environment (Oliver, 1991).

Opposed to institutional theory, the open polity perspective assumes that individuals and groups within the organization respond to pressure and change instead of the organization itself (Ben Khaled & Gond, 2019). To respond to pressure and environmental change on the organizational level, these individuals and groups have to convince other individuals and groups inside the organization to react as one unit. Therefore, this perspective sees organizations as "a polity model whereby internal political processes are intertwined with external conditions" (Weber & Waeger, 2017, p. 888). This process is seen as the "double contingency" because two contingencies occur when the institutional environment influences organizational policy. The first contingency covers the influence of the external environment on an organizational member or group; the second contingency covers the influence of the organizational member or group on the policy of the organization to respond as one unit to the pressure of the external environment (Weber & Waeger, 2017). Ben Khaled and Gond (2019) claim that through this double contingency, organizations adopt certain practices change policies.

This study uses the open polity perspective to explain how living labs influence organization policies. Representatives of organizations interact with each other in field labs, rather than the whole organization. This interaction could lead to the influence of the representative who will translate this influence on the policy of the organization he or she represents. This research aims to investigate the first contingency, i.e., the influence of the living lab on the organizational representative.

Field labs in the open polity perspective

When representatives of organizations come together to share information about and co-create environmentally sustainable practices, the living lab influences the representatives' perception regarding the adaptation of these practices (Bansal & Roth 2000). When information is shared between different organizational representatives about environmentally sustainable practices, these representatives feel more discrete about the information they receive and feel more confident to share this information with members of their organization (Bansal & Roth, 2000). At the same time, this knowledge exchange could raise concern regarding environmental sustainability (Bansal & Roth, 2000). Also, in living labs, subjective norms about environmentally sustainable practices between the representatives could grow (Papagiannakis

& Lioukas, 2012). Likewise, the more an organizational member is personally concerned about environmental sustainability, the more he or she is willing to influence the focal organizations (Flannery & May, 2000; Papagiannakis & Lioukas, 2012). Knowledge exchange in living labs could affect this concern. Finally, when a representatives' perceived behavioral control is high, he or she is more likely to share information about environmentally sustainable practices with the organization he or she represents (Flannery & May, 2000; Papagiannakis & Lioukas, 2012). Living labs could influence this perceived behavioral control when, for example, best practices are discussed. Best practices give insight into how practices can be implemented productively and efficiently in order to save costs (Reddy & McCarthy, 2006). These insights give the representative a better idea of the profitability concerning the particular practice and influence the perceived cost-benefit analysis, which influences the perceived behavioral control.

The perceived subjective norms, personal concerns about environmental sustainability, and the perceived behavioral control form someone's perception about implementing sustainable initiatives (Flannery & May, 2000; Papagiannakis & Lioukas, 2012). Seen from the open polity perspective and within the context of a living lab, these factors could lead to the representatives' intention to share the information about environmentally sustainable practices with the organization he or she represents. Aligning this phenomenon with the open polity perspective, living labs could influence perceptions of organizational representatives, which covers the first contingency. Therefore, the perception of representatives about environmentally sustainable practices shared in a field lab could have a significant influence on what practices the organization is going to adopt and how (Flannery & May, 2000) when these representatives influence the organizational policy, which covers the second contingency.

Case description

This case study collected data in the Living Lab Regio Foodvalley Circulair located in the Foodvalley region in the center of the Netherlands. This living lab consisted of multiple embedded field labs called workplaces. In these workplaces, supply chain parties, education- and knowledge institutions, and local governments tried to exchange and create knowledge in quarterly workplace-meetings and pilot-projects (Regio Foodvalley, 2019). These workplaces involved parties who collaborate for a sustainable and future-proof economy whereby the application of circular economic business models is a conventionality (Regio Foodvalley, 2019). The program aimed to create new ideas and projects whereby the involved parties learned to make circular steps in the Foodvalley Region in order to set a regional standard (Regio Foodvalley, 2018). In the living lab, workplaces were the basis of knowledge exchange,

which should encourage circular economic innovation among the involved organizations (Boon-Bart & Kievit, 2020). The Living Lab Regio Foodvalley Circulair included, besides the workplaces, a "circular booth," which was a point of contact for organizations to receive information about starting circular economic initiatives and referrals to knowledge institutions and a "think tank" whereby experts and governments tinkered about circular system innovation (Regio Foodvalley, 2019). This research explored the process of the first contingency that takes place in field labs. Therefore, the data collection was focused on the workplaces within this regional program.

During the data collection, five workplaces were active, focusing on five different subjects: Circular construction, food waste, measurement of circularity, circular applications in governmental policy, and hydrogen. Every workplace had a different approach towards creating new ideas and projects, depending on the nature of the sector or challenge (Regio Foodvalley, 2019).

Methodological framework

Little theory and data existed about this first contingency in the living lab and corporate environmental sustainability context. Therefore, a descriptive case study was built focusing on the circular construction workplace embedded in the Living Lab Regio Foodvalley Circulair. With the circumstances of low available theory concerning the first contingency in living labs, a descriptive case study design was well-suited (Yin, 2003). Furthermore, case studies give focus to a process or phenomenon studied in a specific context (Yin, 2003; Holloway & Wheeler, 2010). The first contingency can be seen as a process in the living lab context, and therefore the case study design is appropriate to use. Finally, the focus on a phenomenon in a living lab indicates a high level of interaction and dynamics between individuals. A single perspective cannot provide a full account or explanation of the first contingency since dynamics, interaction, and influence exists within two or multiple parties. Therefore, the last reason why a case study design was chosen is that the case could provide insights from the multiple parties that create these shared properties.

Data sources

The study was built upon three sources: Semi-structured interviews with eight participants and facilitators of the field lab conducted in March and April 2020, one observation of a workplace-meeting that took place at the end of February 2020 and additional documents. These documents were, for example, strategic programs of the living lab and a brochure describing the circular applications a living lab participants' firm implemented.

Observations

Observations were made during one workplace meeting in January 2020. Observation notes were made by the researcher using an observation guide (Appendix 1) targeted at interorganizational knowledge transfer practices and the sustainable decision intention of participants based on studies of Easterby-Smith, Lyles, and Tsang (2008) and Papagiannakis and Lioukas (2012). The observation guide was developed in consultation with expert practitioners and academics of the Christian University of Applied Sciences (CHE), which is the leading research partner of the Living Lab Regio Foodvalley Circulair. The notes were made during a two-and-a-half-hour living lab meeting, which started after the researcher presented the purpose of the observations and research.

Interviews

The interviewees consisted of six circular construction workplace participants, one facilitator of the circular construction workplace, and the overall manager of the Living Lab Regio Foodvalley Circulair. Initially, a minimum of 20 interviewees from different field labs intended to be included for this study to cover all organizational representatives in the living lab case. Unfortunately, due to the COVID-19-crisis, interviewees were not able to participate since this crisis demanded their attention, and different workplaces were interrupted in their activities. Of the six workplace participants, four were CEOs or owners of their organizations, one participant was a coordinator for a specific department in the organization, and one participant was a project leader in spatial plans at an involved municipality. The facilitator managed the workplace-meetings, and the overall manager was responsible for the overarching living lab program. Table 2 gives an overview of the interviewees. The interview sample was chosen based on a purposive sampling strategy to ensure that all key constituencies of the first contingency were covered and to get enough diversity in the sample so that the impact of the living lab could be explored (Ritchie, Lewis, Elam, Tennant & Rahim, 2014).

The interview protocol (Appendix 2) was targeted at interorganizational knowledge transfer practices, the interviewees' perception about implementing sustainable initiatives, and the translation of this perception to the firm's policy based on studies of Easterby-Smith et al. (2008), Papagiannakos and Lioukas (2012), Weber and Weager (2017), and Bansal and Roth (2000). Appendix 3 gives a clear overview of which interview questions were based on which study. The interview protocol was used as a guide for the semi-structured interviews and was developed in consultation with expert practitioners and academics of the CHE. The average interview lasted one-and-a-half-hour and was held by phone. All interviews were recorded and

transcribed verbatim. In verbatim transcriptions, the interview is transcribed precisely to what the interviewee has said; grammar mistakes not adjusted (McLellan, MacQueen & Neidig, 2003).

Table 2

Characteristics of the interviewees

Company's industrial specification	Function
Municipality	Project leader spatial plans
Manufacturer	CEO
Engineer	CEO
Landscaper	Coordinator calculation & project planning
Contractor	CEO
Contractor	Technical director
Living Lab	Workplace facilitator
Living Lab	Overall manager / Consultant

Additional documents

The researcher collected several documents containing information about the Living Lab Regio Foodvalley Circulair and its participants. These documents have been used for triangulation during the data analysis. An overview of these documents is provided in table 3.

Table 3

Overview of additional documents

Source of information	Content
Presentation slides	Content shown during the workplace-meetings
Documentary summary	Documentary showed during a living lab-meeting
Interview transcript	Interview about environmentally sustainable practices of one of the workplace participants researched by an intern
Brochure	Environmentally sustainable practices of a workplace participant
PDF	Cooperation program Living Lab Regio Foodvalley Circulair
PDF	Cooperation contract Living Lab Regio Foodvalley Circulair
PDF	Strategic agenda Regio Foodvalley 2019

Triangulation

Collecting data utilizing three sources enables data triangulation, which is used to overcome problems concerning instrument and investigator bias, and validity by cross-validation (Oppermann, 2000). The first form of triangulation was across different interviewees. Interviewing several workplace participants, the living lab facilitator and living lab manager gave multiple perspectives. Through these different perspectives, cross-validation on different topics concerning the field lab was possible. The second form was across the three data sources to validate statements of interviewees or observations. Thereby, confirmation was obtained of what the researcher had implied to see during observations by the interviewees, and statements of interviewees were validated by comparing interview transcriptions with additional documents. Using these different forms of triangulation, the researcher tried to avoid the pervasion of biases by the researcher and interviewees in the results, which increased the validity of this study (Oppermann, 2000).

Data analysis

The obtained data was analyzed through thematic analysis. This way of analyzing aims to identify, infer, and record patterns and was, for this reason, appropriate since the researcher intended to obtain a clear view of the first contingency in the living lab (Braun & Clarke, 2006; Spencer, Ritchie, O'Connor, Morrell & Ormston, 2014). The data were coded through the three step-approach by Gioia, Corley, and Hamilton (2012). This approach resembles the phases of open, axial, and selective coding suggested by Corbin and Strauss (2008). In the first step, the data were coded to make first-order codes as close as possible to the voices and interpretations of the original data sources. "This process has the advantage of stimulating the researchers to be aware of biases and assumptions." (Angeli, Ishwardat, Jaiswal & Capaldo, 2018, p. 8). Thus, no prescribed set of codes was used, but first-order codes were made and defined during the process of open coding. In practice, this involved two substeps. In the first step, codes were attached to the content of 472 quotations. Then, codes were further generalized to cluster multiple quotations underneath one code. This process resulted in 84 first-order codes. During the second step, the researcher took a more knowledgeable stance and started to identify similarities across first-order codes, which led to 18 more abstract second-order themes. In the last step, the researcher categorized the second-order themes in different dimensions of the double contingency, which resulted in six dimensions.

During this process of open, axial, and selective coding, the researcher went through cycles of iterative comparison, aggregation, and re-aggregation of codes, themes, and

dimensions to define clear concepts for a good understanding of the process. Comparison with existing literature identified discrepancies and similarities between the findings and prior research. Therefore, this approach is considered as abductive, which draws "attention to the reflexive character of data analysis as an interactive and iterative process" (Timmermans & Tavory, 2012, p. 168). One dimension, "Organization of the living lab and the workplaces," is used to describe the narrative chapter since these codes had no significant relevance to answer the research questions of this study.

Narrative

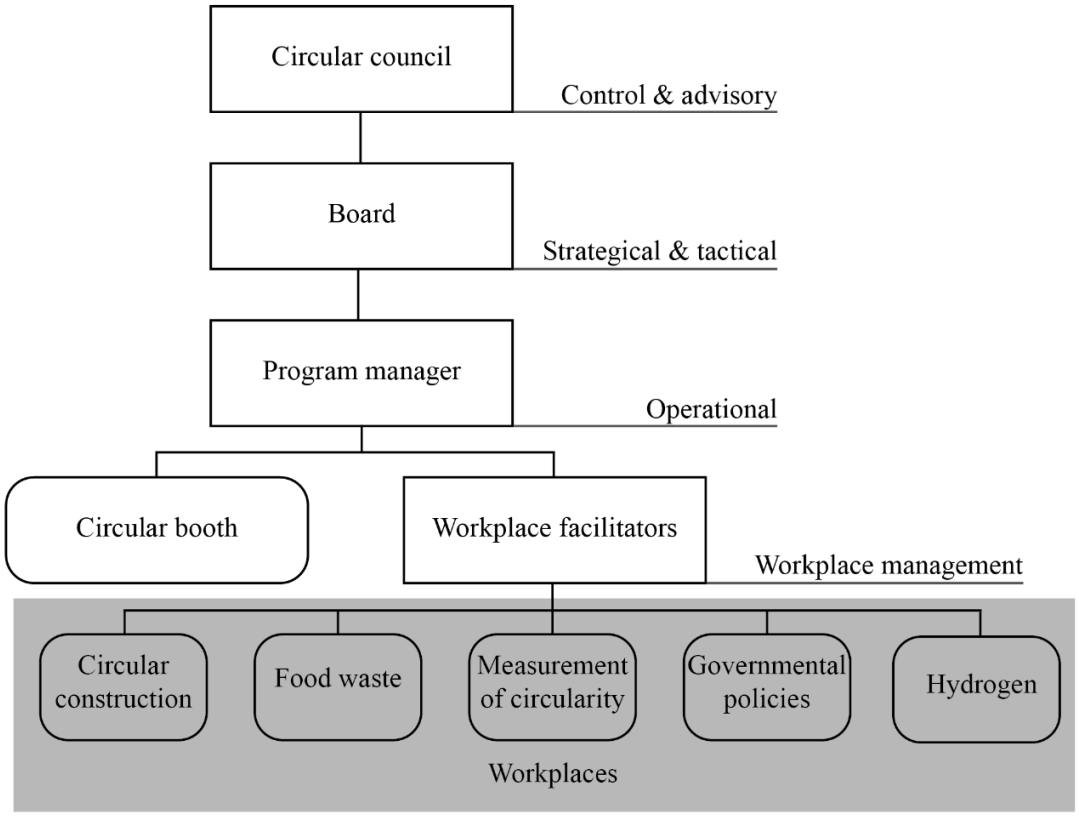
The organization of the Living Lab Regio Foodvalley Circulair

The Living Lab Regio Foodvalley Circulair consisted of an advisory committee, a board, a workplace manager, and workplace facilitators. Board members represented the triple helix; which are businesses, local governments, and knowledge institutions, in- and outside the Foodvalley region. Board members were connected to the field they represented and collected the demands or requests from that field related to the living lab or the transition to a circular economy.

The board was responsible for the living lab program manager. The main activities of the program manager were stakeholder management focused on engaging parties from the triple helix to the living lab, administration, representing the living lab in the provincial board, and thereby translating regional matters to rural matters and visa-versa. Furthermore, the program manager's role included managing the operational activities of the living lab. Even though the program board was formally responsible for the operational activities of the program manager, the program manager delegated the translation of strategic and tactical matters into operational activities. This delegation gave the ability to respond quickly to demands and requests regarding the living lab from the organizational field. The workplaces were the main proposition for partners of the Living Lab program. Besides the workplaces, the program manager could connect parties or partners who are interested in circular applications with organizations that could consult them in their interests. The hierarchical diagram with responsibilities is visualized in figure 2.

Figure 2

Hierarchical diagram and responsibilities in the Living Lab Regio Foodvalley Circulair



Note. Obtained from this study's results

Organization of the workplaces

Workplace facilitators managed the workplaces. Their main activities were to connect parties externally and internally, attract pilot-projects to the workplace, take the lead in pilot projects, form project groups, organizing the workplace, and determine subjects to discuss in the workplace.

The workplace facilitators were free to set up the workplace in the way they preferred, in collaboration with the program manager. By doing so, they were focused on responding to what the group lacked in developing circular economic applications. Workplace facilitators had expertise in the main themes of the workgroup as well as experience in managing living labs and comparable networks. They had contacts in the region and knew what changes and trends were present among local governments and the sector. Therefore, these facilitators had a helicopter view and knowledge partners.

Workplace facilitators were also responsible for crossovers between the different workplaces. Regarding this, quarterly events were set up whereby partners of diverse workplaces came together to talk about experiences in and results of the workplaces. However, these events had not yet taken place at the moment of data collection. Workplace facilitators met once every six weeks. Experiences of workplace-meetings were shared to learn and improve the workplaces they facilitated.

The workplace circular construction

As mentioned before, the data collection was focused on the workplace circular construction. This workplace started in March 2019 and was already matured in knowledge sharing and co-creation. While this workplace was attached to the living lab, it was also part of Cirkelstad. Cirkelstad was a nationwide program focused on developing and co-creating circular applications in the construction sector in collaboration with businesses and local governments. The workplace facilitator was the connection between both programs, and because of Cirkelstad's support, he would not manage the workplace without it. Cirkelstad facilitated the workplace with speakers, educational partner courses, examples from different networks all around the Netherlands, and trained the workplace facilitator.

The workplace's mission was to increase the application of circular economic approaches in products, services, and business models in the construction sector of the Foodvalley region. The primary value to do this in the workplace was sharing knowledge in collaboration with the whole supply chain and local governments. Local governments were the most notable clients in this supply chain since they acted as buyers for projects in the cities. The goal of the workplace was fulfilled when the municipalities and private investors only wanted to build circular buildings.

Workplace participants

Workplace participants were representatives of organizations that already developed circular products and applications in their expertise. The parties were familiar with each other and were sometimes partners in day-to-day business. Overall, business relationships between participating organizations were positive.

The workplace-meetings included a core group, parties who joined the workplace for one or two times, and peripheral actors. The core group involved the representatives of SMEs being mostly CEOs, directors, or managers. Many parties from the supply chain were represented except for an architect, suppliers, subcontractors, and installers. One municipality was engaged in the workplace. Peripheral parties, such as banks, material specialists, and

circular consultants, were not participants of the workplace but joined workplace-meetings to give presentations, information, and consultation to the workplace participants. Also, knowledge institutions joined when there was an urge for research or consultancy.

Results

As described in the methodological framework section, the systematic coding procedure led to 84 codes that were made out of 472 quotations, during open coding. Axial coding involved clustering these codes into more general second-order themes. During selective coding, these 18 second-order themes were compared and aggregated into six dimensions. As mentioned before, one dimension was used to describe the narrative chapter. The other dimensions, labeled as "determinants for participation in the workplace," "workplace dynamics," "knowledge sharing & co-creation," "perceptions about implementing circular initiatives," and "internal translation processes," are used to describe this results chapter. Appendix 4 presents the coding tree where the initial first-order codes (left) were grouped into second-order themes and then into the dimensions (right). The figure also describes, in brackets, the number of quotations retrieved per code. These numbers provide a numerical estimate of the relative importance of the specific code within the transcripts. The results are described along the five dimensions.

Motives for participation in the workplace

The choice of organizations to be involved in the living lab appears to be based on several motives. These motives are presented in this paragraph.

Governmental regulation and market-change

Workplace participants were already developing circular products before they became a participant. The participants pointed out that they started to develop circular products due to several motives. First, the Dutch federal government states that half of the products and services have to be modified to the circular economy in 2030, while in 2050, the entire Dutch economy has to be reconstructed from a linear to a circular economy. However, this ambition is not yet translated into detailed regulation. Firms acknowledged the urgency of this transformation and wanted to avoid risks on claims in the future, or wanted to be a front-runner in this transformation in order to gain more competitiveness. Especially the municipality was tied to this regulation:

"With the national regulation in mind, we developed a vision for the next ten years. . . .

It says that we want as local government to reach a circular economy in 2050, and one

of those elements contain all public buildings. So, all the buildings that the government contracts have to be built circularly."

Second, firms stated that a circular economy is a sustainable solution to ecological problems. Therefore, they saw the implementation of circular products and services as a way to make their business model stable in this transformation. Workplace participants indicated that the announced transformation to a circular economy leads to the expectation of market-role changes and organizational strategy adjustments. To prepare the firm on this changing market, firms became a partner of the living lab. This research titled this motive as the stability driver.

Circular innovation in the supply chain

The construction industry was acclimated to a linear economy whereby products, especially buildings in this particular sector, were built, consumed, and demolished. The materials of the building were disposed of as waste. Organizations that wanted to develop circular structures or apply circular economic approaches in the business processes did not only have to adjust their products and processes internally but struggled with this acclimatization to a linear economy in their supply chain. The main obstacle was found in the design of the building, which was fixed once the client accepted it. When the client or investor agreed with the design of the building, contractors and other parties were not able to implement circular innovations that were not described in the architecture or the plan of requirements. Besides the architect and the client, no other organization was able to influence this design wherethrough the circular innovations, developed by the parties that built the building, could not be implemented in the construction.

For example, a contractor told that a municipality and the contractor agreed upon using reused materials and the implementation of detachable components in the construction that they were building. However, these agreements could not be fulfilled since the construction's design was already determined: "That [project] did not succeed at all. The construction and the design were not suited to make things detachable and reuse materials." The underlying reason for this obstacle was the municipalities' tender process. This process, whereby parties appointed for a project, did not focus on implementing the knowledge and innovations of firms in the constructions. The design and plan of requirements were determined before the contractors, and other parties that build the building were hired.

Multiple interviewees indicated that the implementation of circular products required an increase in collaboration between firms:

> "We strongly believe that when you want to develop circularity, you have to involve the whole supply chain of a product or material. . . . For example, when you talk about the concrete-chain, then you have to look where old concrete is demolished. Who demolishes it? Who is going to crush it? What kind of materials can we make of this material?. . . . But you have to talk with the purchaser as well."

Firms wanted to advise clients and architects before the buildings' design was determined about what circular products they could implement in the building to realize structures with circular applications. At the same time, the municipality wanted the firms' advice about circular innovations, but the regulation to avoid conflicts of interest in the tender-process blocked that.

Interviewees also indicated that most often, clients hired the contractor that offers the proposal with the lowest price. Profit margins were little for the contractor, and therefore, the firm wanted to buy the cheapest material for the building. The pre-described materials for the construction were not always used by the contractor to make a profit. Recycled materials were most often more expensive than new materials. Therefore, when the architect and the client had agreed to use recycled materials in the buildings' design, it was not certain that these materials would be bought by the contractor. Discussion concerning materials between the architect and contractor lacked because the contractor was appointed after the building was designed.

Refurbished building components could also be used as a circular economic approach in buildings. In the Foodvalley region, several demolishers did develop a digital marketplace for elements that could be constructed into new premises. Architects were encouraged to use this marketplace to designate which components they could use in the building. However, it was difficult for architects to use this platform since demolition contractors administrate these components on the marketplace in the short term before demolishing the building. Thus, architects did not have insights in which of these components were in stock at the time the building was in construction.

Based on these barriers, firms became workplace participants to gain knowledge about how the supply chain could change beneficially to implementing techniques and materials that improve circularity in constructions. For example, the representative from a municipality stated that she became involved because she could use the knowledge of firms in the supply chain for their projects while avoiding conflicts-of-interests. Organizations wanted to think about and develop circular applications in collaboration with the whole supply chain and get insights into the obstacles of other firms to implement circularity in the building in pursuance of solving those. Moreover, the firms wanted to collaborate with workplace participants since the other

firms wanted to implement circular products in buildings as well. Finding partners and working together would make it easier to adjust the process. Finally, the participants wanted to learn from each other and stay up to date about circular products and applications. This study titled these motives as the knowledge and collaboration drivers.

Market demand and business models

Workplace partners indicated that the market demand stayed behind for circular buildings and applications. Not many clients wanted circular structures, and clients or customers did not understand circularity yet: "The change you want to make is of societal importance. . . . Nevertheless, you cannot translate this societal importance to the interest of the customer. That is the difficulty of this transition every time." Interviewees stated that the esthetical value of circular materials is low compared to conventional materials. Besides, buying raw materials was more often cheaper than transforming used materials into usable equipment. Predominantly public bodies such as local governments and municipalities asked for circular constructions since these are non-profit organizations. Notably, the high costs of circular buildings were an obstacle for private clients or investors to choose circular applications. Due to these high costs, firms sought business models in the usage of materials that have a long product life cycle or the explanation that circular applications are valuable in terms of the reduction in depreciation and other costs. These business models would be profitable according to the actual market conditions compared to using circular techniques such as the detachability of components in buildings. For example, the representative of the landscaper stated:

> "We want to attach values to flora on buildings. For example, the installation of a roof garden. What does that do with your water management? How much water does a garden holds? . . . Moreover, what does this do with the sewer overload?"

With values as these, the firm intended to change circular landscaping from a cost item to an asset.

These non-competitive prices and lack of market demand led to an increase in risk for investors and firms. With traditional buildings, investors were nearly sure to make a profit. At the same time, firms avoided making substantial investments in machinery and R&D costs since there was a high risk of sunk costs.

In order to implement circular products, firms advised customers about the extension of the materials' product-lifetime and were focused on long-term contracts. These contracts mainly involved the construction and maintenance of the building—the more robust the

materials, the less maintenance, which led to a higher profit-margin to the firm. Interviewees saw opportunities in circularity and the workplace. Through the workplace, firms wanted to show what the firm was able to produce, and interviewees expected that this would increase the circular reputation and competitiveness of the firm. Further, the workplace sought to attract multiple pilot-projects, which led to business. For example, a municipality wanted to tender for a circular integral child center, and to realize this, conversations between the workplace and the local governments took place to collaborate. The workplace participants thus saw business and branding opportunities in the workplace. These reasons together formed the opportunity driver in this study.

Regionality

Finally, some participants indicated that the regionality of the workplace attracted the firm to participate. Firms expected that they could exchange knowledge and collaborate more efficiently with local organizations since they were able to respond quickly. Moreover, they were socially embedded with those firms and found, therefore, other participants trustworthy. "You know what peoples values are and what them drives. That makes it a lot easier." In these circumstances, firms were more willing to step into uncertain projects and saw this as an accelerator for collaboration. In this study, this is called the proximity driver.

Workplace dynamics

When organizations became involved in the workplace, the workplace dynamics and atmosphere seemed to be crucial for knowledge sharing and the influence on representatives' perceptions regarding circular solutions.

Workplace participants experienced a transparent atmosphere in the workplace-meetings. The interviewees indicated that they were open because they intended to share knowledge and collaborate. Three contractors were engaged in the workplace, but these parties did not have a fierce competition. Workplace participants stated that competition would not be a bottleneck for knowledge sharing in the workplace when the firms came from the Foodvalley region. They preferred that knowledge and projects maintained in the region over spilling it to rural companies. The most marked relationships were the ones between the firms and the municipality. In the past, the firms had frustrated the tender-processes with public bodies. Interview participants looked critically at the collaborations between the firm and the municipality, even though they indicated that the contact was positive in the workplace.

The participants also recognized a shared ambition as well and declared that they saw the same opportunities. Despite the transparency, they did not entirely play off the back foot.

The workplace manager told, for example, that one of the contractors had critique on the pilot-project during a drink when the formal workplace-meeting had ended. However, he did not express this during the session. The workplace participants trusted each other because of the positive business relationships and were open about the innovations they developed but did not show critiques on the topics discussed. Multiple interviewees declared that the workplace-meetings were most often passive, and they saw a lack of interaction. One of the interviewees said:

> "I think it is now more often passive and then I walk away from a workplace-meeting and think: ". . . but what do companies think about it? Are they first going to think about it and do they scheme together?" . . . They have critique, but do not discuss it during the workplace."

This phenomenon was also mentioned connected to leadership for pilot-projects. Workplace participants did not seem to step into pilot-projects quickly or did not often express that they wanted to engage in a pilot-project collaboration. Therefore, the workplace facilitator talked with the participants between the workplace-meetings and formed project groups.

Finally, all workplace participants were enthusiastic about circularity. Sometimes a tension arose when the participants discussed circularity among their organization. Workplace participants also noticed that the firm's relationships outside the workplace became more comprehensive, and collaborations were more often focused on projects involving circularity:

> "We knew [firm] all before, but our partnership was different. We see that we develop projects together now . . . We are going to make a roof-garden for a project of theirs whereby circularity is an important component. . . . That is an example that comes from networks such as the living lab."

Participants acknowledged that they knew, through the living lab, with whom to collaborate regarding projects focused on circularity.

Knowledge sharing and co-creation

In the workplace-meetings, different forms of content were shared in different knowledge sharing approaches. First, the data about the content is described, after which the different approaches are portrayed.

Content

Workplace-meetings were aimed at knowledge sharing focusing on circularity in the construction sector. Subjects were devoted to the basics of circular economy, circular materials,

processes, and examples of circular applications. The workplace facilitator most often determined the subjects. He chose the topics based on the preferences of participants, knowledge gaps of participants, questions, and the information needed for pilot-projects. In the four workplace-meetings that took place, the main subjects were group forming, tender processes and cooperation with municipalities, usage of bio-based materials, and the jurisdictional and financial components of pilot-projects. Workplace participants told that most parties knew the basics of circularity; there was thus no need to discuss basic principles and definitions of the field. No questions were asked during a workplace-meeting about these basics, even though some presenters talked about this elemental information.

Regarding content shared in the workplace, first, knowledge about materials and particular techniques, e.g., the use of bio-based materials, raised tension between workplace participants. Different parties were convinced that various materials could be used for circular applications. The representative of a concrete manufacturer stated that substances are competitive in the market. The focus on one initial material could, therefore, lead to resistance among the participants who compete with this discussed material. However, other workplace participants indicated that focusing on materials was inspiring and gave insight into the applications of this material regarding circularity.

Second, information about circular processes in the supply chain and the development of circularity has been received more favorably. The workplace focused on, for example, the juridical and financial aspects firms face when developing circular buildings and techniques. Workplace participants indicated that they learned from information about these processes. The workplace facilitator explained this learning regarding the process: "The firms are very innovative. They know how to apply circularity construction-technical. . . . So it is mostly in the process, the flip-thinking to another process. That is where the biggest hick-up lies."

Finally, best practices were shared during the workplace-meetings. There was a significant distinction between examples in terms of the message's receival by the workplace participants. Best practices developed by large contractors and without budget limitation gave resistance since the participants did not find it realistic for SMEs to construct in these conditions. Best practices developed by SMEs and especially in the region, inspired workplace participants, and made them understand what they were able to develop and achieve. When interviewees elaborated on the diverse content, they told that the combination of the content is essential: "From small to large, that is a good interpretation. So, an alternation between pilot-projects, process, process renewal and circular processes, and the products."

Concreteness of content linked to pilot-projects was a frequently discussed topic during the interviews. Interview participants indicated that they learned from information that they could directly apply to their firm, such as avoiding certain blockades that firm face to implement circular products. Interviewees found detailed and general information useful to start thinking about circularity. However, the receivers of this information were already developing circular applications and found it challenging to translate this information to the firm's products and processes. The workplace facilitator stated:

> "You have to make it practical to an example that they [workplace participants] can understand. When they see already a design, mock-up sketch, or something like that, they say: "Wait a minute, this is something real, there lies a business opportunity in it." I think that when you tell a story whereby participants smell a business opportunity, it appeals the most." Inherent to concreteness was the linkage of content to pilot projects. The subjects that

appealed from pilot-projects, such as obstacles in the tender process for building the integrated child center, were highly appreciated. The participants were able to turn this information into practice immediately. Participants longed for this information and did like to see more of this content.

Knowledge sharing approaches

The workplace used three different knowledge sharing approaches: Unilateral knowledge sharing, bilateral knowledge sharing and co-creation in pilot-projects. This section describes how these different approaches took place in the workplace-meetings and how this was perceived by the workplace participants.

Unilateral knowledge sharing contains sending information from a sender to a receiver. In the workplace-meetings, external specialists most often gave presentations about different applications of circularity. These presenters provided information about their profession linked to circularity and pilot-projects with multiple examples and best practices. Workplace participants expressed that circular visionaries and advisors made them think about circularity but experienced that the content shared was most often not realistic in terms of SME capabilities. They also revealed that when those speakers inspired other participants, no question arose. The participants were critical when specialists used examples and best practices. Most often, specialists used cases that were not feasible for SMEs to realize. Speakers also presented information about processes or linked to the pilot-projects. Interviewees were positive about those presentations and indicated that they learned from this information:

> "Precisely because of the presentations, you see things that are external outside your primary process, and you see the things that are possible, separated from the product itself. How things have developed and what is looked at. I can do something with that in my business operations."

Furthermore, speakers who linked their information to the pilot-projects confirmed the view of participants and helped them with their insights to avoid or clear the obstacles.

Bilateral knowledge sharing contains sending information between a sender and receiver by interaction. Workplace participants did like to see more interaction during the workplace-meetings:

> "The given presentations have concrete relationships with circularity in its broadest sense, but these are nothing more than presentations. That is nice, and you may learn because of it, but you want interaction, and that's what I miss. It won't be an active session when it involves only presentations."

Parties did not discuss in what conditions a circular product or material is appropriate to implement. However, the interaction that occurred after presentations when the information is discussed was fruitful. The main topics of these discussions between participants regarded the pragmatism of the content for the participant's firm, the feasibility of presented applications and examples, and the linkage to pilot-projects. In the workplace, views of circularity and feasibility clashed during these discussions, through which workplace participants wanted to convince other parties of their perception, mainly when disputes arose about the translation of the information for the pilot-projects. It seemed that all parties wanted to make the pilot-projects successful, and therefore, they were active in discussions in order to make the appropriate choices in collaboration. Workplace participants noticed that they learned from these discussions and conversations because it gave them insight into the view and feasibility of other parties in the supply chain. For example, through an open debate during the first workplace-meeting, the firms and municipality discussed the friction in tender processes of implementing innovation and circularity in buildings. Firms were critical, but after the representative of the city explained how the tender process works and what obstacles it faced with implementing innovation and circularity in buildings, the workplace started to look at how these obstacles could be resolved.

Co-creation in pilot projects contains experimentation in practice. The workplace had during the analyses for this study one pilot-project, building an integral child center with circular applications, and was starting-up a second, developing solutions for vacant agricultural buildings. Project groups between participating firms were formed by the workplace facilitator

in order to attract the firms' relevant specialisms. Workplace participants appreciated pilot-projects for several reasons. The pilot projects made the workplace attractive in terms of business. However, workplace participants valued learning even more: "I would like to meet and discuss how to build a school circularly and that we learn collaboratively, we do not even have to get the deal." Also, participants learned how to collaborate intensively in the supply chain and with the municipality, and how to solve common issues in developing circular applications. The experience to translate the theory into practice was valuable for the participants provided that the projects contained some conditions. These conditions were focused on the experimentation space in which the workplace participants could co-create, such as an investor or client that values learning or circular economy over high-profit margins and leaves space to innovate in the projects. For example, the municipality who entrusted the integral child center instructed the firms with an ambition document instead of a plan of requirements. This ambition document described the purpose of the building, but the way of constructing or technical demands were not fixed. Furthermore, the participants were open to some financial risk, but it should not be too big of a burden for the company. Therefore, the workplace facilitator indicated that public bodies are most often appropriate for these projects since these organizations are non-profit institutions and interested in how to develop circularity in buildings.

This innovation space gave workplace participants the chance to experiment in pilot-projects. Although firms can experiment within these conditions, project groups could constrain experimentation themselves as well by determining a result for the project in front. Workplace participants indicated that they want to learn and develop in small steps during the process of developing a given building:

> "You have not all the information to build a 100 percent circular building. That information is not there yet most of the time. You dive into a process in collaboration. . . . It is mostly doing and finding out, and then we are a step further, and are you going to take the next step. Thus, you receive all kinds of information, but nobody has the circular process entirely figured out. So, you are going to discover it cooperatively."

The workplace participants thus wanted to learn during the process of building a circular construction but also wanted to reflect on the project and discover how they could improve things in the next construction. They also indicated that determining a result or taking too big steps led to resistance among workplace participants, which could cause fallouts. Interviewees stated, based on earlier experience in pilot-projects in and among the workplace, that they learned about several aspects of circularity in processes, materials, techniques, and other

applications. When obstacles or problems appeared, professionals from the workplace and relations of Cirkelstad helped the project group to solve those. In the end, the pilot-projects made the other forms of knowledge sharing more concrete and relevant, and these projects led to attention from parties inside and outside the region.

Perceptions about circular initiatives

Interviewees talked about the influence the dynamics and knowledge sharing approaches had on their personal views concerning developing circular applications. They commented especially on their attitudes towards circularity, and the perceived feasibility of implementing circular applications.

Attitudes towards circularity

Most participants indicated that they were enthusiastic about the circular economy. Almost all workplace participants saw the circular economy as a solution or strategy to achieve environmental sustainability. Especially the exhaustion of raw materials in combination with the growing world population made the participants realize that circular approaches are ways to solve these societal challenges. Some participants combined this urgency to contribute to environmental sustainability with religious values or the motivation for social entrepreneurship. One of the interviewed workplace participants did not see the circular economy as an answer for ecological sustainability but was positive towards it because of the innovation the transformation enforces.

The workplace dynamics seem to have a positive influence on the participants' attitudes towards circularity. The workplace increased enthusiasm for developing circular economic applications because the representatives saw that they are not the only ones striving for this new economic model: "You see that you are not the only one in the region who develops circularity. Talking about it makes that you are going to think more consciously about it." Participants found similar ambitions, opportunities, and visions that led to a shared mission between the workplace participants. When successful pilot-projects fulfill this mission, interviewees expected that this enthusiasm would rise even more.

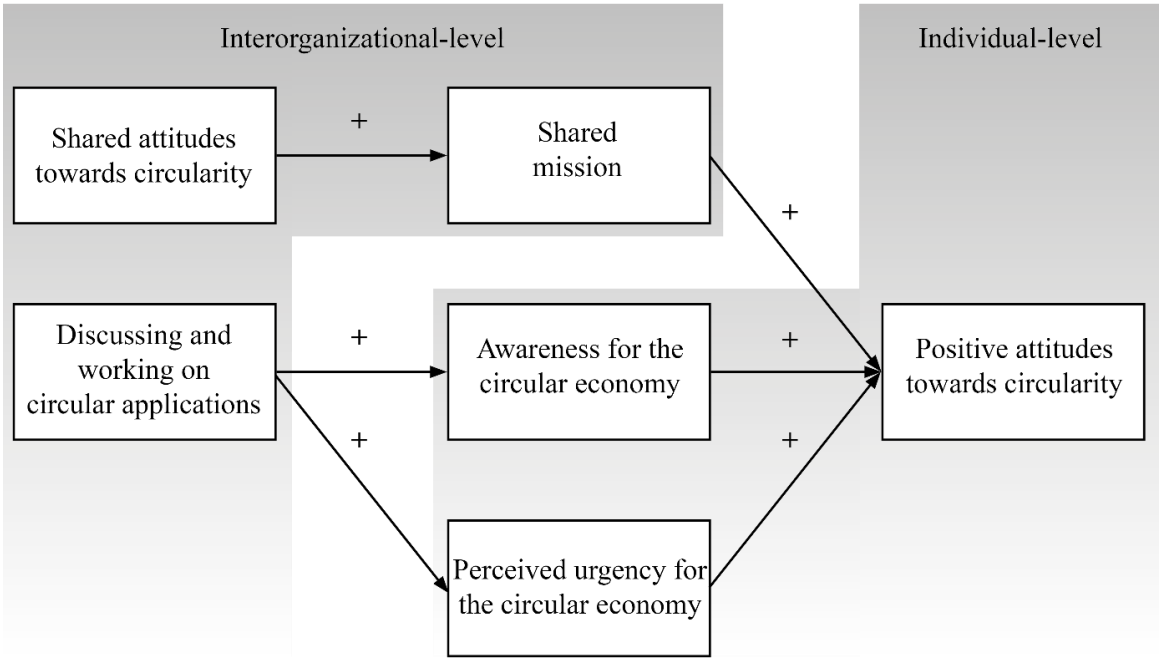
Furthermore, the workplace increased the awareness to implement circular products, services, and business models in organizations. While working at their firm, participants were mostly focused on day-to-day business. Discussing and working on the implementation of circularity in the workplace gave space to think about and work on circular applications.

Participants, therefore, indicated that this awareness led to more focus on circularity in their day-to-day work-life.

Finally, working towards circularity gave more knowledge about and attention to the urgency of a circular economy. "The more you work with circular ideas, the more you see and feel the necessity of it. That is a reciprocity." Participants felt more triggered to contribute to a circular economy because of the urgency encouraged by the workplace. The influence of the workplace on the participants' attitudes toward circularity is shown in figure 3.

Figure 3

The living labs' influence on the participants' attitude toward circularity



Perceived feasibility

Participants looked differently at applications of circularity due to different views on circular products. In general, they all noticed that full circular buildings could not be developed at that moment, especially in an SME context. Participants had different views on the profitability of circular buildings and applications as well but agreed that making a profit was possible in some settings.

Pilot-projects seemed to change this perception on feasibility, under the condition that the projects involved room to innovate. Determining a result for the project upfront led to resistance; most often, participants found these results not feasible. Opposingly, the interviewees told that the little steps of experimentation led to the expansion of their knowledge about the feasibility of making circular applications. "By making it practical, and by searching in collaboration for possibilities, we learn about the feasibility of circularity." In these small steps, participants ran into several barriers that they collaboratively tried to solve. Solving these barriers drove participants to solutions that expanded their view on the feasibility of implementing circular applications. Through these incremental steps, pilot-projects were executed, which led to the maximum achievable implementation of circularity in the buildings. Incremental steps allow participants to decide the possibilities for every stage separately. Thereby, participants saw what they were able to reach in collaboration with the supply chain instead of what the participant could achieve with his or her firm individually. Participants said that through these experimental settings, they learned how to solve barriers that blocked them in the first place. "People are pulled into these circular processes and see the work by themselves. They experience that it is not so complicated as when they are just watching and do not experience it by themselves." For example, one of the contractors stated that when the municipality asked him to build the circular integral child center at that moment, he was able to give a more precise answer than a year before. In sum, pilot-projects containing incremental steps of experience seemed to expand the perceived feasibility of workplace participants.

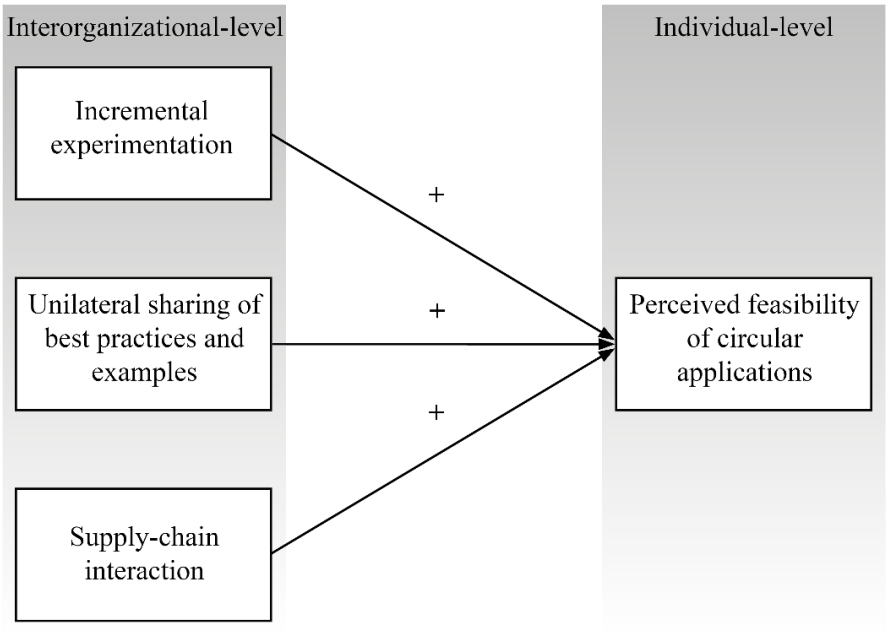
Also, unilateral knowledge sharing changed the participants' perspective about the feasibility of developing circular applications. Some workplace participants said that examples in the region or from SMEs gave more insight into what firms are able to implement. "When a product or project is shown, you see what things are possible. So, in that way, the feasibility is demonstrated." Likewise, shared content about the application of materials led to new insights about how the application of circularity in a construction was possible. A video inspired the landscaper about wood building, for example. Through these new insights, the landscaper evaluated the wood his firm worked with, and he thought about the application of wood in his firms' products and services. Finally, external professionals gave indications of what circular applications were possible to implement or not. This expansion of the view on feasibility coincided with the pilot-projects.

Finally, bilateral knowledge sharing led to a better view of the feasibility of circular applications. Discussions gave insights into what obstacles blocked circular development in the supply chain, which influenced the perceived feasibility. For example, the municipality

requested to build the integral child center with the product-as-a-service method as a pilot-project. One contractor discussed with the representative of the city that this plan was not feasible for SME firms and not profitable for the municipality. Subsequently, the representative of the municipality convinced her organization to waive the product-as-a-service method and looked for a different approach. Besides discussing conditions of pilot-projects or the application of materials in buildings, bilateral knowledge sharing gave insight into what circumstances different techniques, materials, and applications were possible to use or not. The influence of the workplace on the participants' perceived feasibility towards circular economic applications is shown in figure 4.

Figure 4

The workplaces' influence on the participants' perceived towards circular economic applications



Internal translation processes

Workplace participants desired to translate the newly gained knowledge to the activities of the firm they represented. The interviewees indicated that they did this in diverse ways. In some organizations, workplace participants found support to implement circular products and applications by other employees of the firm. In these firms, employees were interested in certain

aspects of circularity and received space to develop certain circular practices. Workplace participants were able to discuss their gained knowledge with those employees, and together they translated the obtained information into the firm's products and services. Through this translation, the employees put pressure on the management of the firm to change the organizational policy regarding circularity and environmentally sustainable products and applications.

In other firms, the management team of the firm collaborated with their employees to develop circularity. CEO's and management discussed the obtained information with employees who were motivated to develop circular products and applications. For example, circular coordinators were appointed by the management who designated where circular products or applications could be expanded or implemented. Another translation form carried out in collaboration with the firms' management and its employees was by executing pilot-projects in- or outside the workplace. Not only representatives of the firms, but also their colleagues learned from the experimentation with circularity through pilot-projects. CEOs of firms sent employees to the workplace to convince them about the value and feasibility of circular applications.

Finally, some workplace participants told that they translated the information to the firm through adjustment of policy by regulation or the building manual. The CEO and directors have forced the employees to develop or implement circular products and applications because they were convinced that this top-down approach is necessary to implement circular applications in their organizations. One of the CEOs argued this as follows: "I think that it is something that you have to instill in your organizational policy. Because in the end, project leaders and project advisors should act on it while they receive the necessary information to do so." Some firms even used professionals from the workplace to influence their employees by mandatory learning tracks provided by Cirkelstad.

Discussion

This study aimed to gain insights into the firms' drivers to become involved in living labs and how these living labs can influence firms' environmental sustainability policies. The results conducted through observation, interviews, and additional documents, bring multiple drivers forward, as well as the influence the living labs have on the representatives' perception of environmental sustainability through which organizational policies can be adjusted.

Drivers

The results from this qualitative study provide insights into the reasons to participate in the living lab.

Stability driver

The results indicate that the main reasons for firms to implement environmentally sustainable applications are stabilizing business models in a changing market environment and adjustment to changing institutional pressures. These findings coincide with studies that identified institutional regulative pressures, competitive advantage, reduction of costs, and the capability to innovate as drivers to implement environmentally sustainable practices (Schaltegger & Wagner, 2006; Schaltegger, Lüdeke-Freund & Hansen, 2012; Nijhof et al., 2019). The changing institutional pressure is mostly driven by governmental regulation since organizations do not experience that customers request circular products or that industry standards are changing. The results show that firms are aware of future governmental regulations regarding environmental sustainability and respond to this by trying to implement environmentally sustainable applications. Laukanen and Patala (2014) found the same results focusing on innovation systems in general. This studies' findings explain this innovation focus. Firms know what to expect in the future, which reduces the uncertainty of investments and encourages them to adjust their products and services according to future governmental regulations. This phenomenon is in line with Kemp and Andersen (2004), who argue that governmental regulation does not dissuade or encourage innovation but shapes it. The expectation of governmental regulation regarding environmental sustainability gives direction to innovation, makes new contraptions regulatory-proof, and reduces chances on future-claims or costs. This study shows that firms take action to control environmental problems ahead of time to lower the future costs of compliance.

Furthermore, this study reveals that the expectation of governmental regulation encourages environmentally sustainable innovation. The Dutch government exerts to finish the

transition from a linear to a circular economy in 2050. This aim is not yet translated into detailed regulation. In 2021, future regulations will be introduced (Government of the Netherlands, 2018). Organizations can only estimate what this regulation implies. Thus, not only governmental regulation itself seems to encourage sustainable environmental innovation but also the expectation of this regulation. These findings supplement Laukkanen and Patala (2014), who state that semi-strict governmental regulation encourages environmentally sustainable innovation to gain a competitive advantage. The present study also shows that this long-term regulative perspective leads to more certainty regarding market changes. Firms foresee the transformation to a circular economy in the market and want to be frontrunners in this transition. Firms expect to gain a competitive advantage over competitors who do not adjust their products and services in the long-term. The results elaborate on studies that focus on the competitive advantage firms gain when they implement sustainable business models, such as Carayannis et al. (2015), Bocken et al. (2014), and Nijhof et al. (2019). Most of these studies are focused on short-term competitive advantage, e.g., the expansion of market share by reaching new customer groups. This study adds the long-term competitive advantage to this motive. This adjustment to governmental regulation and the frontrunner motive makes organizations want to become participants of a living lab. They believe that living labs help them to stabilize their business models in the long-term.

Knowledge and Collaboration driver

This study points out that firms acknowledge that the successful implementation of environmentally sustainable initiatives is dependent on multiple parties in the supply chain, which is line with Rizos et al. (2016) and Kirchherr et al. (2018). The results also show that firms want to create a shared understanding of drivers and barriers that they experience by the implementation of environmentally sustainable products, services, and business models. By exchanging knowledge in living labs, firms expect that gaining insights into those barriers and drivers stimulate a more fluid collaboration in the development of environmentally sustainable products. This motive to collaborate in the supply chain adopts the systemic nature of environmentally sustainable business models that Konnertz et al. (2011) describe. Participants want to use this collaboration in order to implement these initiatives among the supply chain. By collaboration, participants expect that the collected knowledge and insights neutralize barriers or give an understanding on how to avoid them, such as avoiding present obstructive regulation in the municipalities' tender process. At the same time, participants want to share

their insights about the barriers they face to other parties to influence multiple parties across the supply chain.

Opportunity driver

Furthermore, the results show that firms participate in a living lab to gain market demand. By participating in the living lab, firms expect to show other parties what the firm can offer on an environmentally sustainable level. By doing so, they expect to increase their competitiveness and demand for their environmentally sustainable products and services in the short-term, next to becoming a frontrunner in the long-term. According to Nijhoff et al. (2019), firms tend to attach to new customer markets with environmentally sustainable business propositions. Kirchherr et al. (2018) state that the overall customer market does merely react to those business propositions because of the non-competitive prices. This study reveals that by operating in the living lab, firms tend to show the value of their environmentally sustainable products and services, especially in business-to-business markets. Firms expect to bridge the gap between this lack of customer interest and reaching new customer segments.

Likewise, the findings indicate that firms expect to sell their environmentally sustainable business propositions in the living lab. The public sector is a notable client for firms since this sector values and wants to encourage environmentally sustainable applications. Most research focused on living labs explore the benefits of living labs regarding innovation and avoiding obstacles in the implementation of business models (e.g., Baden-Fuller & Morgan, 2010; Breuer & Lüdeke-Freund, 2016; Breuer et al., 2018). This studies' results indicate that firms are not only focused on the innovation and the clearance of obstacles in the supply chain but want to increase business among the living lab as well. This motive corresponds to Nyström and Leminen (2011), who explain that firms see living labs as business networks. In these networks, firms benefit collaboratively from a living lab in terms of innovation. However, individual actors have their own objectives (Nyström & Leminen, 2011). This research shows that firms seek cooperation and new business opportunities with other living lab participants—for example, the services that participants provide to each other outside the living lab. The accomplishment of this driver is essential for the degree of innovation that finds place in the living lab. Findings showed that without this sales market, organizations are not willing to make substantial investments in environmentally sustainable innovation, which is in line with Kirchherr et al. (2018). Firms thus expect to increase their market share regarding environmentally sustainable products and services by participating in living labs.

Proximity driver

Finally, the results show that the regionality of the living lab attracts firms to participate. Firms see the regional living lab as a safe condition to step into uncertain projects and collaborative settings. Proximate firms are already embedded in the same social network due to the small-geographical distance and proximity of the firms. Therefore, the firms can indicate if living lab participants are trustworthy to exchange knowledge among the participants. These findings are in congruence with Granovetter (1985) and Knoben and Oerlemans (2006), who state that small social and geographical distances facilitate face-to-face interactions, which fosters knowledge transfer and innovation. Van Zelst, Mannak, and Oerlemans (2017) state that organizations collaborate more with firms that are already embedded in existing networks and have technological and cultural proximity. This embeddedness and proximity reduces uncertainty and opportunity costs (van Zelst et al., 2017). However, it is not likely that organizations participate in living labs only based on the argument that living lab participants are proximate and embedded to the focal firm. Therefore, the proximity driver could be considered as a stimulative moderator when other drivers make firms consider to participate.

Living lab's influence on the representative's view

The findings indicate that when organizations become a partner of the living lab, they exchange knowledge and co-create through the individuals who represent the firms. Participants receive information through the different knowledge sharing approaches. Bansal and Roth (2000) argue that knowledge translation to the representatives' firm depends on the representative's view towards environmental sustainability. Participants may or may not choose to share this information with his or her firm and thereby influence the organizational policy to some extent, as argued by Weber and Waeger (2017). The study shows that the living lab influences the representative's view on two aspects: The attitudes towards environmental sustainability and the perceived feasibility of implementing environmentally sustainable products, services, and business models, as shown in figures 3 (p. 37) and 4 (p. 39). This changed attitudes can be considered as the first contingency that living labs provoke.

Influence on representatives' attitude towards environmental sustainability

The findings show that participating firms already develop environmentally sustainable products, services, and business models before they join the living lab, or they intend to do so. The living lab increases the representatives' enthusiasm for environmental sustainability through the dynamics in the workplace. Representatives see that they are not the only ones

striving for the implementation of sustainable environmental applications. This dynamic leads to a shared mission in the living lab. This construction of a shared mission is in line with Schaffers and Turkama (2012), who state that it is encouraged and common to build on a shared mission in a living lab. The shared mission is often used to refer to shared values, goals, and understanding in interorganizational relationships (Parsons, 2002; Li, 2005). Shared values facilitate meaningful communication between parties, which is essential for knowledge exchange and knowledge creation (Li, 2005; Chow & Chan, 2008). The increase in enthusiasm through this shared vision can be explained from an organizational perspective. A shared mission is the cornerstone in an organization that motivates and inspires organizational members (Bart Baetz, 1998). According to Nguyen (2010), organizations are social constructions made up of individuals who act upon shared perceptions. A living lab could be described as an organization itself because participants share the same values towards developing environmentally sustainable business models. This study shows that the participants, therefore, form a shared mission that inspires and motivates them. Shared missions based on shared perceptions motivate people because it is based on their personal value, which makes this shared mission aligned to somebodies vocation (Bart Baetz, 1998). Klein (2017) investigated this phenomenon in an interorganizational setting and found that redundant internal and external drivers of individuals lead to the acquisition of awareness for the discussed subject. The results show that this increase in motivation and awareness towards environmental sustainability increases through this shared mission in living labs as well.

The study shows that participants find the transition towards environmentally sustainable practices more urgent through discussing and developing these applications in the living lab. This coincides with Lozano (2008a), who states that attitudes regarding environmental sustainability are encouraged by learning. "The internalization of sustainability passes from a change in informational attitudes, mainly through learning, to emotional attitudes to behavioral attitudes." (Lozano. 2008a, p. 506). The congruence of attitudes and alignment between individuals, groups, and organizations leads to the successful internalization of these values (Lozano, 2008a). The present study's results are in line with this investigated process. When participants learn about environmental sustainability, they become more emotionally and behaviorally involved in developing environmentally sustainable practices. In living labs, participants discuss information about environmental sustainability and work with participants who value this subject. By doing this, individuals internalize this information, which influences the emotional attitudes, the perceived urgency in this case, towards environmental sustainability.

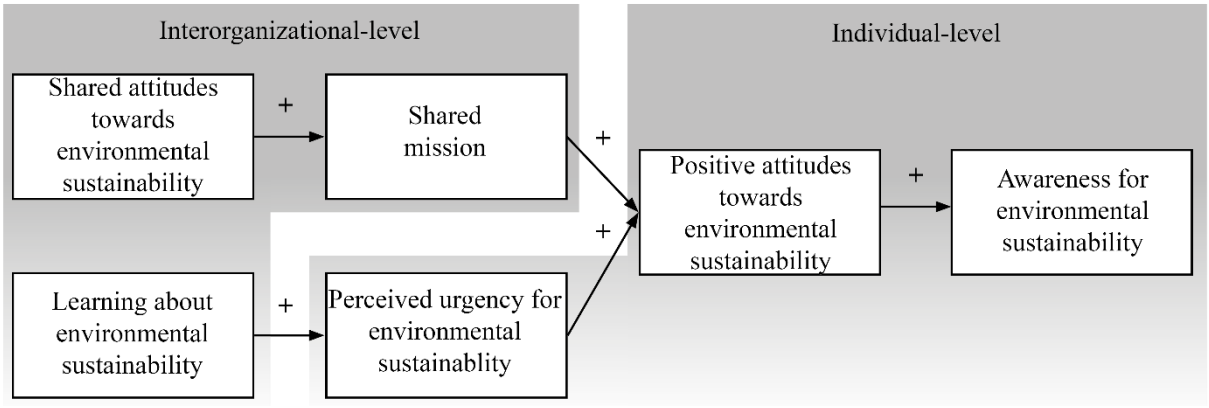
Finally, the findings show that discussing and working on environmentally sustainable applications does not only increase their perceived urgency, but participants also become more aware of these applications in their day-to-day work life. This corresponds, again, with Lozano (2008a). When somebody has internalized information, and environmental sustainability becomes an emotional attitude, it could become a behavioral attitude as well (Lozano 2008a). I.e., when someone's view on the urgency towards environmental sustainability has increased, it is likely that this person is also going to act in an environmentally sustainable way. The results reveal that participants first become emotionally internalized and then behaviorally internalized by learning through the workplace. Also, participants are motivated to develop environmentally sustainable practices since they have formed a shared mission to do this with other participants. Motivation increases the activities spent on environmental sustainability even more, which corresponds with Klein (2017). Participants thus feel more encouraged to contribute to environmental sustainability in their day-to-day work life.

Concluding, this study reveals that awareness towards environmental sustainability leads to positive attitudes towards it as well (figure 3, p. 37). However, looking at these results from the peer literature of Lozano (2008a), it is more likely that positive attitudes (emotional internalization) increase someone's awareness towards environmental sustainability (behavioral internalization). This mechanism agrees with decision making literature. The more decision-makers are personally concerned with environmental sustainability, the more they bring this forward in their decisions (Flannery & May, 2000; Pappagiannakis & Lioukas, 2012). This literature is based on the theory of planned behavior (Ajzen, 1991). Attitudes towards a particular behavior lead to the intention of doing so. This intention thus leads to the specific behavior of an individual (Ajzen, 1991).

To summarize, participants' attitudes towards environmental sustainability are influenced by the living lab through living lab dynamics, which causes a shared mission, and learning about environmentally sustainable applications, which causes an internalization of this information. This shared mission and internalization leads to a more positive attitude towards environmental sustainability among the representatives, which causes more awareness for environmental sustainability in their day-to-day work. This process belongs to the first contingency causes by living labs since a living lab significantly influence the representatives' organizational behavior and is visualized in figure 5.

Figure 5

The first contingency in living labs regarding the participants' attitudes towards environmental sustainability



Note. Based on this study's results and Lozano (2008a)

Influence on representatives' perceived feasibility towards environmental sustainability

The findings display that living labs seem to expand the perceived feasibility of participants. They get a better view of what is possible or impossible to implement. These results are in correspondence with Hekkert, Suurs, Negro, Kuhlmann, and Smits (2007), who state that in innovation systems such as living labs, participants identify technological possibilities and economic viability. The present study shows that this perceived feasibility is expanded through various knowledge-sharing approaches.

At first, incremental experimentation in pilot-projects expands the participants' perception regarding this feasibility. This is in line with Schuurman, De Marez, and Ballon (2013), who saw the same phenomenon in a living lab focused on IT innovation systems. In this living lab, obstacles implementing a particular innovation led to the exploration in terms of the technical feasibility of this innovation (Schuurman et al., 2013). Also, Hyysalo and Hakkarainen (2014) saw the usage of pilot-projects to verify technological feasibility in another living lab. Several scholars mention the creation of knowledge about technical and business model feasibility in pilot projects and experimental settings (e.g., Negro, Hekkert & Smits, 2007; Nesterova & Quak, 2016). In all studies, this led to an expansion of the knowledge about the feasibility of developing or implementing a specific product. This studies results show that participants know how to produce environmentally sustainable practices but experience external barriers when doing so, such as a lack of market demand. By innovating and testing

with the supply chain, living labs help to develop more context-specific insights to get a better view of how to implement environmentally sustainable practices in the firms' environment. This is in line with Frissen and van Lieshout (2004) and Ballon, Pierson & Delaere (2015). These scholars state that supply chain development gives firms better insights into acceptance processes, societal and economic embeddedness of technology, and the societal impacts of innovation. This study reveals that through this understanding, participants know when and where to implement environmentally sustainable products, services, and business models. This information expands the participants' view on the feasibility of environmental sustainable practices. This expansion of perceived feasibility based on these insights could be explained by Dutton & Duncan (1987), who state that perceived feasibility towards a specific issue depends on the level of understanding and perceived control over the means for resolving an issue. When individuals are familiar with this or a similar issue, they are more likely to interpret it as an opportunity because the individual could estimate the feasibility of responding (Dutton & Duncan, 1987). Experimentation in pilot-projects leads to more familiarity regarding working with environmentally sustainable products and services. This familiarity could help the living lab participants to understand the environmentally sustainable practices better and could expand the knowledge about the firms' perceived control since they learn more about the external barriers in the supply chain. Experimentation in pilot-projects thus leads to a better understanding of feasibility regarding environmentally sustainable applications.

Second, this research shows that concrete best practices and content about the application of materials in an environmentally sustainable way lead to the expansion of the participants' view of the implementation feasibility. This is in line with Bergvall-Kareborn, Hoist & Stahlbröst (2009), who state that living labs use best practices and examples of applications to identify the needs and the wishes of the users. People must alter their view from a problem perspective into an opportunity perspective (Bergvall-Kareborn et al., 2009; Chu, Kolodny, Maital & Perlmutter, 2004). Best practices and examples help to look beyond the present knowledge and technological capabilities of the participants' firm and show participants what is possible to achieve and where opportunities of the firm are found (Bergvall-Kareborn et al., 2009). Best practices and examples could become emblems of what is possible to achieve, and they fill knowledge gaps (Bulkeley, 2006).

However, not all cases give these insights. Findings show that living lab participants learn from these cases when the conditions of the example-case are similar to their organizations. This coincides with Murdoch (2000), who argues that best practices should be spread in a local context or within similar conditions regarding the receivers to achieve

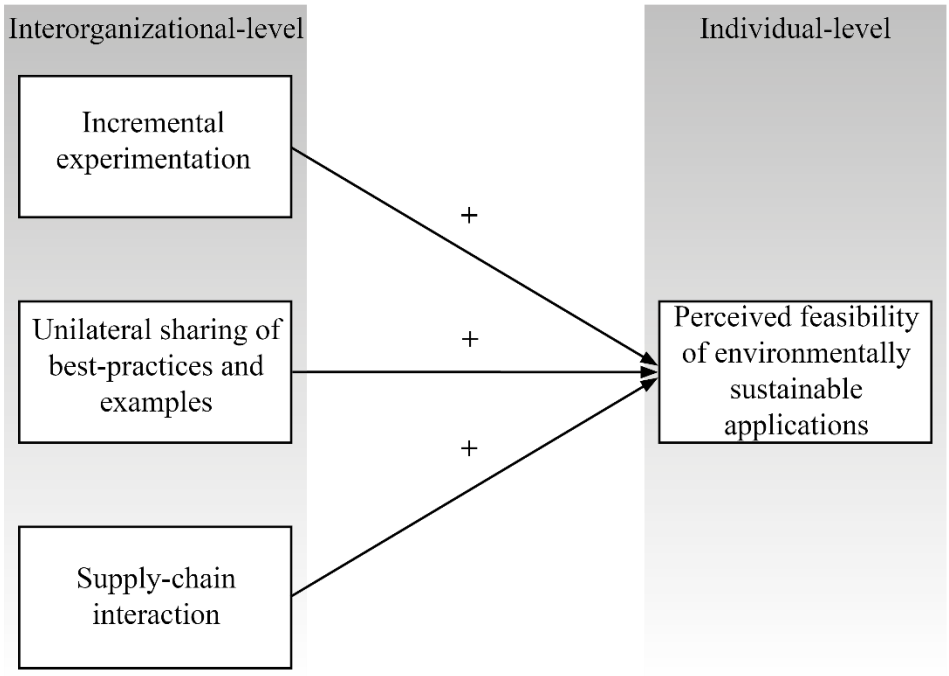
inspiration goals. Receivers of this information are aware of the "good news" stories where sometimes murky details are obscured (Murdoch, 2000). Best practices from contexts with similar conditions make these practices more realistic and valid, which opens the receiver up for inspiration (Bulkeley, 2006). The results of this research are in line with this statement. Living lab participants indicate that their perceived feasibility expands when they receive best practices and examples of material applications from the region or in the SME context.

Last, bilateral knowledge sharing seems to expand the participants' feasibility of the implementation of environmentally sustainable products, services, or business models as well. Scholars have identified similar results more often in innovation systems. Hekkert et al. (2007) state that the heterogeneous context of interorganizational networks make that participants learn by interaction with results, such as the discovery of technological possibilities. The results are in line with this study. Discussing certain conditions about the application of environmentally sustainable solutions gives participants more insights about the feasibility in particular contexts. Also, Laukkanen and Patala (2014) state that interaction between firms and governments in innovation systems can result in insights of barriers and opportunities in supply chains, which gives a better perspective of what is possible to implement and what is not. These statements are in line with the results of this research. Notably, the interaction between the municipality and the firms brought clearance in the technological and economic possibilities of named environmentally sustainable applications. This research builds on the literature of Hekkert et al. (2007) and Laukkanen and Patala (2014) by showing that through bilateral knowledge sharing in living labs, participants get insights into barriers and opportunities of other participants which expands their perception of feasibility regarding environmentally sustainable applications.

To summarize, the perceived feasibility regarding the implementation of environmentally sustainable applications is expanded through incremental experimentation, unilateral sharing of best practices and examples, and insight in the supply chain through interaction. Again, this influence of living labs can be placed under the first contingency since the feasibility perception is significantly influenced through knowledge sharing approaches. This process is visualized in figure 6.

Figure 6

The first contingency in living labs regarding the participants' perceived feasibility towards environmental sustainability



Note. Based on this study's results

Second contingency

Finally, the results give insight into how living lab participants translate the information gained in the living lab to the firm they represent. Overall, workplace participants do translate the information to the focal firm and intend to influence the organizational policy towards the development or implementation of environmentally sustainable products, services, and business models based on their perception change. This coincides with Papagiannakis and Lioukas (2012), who state that when someone is personally concerned with environmental sustainability and perceives the organization to be capable of implementing environmentally sustainable initiatives, he or she is willing to influence the organizational policy regarding it. The study of Papagiannakis and Lioukas (2012) is based on the theory of planned behavior (Ajzen, 1991). This theory states that these personal concerns and perceived capacity, together with perceived normative pressure, lead to someone's decision to do something or not (Ajzen, 1991). The findings show that this personal concern and perceived feasibility increase through the influence of the living lab. Therefore, a living lab could be a way to influence organizational policy and causes the second contingency. Also, Dutton & Duncan (1987) state that decision-makers make

decisions based on the perceived urgency and feasibility. The results show that representatives are decision-makers in the firms they represent. When these individuals perceive environmental sustainability more urgently and have a better understanding of the feasibility of environmentally sustainable practices, these decision-makers are likely to adjust their considerations towards decisions regarding the development and implementation of these practices.

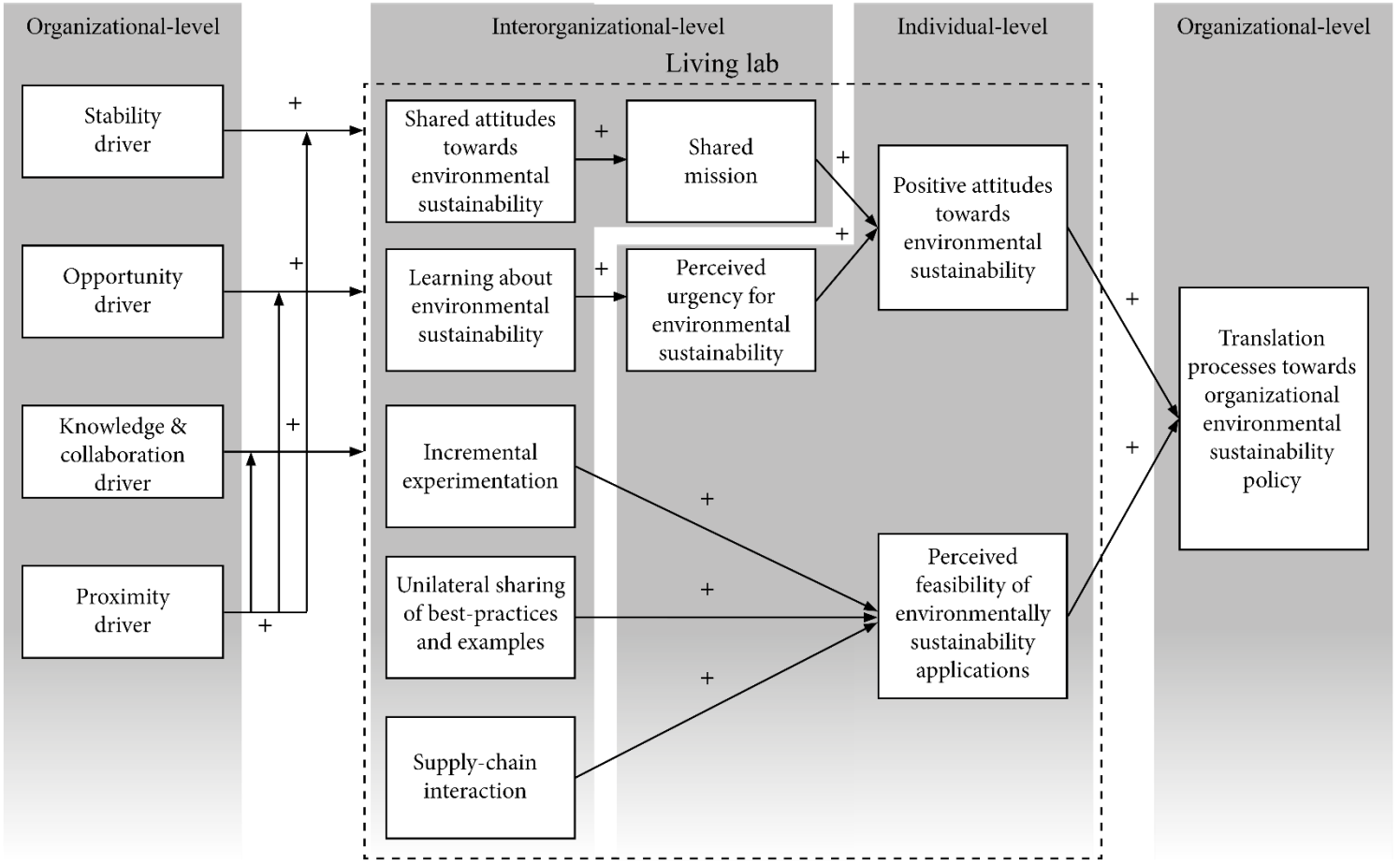
Furthermore, participants use several ways to influence the focal organizations. Some participants use bottom-up approaches. Others emphasize environmental sustainability through collaboration between different layers in the organization. Additionally, regulative, or top-down approaches are used to influence the organizational policy. Weber & Waeger (2017) describe several translational approaches in the open polity perspective to influence organizational policies, including the approaches that living lab participants used. However, the choice of the translation approach depends on a variety of variables, such as organizational size, culture, and values towards environmental sustainability. Therefore, this research concludes that living labs can influence organizational policies regarding environmental sustainability, which involve the first contingency that the open polity perspective describes. However, the heterogeneity in the sample was too high to conclude if common translation approaches are used to influence the organizational policy in the second contingency.

First contingency in living labs

Based on this study's results and discussion, an overall view of the first contingency in living labs can be given. Through specific drivers, firms choose to become a participant of a living lab. In doing so, firms are open to learn and to be influenced. The living lab dynamics and knowledge sharing approaches lead to an increase in the firm representatives' attitudes towards environmental sustainability and feasibility of developing and implementing environmentally sustainable applications, which is the first contingency. With this adjusted perception, they influence organizational policies through a variety of approaches causing the second contingency. This process is visualized in figure 7.

Figure 7

The first contingency in living labs



Note. Based on this study's results and Lozano (2008a)

Theoretical contributions

This research makes several contributions to the literature. First, it takes part in the need for research on living labs. Living labs have rapidly emerged in project practice, and therefore, Katzy, Pawar, and Thoben (2012) state that more research focused on living lab operations is needed. This research contributes to this research agenda with the study of the Living Lab Regio Foodvalley Circulair case. To the best of the researchers' knowledge, so far, no study revealed the impact that living labs have on the participants and what they do with this in their firm. In taking up this challenge, the present study contributes towards a better understanding of this impact on living lab participants in the environmentally sustainable innovation field. Furthermore, Hossain et al. (2019) state that more research should be conducted regarding living labs that focus on environmental sustainability. This study reveals more insights into the drivers of an organization to participate in a living lab focusing on environmental sustainability issues. Previous research found several drivers that correspond or are in line with drivers of the present research (e.g., Kirchherr et al., 2018; Konnertz et al., 2011). Unique is the proximity driver in this research that stimulatively moderates the other drivers.

Second, this research found that governmental regulative pressure focused on the implementation of ecological-friendly business models is not only a driver to develop and implement these, but also a driver to make organizations collaborate and share knowledge about these issues. Several authors have investigated the external and internal drivers that lead organizations to develop and implement environmentally sustainable practices (e.g., Elkington, 1997; Rizos et al., 2016). However, the researcher could not find in prior studies, so far, that governmental regulative pressure leads to collaboration and knowledge sharing. Therefore, this research contributes to institutional theory regarding the impact of environmentally sustainable governmental regulation on organizations.

Third, this study contributes to further research on the open polity perspective. Weber and Waeger (2017) recognized existing knowledge gaps regarding network ties that could influence the behavior of an organization. From a network perspective, it could be argued that living labs are a formal network focused on innovation. Weber and Waeger (2017) suggest that networks could be a pipeline for organizational policy change through connected individuals or groups. This paper confirms this suggestion from a living lab angle. Participants intend to change the organizational policies with the, through the living lab influenced, changed perceptions.

Fourth, this study builds on research focused on the individuals' perception towards environmental sustainability (Flannery & May, 2000; Papagiannakis & Lioukas, 2012). The results of this research partially repeat the outcomes of these studies and clarify that knowledge sharing practices could influence these perceptions. Individual's attitudes towards environmental sustainability and the perceived feasibility of implementing environmentally sustainable practices are covenant to these studies.

Finally, the research contributes to decision-making theory. As mentioned before, the study found that living labs influence an individual's attitudes and perceptions regarding environmentally sustainable applications. Dutton and Duncan (1987) argue that perceived feasibility and urgency of decision-makers towards a particular decision has a significant influence on an organizational decision. Decision-making theory gives much attention to external forces influencing decision-making. This research gives insights into how living labs can influence the decisions of participants by influencing these perceptions of representatives, especially towards decisions regarding environmental sustainability.

Practical implications

This study gives practical contributions for managers of organizations, governmental policymakers, and living lab facilitators.

For organizational policymakers, this study shows that living labs make participants more positive towards and aware of environmental sustainability. One of the barriers organizations face to implement those applications is the resistance towards environmental sustainability in the organizational culture (Kirchherr et al., 2018). Managers who want to implement these environmentally sustainable applications could send employees to living labs who have inertia in implementing it. Living labs could reduce the inertia and resistance of the employee. Especially sending resisting managers or decision-makers could have a significant influence on the implementation of environmentally sustainable applications since these employees have a significant influence on the firm.

Also, organizations struggle with the implementation of environmentally sustainable business models and innovations since these have a systemic nature (Konnertz et al. 2011). The limited willingness to collaborate in the supply chain is, therefore, seen as a significant barrier to implement those business models (Kirchherr et al., 2018). Organizations should participate in living labs when they face this obstacle. Organizational members interact and collaborate with the supply chain in living labs and receive insights into the opportunities and barriers to implement environmentally sustainable business models and innovations in this chain. Thereby,

the organization gets insights in the feasibility of implementing these environmentally sustainable applications among the supply chain and connections with participants with which they can reduce these barriers.

For governmental policymakers, this study indicates that living labs influence the organizational policies through living lab participants to some extent. Living labs are frequently used by governmental policymakers to encourage environmental sustainability in a specific region (e.g., Levén & Holström, 2008; Maas et al., 2017). The implementation of a living lab in a region could foster the development and implementation of environmental sustainability initiatives among participating organizations, and living labs could be, therefore, effective. Besides, governmental policymakers could receive information from firms in the living labs about how their regulation restricts or encourages this innovation. Based on this information, governmental policymakers could adjust their regulation and be an ally among firms in the transition towards environmental sustainability.

In this study, several drivers to become living lab participants are designated. Living lab managers can use these drivers as arguments in their attempts to attract firms to the living lab. For example, when firms struggle with implementing environmentally sustainable business models in the supply chain, the living lab manager could indicate that obstacles could be reduced by collaborating with the supply chain in this living lab.

Furthermore, information sharing in the living lab must be done appropriately to encourage environmentally sustainable innovation. Living lab managers must discourage working towards a fixed and complete picture in pilot-projects. Incremental steps of experimentation show participants the possibilities in every development-stage. Working towards a complete picture would impede this learning. Also, examples and best practices in presentations should only be used when the conditions of those cases coincide with the conditions of the participants. Participants get inspired by examples and success stories of firms compared to the firms they work for.

Limitations

The results of this study are accompanied by some limitations. Firstly, being based on a sample of six living lab participants and two living lab managers, the study may not necessarily provide a complete overview of the impact of the living lab. Due to changing governmental regulations and economic impact on the construction sector caused by the spread of the COVID-19 virus, some living lab participants were not able to participate in this research. Thus, this limited the generalizability of this research since other participants could have given more

perspectives on the investigated process. Nevertheless, the researcher was able to interview the representatives of organizations who have participated in the living lab from the beginning, all of whom are considered core participants. Therefore, the impact of this limitation has been decreased to an extent in which the data is still generalizable.

Secondly, the data collection was aimed at one specific workplace in the living lab. Due to regulations to contain the COVID-19 virus, several workplace-meetings were canceled, and therefore other workplaces could not be investigated. Considering multiple workplaces could have increased this studies' generalizability.

Thirdly, the study only included one observation moment while several others were planned to be included, which was not possible due to regulations regarding the COVID-19 virus. Therefore, the triangulation of data was difficult to fulfill. However, the researcher received slides and minutes of previous workplace-meetings in order to ask reflective questions about those workplace-meetings. Therefore, triangulation became more dependent on additional documents. More observations could have improved triangulation and, thus, the validity of this research.

Fourthly, this research deals with some scope conditions. The results count for living labs focusing on innovation regarding environmental sustainability. However, living labs are also active in the development of, for example, IT or business intelligence. Multiple findings are based on the systemic nature of environmentally sustainable development, which does not necessarily count for other fields. Besides, when representatives are not motivated to develop environmentally sustainable innovation, living lab dynamics could be different, which could impede the living labs' effects on the organizational representatives' perceptions.

Finally, the lack of maturity of the circular construction workplace analyzed in this study formed a limitation. The workplace existed at the time of investigation and data collection for one year, and the pilot-project had not been finished yet. Therefore, the interviewees had not experienced the process of building a circular building entirely. Although some participants were able to indicate what a pilot-project could bring based on pilot-projects of other programs and partnerships, they could not refer in the interviews to finished pilot-projects in this living lab context. This limitation might have impeded the reliability of this research.

Directions for future research

Due to the limitations of data collection experienced in this study, future research should focus on studying living labs with multiple embedded field labs more in-depth. Through the

ability to collect more data on different field labs, the findings can be more generalized to a broader audience.

Another direction in which future research could extend the findings from this study is the normative pressure participants receive from other participants to implement environmentally sustainable initiatives. Papagiannakis and Lioukas (2012) state that someone's perception towards environmental sustainability depends on the perceived feasibility of implementing environmentally sustainable initiatives, the attitudes towards environmental sustainability, and the perceived normative pressure. In the living lab analyzed in this research, nobody experienced normative pressure from other participants to implement environmental sustainability within their organization. In other living labs, dynamics between participants could be different, which could form normative pressures.

This study found that organizations have different drivers to participate in the living lab. Literature states that sometimes different drivers make the organization participate in innovation systems. For example, to influence governmental regulation or collaborative resource mobilization (Hekkert et al., 2007; Breuer et al., 2018). Different regions, industries, or living labs could expand this view on the drivers of organizations to participate, which increases the knowledge about drivers for living labs in general.

Last, future research should focus on the influence on the participants' perception towards diverse subjects to make this influence generalizable for living labs in general. The living lab studied was focused on the implementation of circular products, services, and business models, and therefore perceptions towards environmental sustainability were changed. Future research should focus on living labs that innovate regarding different topics in environmental sustainability, such as clean energy or green transportation, or topics unrelated to environmental sustainability. These studies would give a more general view on the living lab influence on participants and organizational policy.

Conclusion

This study aimed to unveil the organizational drivers to become a living lab participant and how this participation could influence the organizational policy, investigating the double contingency in a living lab setting. Through a qualitative research approach, the evidence produced answers to the two research questions. The first research question was: "What are the drivers of organizations to participate in living labs focused on environmental sustainability?" The answer to this question can be inferred that organizations that are willing to implement environmentally sustainable products, services and business models because of regulative

institutional pressure and long-term competitive advantage, have diverse drivers to become living lab partners. First, organizations seek help to stabilize their business models for the long term. Second, they seek solutions to barriers they experience in implementing these initiatives. Notably, the barriers regarding the lack of collaboration in the supply chain and the lack of market demands make that organizations want to collaborate in living labs. Third, firms expect to find customers in the living lab, which should encourage market demand. Finally, a stimulative moderator is the regionality and proximity of participating firms. When firms consider to participate in a living lab based on the other drivers, regional-close and proximate participants could make the living lab even more attractive. Based on these reasons, organizations become participants in living labs focused on environmental sustainability.

The second research question was: "How do living labs focused on environmental sustainability influence organizational policy?" The answer to this question can be drawn that the perception towards environmental sustainability initiatives of living lab participants is influenced by two aspects. First, living lab dynamics and learning in the living lab make the participant more enthusiastic about and more aware of the urgency for environmental sustainability. This influence affects the participants' attitudes towards environmental sustainability. Second, the incremental experimentation, concrete best practices, and interaction among the supply chain gives insight into possibilities and opportunities to solve barriers that influence how participants perceive the feasibility of implementing environmentally sustainable initiatives. With this changed perception, participants act as a bridge by influencing the policy of the organization they represent and contribute to an environmentally sustainable future.

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Appendices

Appendix 1

Observation guide

Overview interorganizational knowledge transfer (Easterby-Smith et al., 2009)

#	Interorganizational knowledge transfer practices	Characteristics
1	Interfirm community of practice	
2	Cross-functional teams	
3	Colocation	
4	Regularly shared meetings	
5	Conferences	
6	Matrix-style reporting structures	Organizational matrix structure but then with organizations instead of departments
7	Personal networks across organizations	Informal knowledge sharing
8	Emphasize transferring practical knowledge	
9	Integrating learning activities in ongoing related work	
10	Integrating social interaction with task-related work	Learning by doing with others
11	Unilateral knowledge sharing	Sequential nature; Single direction
12	Bilateral knowledge sharing	Pooled nature; Interactive direction
13*		
14*		
15*		

**To fill in when knowledge transfer practices do not coincide with the suggested above.*

Observations regarding interorganizational knowledge transfer

Elements ecological decision intention (Papagiannakis & Lioukas, 2012)

ABC	Antecedents of intention	Definition
A	Attitude toward the behavior	The degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question.
B	Subjective norm	The perceived social pressure to perform or not to perform the behavior.
C	Perceived behavioral control	The perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles.

Observations regarding ecological decision intention

Observed causalities

IKT practice (#)	Effect on antecedent (ABC)	Observations

Appendix 2

Interview protocol

A. Introductions
B. Introduction of the research and an explanation of the participant's rights
C. Start recording
D. Beginning of the interview: Organization, function and industry
E. In depth questions

1. Why is your organization involved in the workplace?

2. Which activities have occurred in the workplace?

3. What did you think about these activities? Why?

4. Which parties were clearly present during the workplace-meetings? Is this justified? Why?

5. What do you think of the workplace participants? Are there good relationships among them?

6. What do you think about the structure in the workplace? Does this contribute to the learning process? Why?

7. What is the most precious component in the workplace? Why?

8. Are there specific things that you learned in the workplace? Which one? And during which activity?

9. How do you about the circular economy?

10. Did this view change over time? Did things change occur because of the workplace? How?

11. Do you feel pressure from other parties to do circular business?

12. Did this pressure increase and/or decrease because of visiting the workplace? Why?

13. Do you think that your organization has the capacity to do circular business? Did this view became more clear because of the workplace?

14. Do you think that the transformation to a circular product or business model requires high costs? Why?

15. Do you think that people in your organization hear your voice regarding to subjects about the circular economy?

16. Do you feel personally responsible for contributing to climate issues?

17. What do you do in your organization to let the organization do circular business?

18. With whom do you do this? Who or which department is the driver in your organization that lets the organization do circular business?

19. Does your organization contribute to the transformation of a circular economy? Are you involved in this contribution?

20. Are there concrete plans to implement the circular economy in your organizations' products, services, or business model? Were you involved in making plans to do this?

F. Ending: Do you have questions for me? Do you want more information about this research?

G. Information about the publication of the research

Appendix 3

Table 4

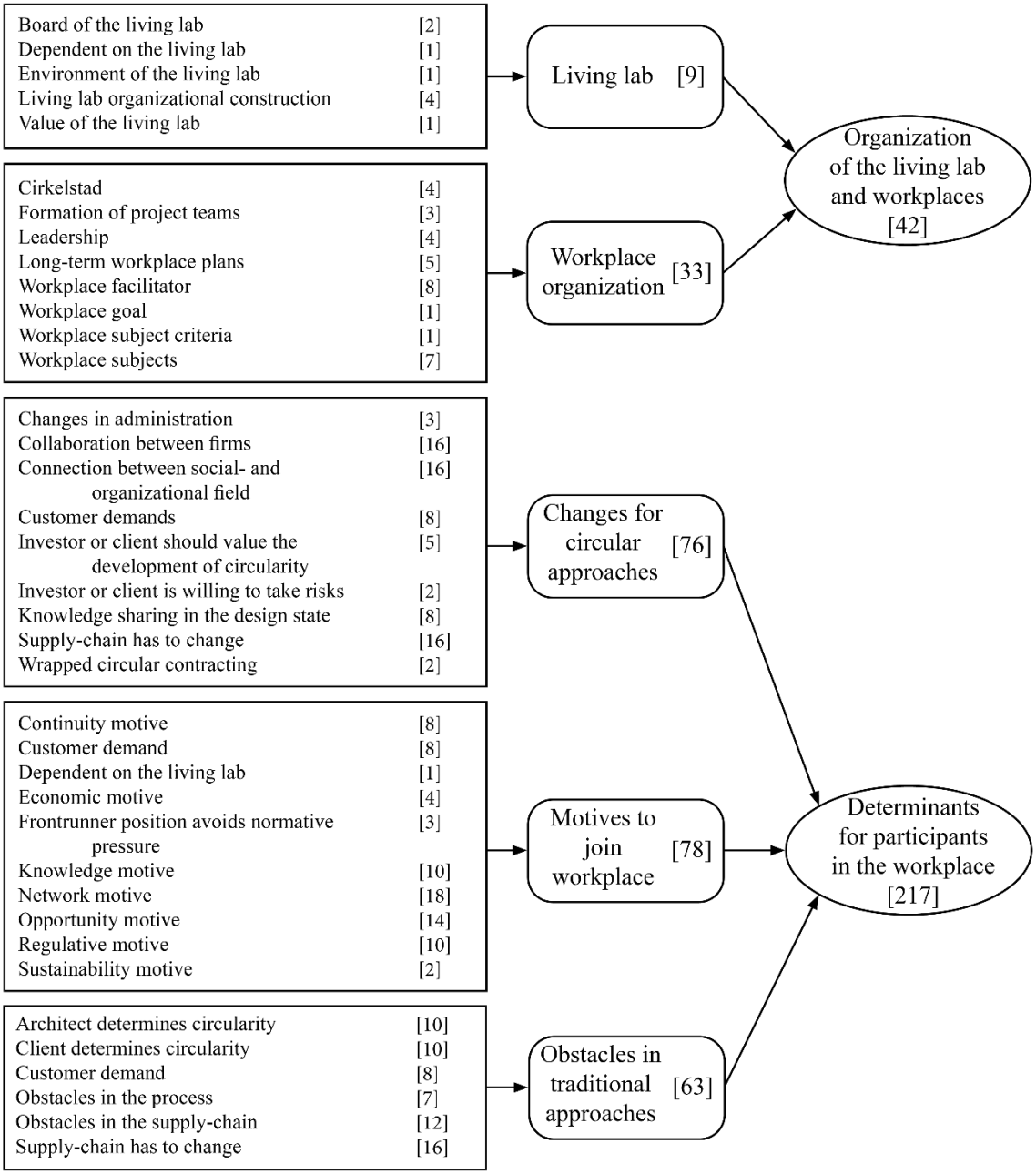
Overview of the connection between interview questions and studies

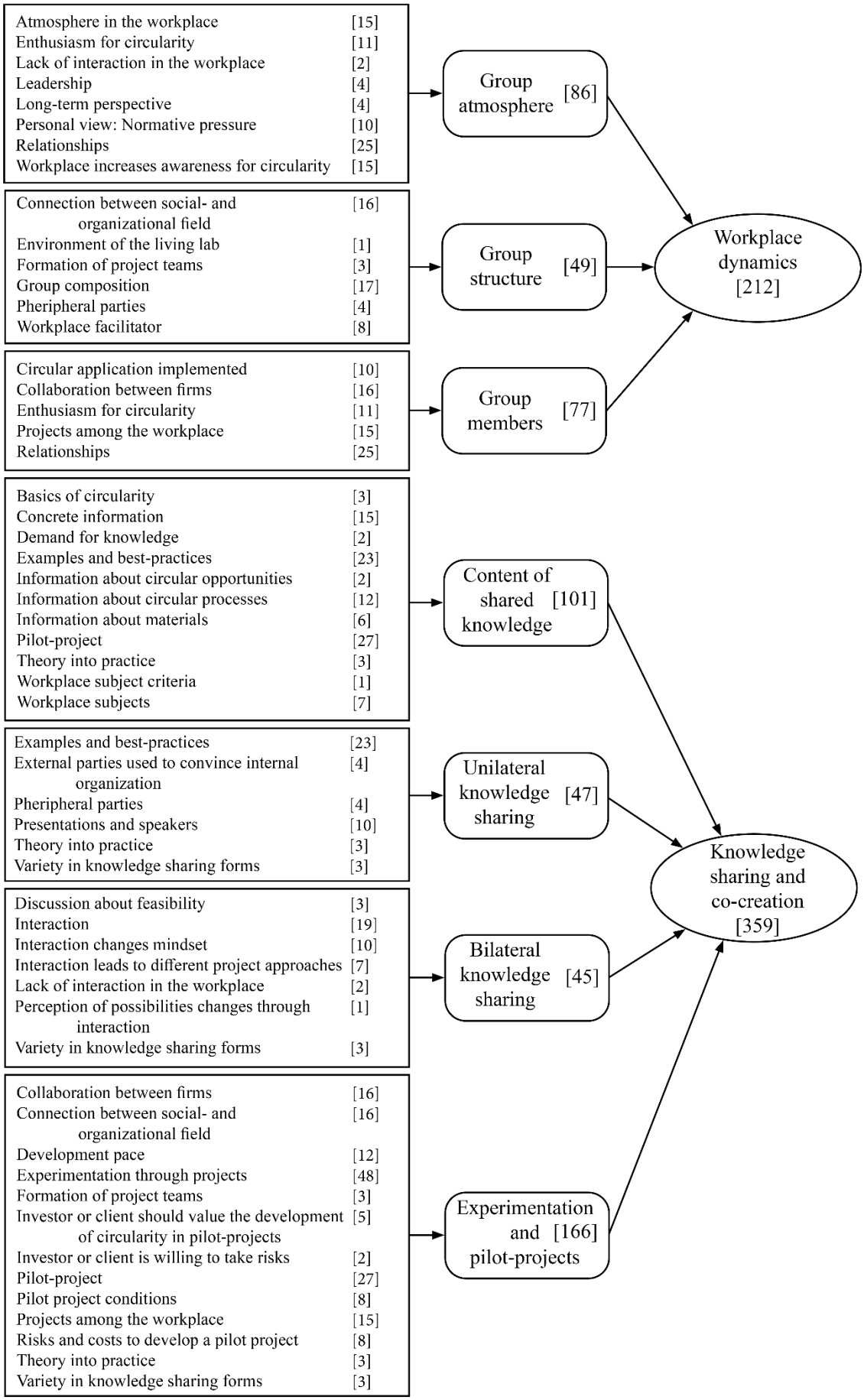
Element	Topic	Sub-topic	Question
Drivers			1
Interorganizational knowledge transfer practices	Donor firm		4, 5
	Nature of knowledge		7, 8
	Event	Transfer	2
		Dynamics	3, 4, 5, 6
Sustainable decision intention	Attitude toward individual behavior		9, 10
	Subjective norms about environmental behavior		11, 12
	Perceived behavioral control	Self-efficacy	13
		Ethical climate	15
		Financial costs	14
	Moral obligation		15
Translation processes	Top-down approaches		17, 18, 19, 20
	Lateral approaches		17, 18, 19, 20
	Bottom-up approaches		17, 18, 19, 20
Corporate ecological responsiveness	Established		19
	Planned		20

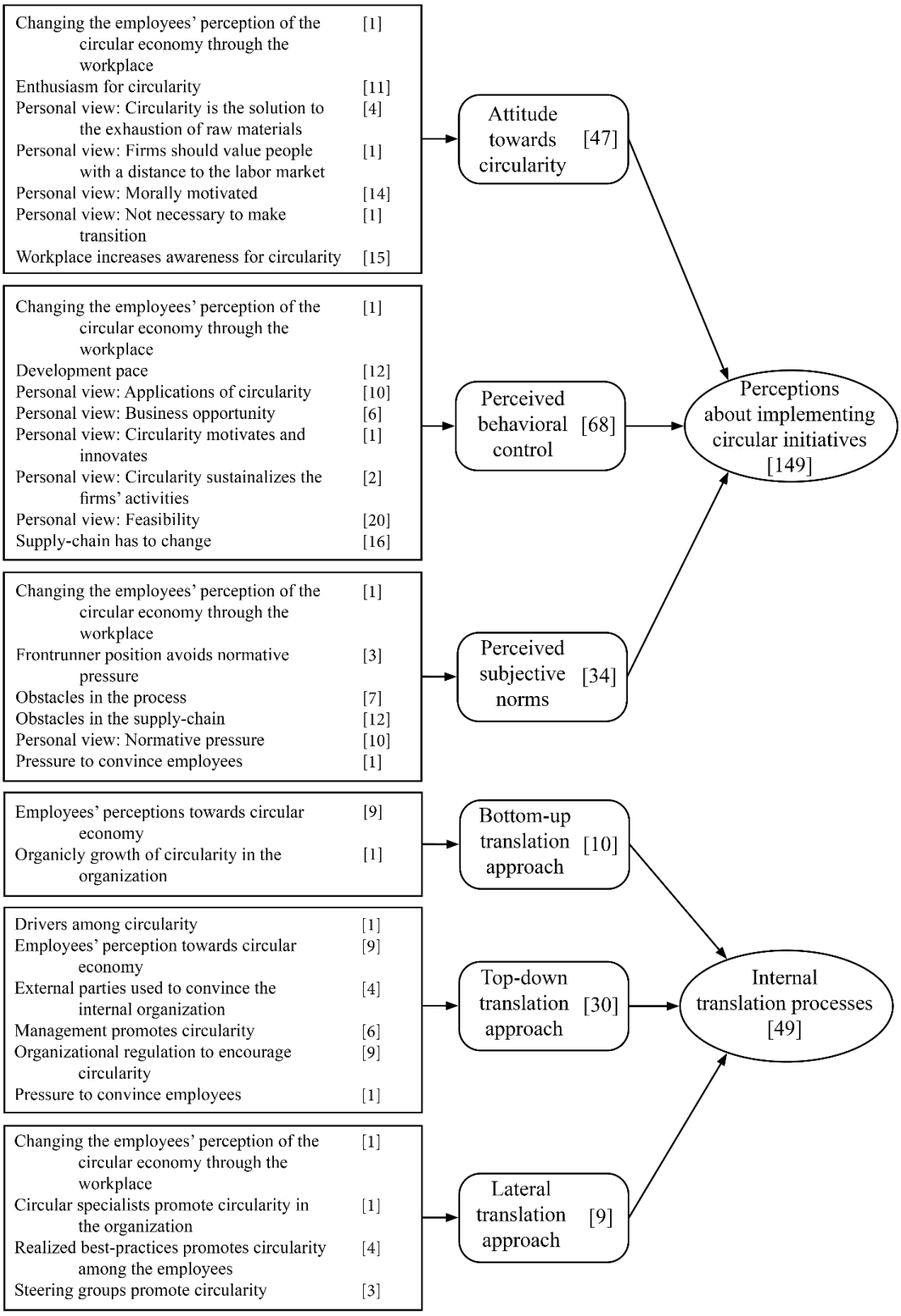
Appendix 4

Figure 8

Code tree




Atmosphere in the workplace [15]
Enthusiasm for circularity [11]
Lack of interaction in the workplace [2]
Leadership [4]
Long-term perspective [4]
Personal view: Normative pressure [10]
Relationships [25]
Workplace increases awareness for circularity [15]
Group atmosphere [86]
Connection between social- and organizational field [16]
Environment of the living lab [1]
Formation of project teams [3]
Group composition [17]
Pheripheral parties [4]
Workplace facilitator [8]
Group structure [49]
Circular application implemented [10]
Collaboration between firms [16]
Enthusiasm for circularity [11]
Projects among the workplace [15]
Relationships [25]
Group members [77]
Workplace dynamics [212]
Basics of circularity [3]
Concrete information [15]
Demand for knowledge [2]
Examples and best-practices [23]
Information about circular opportunities [2]
Information about circular processes [12]
Information about materials [6]
Pilot-project [27]
Theory into practice [3]
Workplace subject criteria [1]
Workplace subjects [7]
Content of shared knowledge [101]
Examples and best-practices [23]
External parties used to convince internal organization [4]
Pheripheral parties [4]
Presentations and speakers [10]
Theory into practice [3]
Variety in knowledge sharing forms [3]
Unilateral knowledge sharing [47]
Discussion about feasibility [3]
Interaction [19]
Interaction changes mindset [10]
Interaction leads to different project approaches [7]
Lack of interaction in the workplace [2]
Perception of possibilities changes through interaction [1]
Variety in knowledge sharing forms [3]
Bilateral knowledge sharing [45]
Knowledge sharing and co-creation [359]
Collaboration between firms [16]
Connection between social- and organizational field [16]
Development pace [12]
Experimentation through projects [48]
Formation of project teams [3]
Investor or client should value the development of circularity in pilot-projects [5]
Investor or client is willing to take risks [2]
Pilot-project [27]
Pilot project conditions [8]
Projects among the workplace [15]
Risks and costs to develop a pilot project [8]
Theory into practice [3]
Variety in knowledge sharing forms [3]
Experimentation and pilot-projects [166]


Changing the employees' perception of the circular economy through the workplace [1]
Enthusiasm for circularity [11]
Personal view: Circularity is the solution to the exhaustion of raw materials [4]
Personal view: Firms should value people with a distance to the labor market [1]
Personal view: Morally motivated [14]
Personal view: Not necessary to make transition [1]
Workplace increases awareness for circularity [15]
Attitude towards circularity [47]
Changing the employees' perception of the circular economy through the workplace [1]
Development pace [12]
Personal view: Applications of circularity [10]
Personal view: Business opportunity [6]
Personal view: Circularity motivates and innovates [1]
Personal view: Circularity sustainalizes the firms' activities [2]
Personal view: Feasibility [20]
Supply-chain has to change [16]
Perceived behavioral control [68]
Perceptions about implementing circular initiatives [149]
Changing the employees' perception of the circular economy through the workplace [1]
Frontrunner position avoids normative pressure [3]
Obstacles in the process [7]
Obstacles in the supply-chain [12]
Personal view: Normative pressure [10]
Pressure to convince employees [1]
Perceived subjective norms [34]
Employees' perceptions towards circular economy [9]
Organicly growth of circularity in the organization [1]
Bottom-up translation approach [10]
Drivers among circularity [1]
Employees' perception towards circular economy [9]
External parties used to convince the internal organization [4]
Management promotes circularity [6]
Organizational regulation to encourage circularity [9]
Pressure to convince employees [1]
Top-down translation approach [30]
Internal translation processes [49]
Changing the employees' perception of the circular economy through the workplace [1]
Circular specialists promote circularity in the organization [1]
Realized best-practices promotes circularity among the employees [4]
Steering groups promote circularity [3]
Lateral translation approach [9]