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Organizational Capabilities for Stakeholder Engagement in Sustainability-oriented Innovation

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Master's thesis

Riccardo Decarolis

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Department of Management Studies
Aalto University
School of Business

Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

Abstract of master's thesis

Author Riccardo Decarolis

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Abstract

Research in the field of innovation has revealed that sustainability aspects play an increasingly important role in the development of new products and services. At the same time, stakeholder engagement in open innovation is an emerging area of study. This is mainly achieved by the creation and development of specific organizational capabilities. The purpose of this thesis is to combine research fields of organizational capabilities, stakeholder engagement and sustainability-oriented innovation. Thereby, the aim is to present a framework of organizational capabilities for stakeholder engagement in sustainability-oriented innovation processes.

The literature review provides insights from existing contributions in the fields of organizational capabilities, stakeholder engagement and sustainability-oriented innovation. The synthesis of the literature review suggests that there is a research gap between the individual fields, which this thesis aims to bridge. The theoretical framework is structured in a way that adequately addresses the posed research questions and combines inputs from previous literature as well as findings from empirical data. This data is collected from primary and secondary sources and analyzed in a multiple case-study design. First, an extensive within-case analysis is conducted. Second, the findings are presented in a cross-case comparison.

Individual cases are described in the empirical findings. This section further contains information about sustainability-oriented innovation processes and involved stakeholders. Moreover, specific organizational capabilities for stakeholder engagement are presented. These include external dialogue, internal coordination, learning process and pilot testing. Entrepreneurial sprit, organizational culture and stakeholder incentivization are capabilities that emerge from the case data, but are not extensively backed by existing literature.

In the discussion part a modified version of the theoretical framework is presented, considering inputs from the analysis of empirical data. The data sources do not provide information about prioritization of individual stakeholders. Moreover, there is no specific evidence if capabilities exist already at the beginning of the process or are developed along the way. These are the main limitations of this study. Future research should thus address these challenges and provide additional insights into this emerging field of research.

The results of the study provide management with insights into sustainability-oriented innovation processes. Furthermore, various ways of stakeholder engagement are presented. Most importantly, managers gain knowledge about specific organizational capabilities that promote stakeholder engagement in sustainability-oriented innovation processes. The main contribution for academia is the combination of these separate research fields into a comprehensive theoretical framework. This framework is applied and tested in a multiple case-study design to increase the relevance and value of the results.

Keywords organizational capabilities, dynamic capabilities, knowledge management, stakeholder, stakeholder engagement, sustainability-oriented innovation, radical innovation

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1. Introduction

In an ever-changing and dynamic global environment, innovation becomes the most important source for generating firm performance and success. Besides the need for corporations to be innovative in order to overcome their competitors, elements of sustainability have grown in significance within the current business setting. Companies who manage to consider and integrate both, being innovative and at the same time sustainable, will pave their way to a successful future.

1.1. Background and Research Problem

The aim of this thesis is to show what kind of organizational capabilities are needed for stakeholder engagement in sustainability-oriented innovation processes. The individual fields of research have previously been treated separately. Only recently, literature has combined certain parts of this topic area in a more condensed way. From an academic perspective, my goal is to contribute to existing knowledge in the topic area by designing a framework of organizational capabilities for stakeholder engagement, eventually resulting in sustainability-oriented innovation. In a second phase, I apply the framework to existing company casa data to validate its theoretical background. Personally, I have a strong interest in sustainability-oriented innovation. Hence, the outcome of this study will develop my knowledge further as to how companies are able to drive innovation by developing organizational capabilities for considering inputs from their interest groups.

Briefly providing an overview of relevant literature shows that Ayuso, Rodríguez and Ricart (2006) as well as Ayuso, Rodríguez, García-Castro and Ariño (2011) have strongly contributed to the discussion about stakeholder engagement in sustainability-oriented innovation. 'Stakeholders' in this sense refers to interest groups that are external to the firm (Ayuso et al., 2006, p.14). In addition, Driessen and Hillebrand (2013) focus on challenges of stakeholder engagement when it comes to new product development in general. Sharma and Vredenburg (1998) present an interesting view on the emergence of organizational capabilities resulting from proactive strategies at the interface between business and ecology. Teece and Pisano (1994), Zander and Kogut (1995) as well as Lawson and Samson (2001) all concentrate on organizational capabilities in various senses. As a third perspective, Leonard-Barton (1992) as well as Rodriguez, Ricart and Sanchez (2002) talk about capabilities from an innovation perspective.

Especially Ayuso et al. (2006) address the view of stakeholder engagement as a dynamic capability fostering sustainability-oriented innovation. My position challenges this statement as in my assumption, organizational capabilities are needed to engage stakeholders. Ayuso et al. (2006) further outline in their contribution that stakeholder dialogue and stakeholder knowledge integration might be relevant for the studied cases, but certainly there are other types of organizations with different interest groups that would need to be investigated as well (p.15). In addition, Driessen and Hillebrand (2013) point out that there is lack of research in identifying learning processes within firms that show how stakeholder integration capabilities are build over time (p.377). Considering the second element, organizational capabilities, Lawson and Samson (2001) present some valid points in their contribution. However, the scholars emphasize that forms of organizational capabilities might differ when considering radical versus incremental innovations (Lawson & Samson, 2001, p.396). From the viewpoint of innovation, Rodriguez et al. (2002) point out that the way companies are managed should rather consider sustainable development than economic growth as core value. How this applies in the context of stakeholder integration and organizational capabilities remains open (p.143). Strongly contributing to the research gap identification is the conclusion made by Sharma and Vredenburg (1998). According to the scholars, capability for stakeholder integration and capability for continuous innovation are placed on equal levels (p.749). The findings I present in my thesis challenge the view expressed by Sharma and Vredenburg (1998). For instance, I argue that the development of certain organizational capabilities promotes stakeholder engagement, which in turn leads to sustainability-oriented innovation.

This study is based on my motivation to combine all described viewpoints and provide a framework of organizational capabilities for stakeholder engagement in sustainability-oriented innovation. I attribute special attention to the way in which companies successfully integrate their stakeholders in the process of green product or service development. As basis for the evaluation, my study will rely on data of three specific company case studies conducted in Europe. The selection of the cases has revealed that they fall into the category of 'radical' innovations. Thus, this will contribute to the statement made by Lawson and Samson (2001). Radical innovation is defined as a form of new product development that has a significant impact on existing markets and customers (Garcia & Calantone, 2002). Furthermore, in my study I address the suggestions made by Ayuso et al. (2006) and consider various forms of organizations in different countries. The same scholars additionally remark that 'current research has not dealt with knowledge integration from stakeholders in the context of sustaina-

ble development' (Ayuso et al, 2006, p.478). This is eventually one of the main research objectives I present in my thesis. Moreover, Ayuso et al. (2006) suggest that stakeholder engagement is a capability in itself. I challenge this by arguing that stakeholder engagement results from the development of organizational capabilities.

As part of the European Union funded project 'EU-InnovatE', interdisciplinary groups of scholars conduct research in the domains of sustainability, innovation and entrepreneurship. A strong focus lies on the integration of end users into the innovation process of green products and services. The project is divided into three areas of research: Sustainable Innovation, Sustainable Entrepreneurship and Sustainable Lifestyles. Sustainable Innovation considers the integration of end users in open innovation processes. In this regard, company cases from various regions in Europe assist in determining trends and future research paths for this domain (EU-InnovatE, online). In my master's thesis I analyze two cases in the domain of mobility and one case in the field of housing. I select the cases based on their radicalness with regards to the sustainability-oriented innovation.

From a practical perspective, with the help of this study businesses should be able to assess what kind of capabilities they need to develop in order to use inputs from stakeholders and successfully innovate for sustainability. Considering society as a whole, companies that develop the necessary skills to improve their sustainability-oriented innovation process will benefit the environment in the long run. Furthermore, stakeholders in the sense of customers get sensitized for their possible contributions in co-creating sustainable products and services. Leading innovators will be able to rely on stronger stakeholder support when seeking inputs in their participatory innovation models.

1.2. Research Objectives and Relevance

Considering the background of this study and reflection on existing literature, the main research question is formulated as follows:

> *Q: Which organizational capabilities are needed to engage stakeholders into sustainability-oriented innovation processes?*

In order to specify the broad research area and focus, following sub-questions aim at guiding the research in the right direction:

Q1: How are sustainability-oriented innovation processes organized in the case companies?

Q2: Which capabilities are essential for stakeholder engagement?

Q3: How do the case companies develop capabilities for recognizing their most crucial stakeholders in sustainability-oriented innovation?

The main research question consists of three separate elements. Sub-question number one tries to identify process elements of sustainability-oriented innovation. Secondly, development of organizational capabilities is addressed with sub-question number two. Finally, third sub-question sheds some additional light on stakeholder engagement methods and selection.

In my study I will primarily refer to literature on organizational capabilities in the context of innovation. With this in mind, I incorporate characteristics of stakeholder engagement in the process. I will then apply the resulting theoretical framework to three pre-defined company cases in Europe. Eventually, I summarize the findings and present a list of organizational capabilities for stakeholder engagement in sustainability-oriented innovation.

1.3. Research Design

This thesis has cases as the basis for argumentation. I utilize qualitative research and more concretely, case study research as the principal research method. In this regard, the contributions of Miles and Huberman (1994), Eisenhardt (1989), Yin (2009) as well as inputs from methodology courses at the host university are most beneficial to apply this way of conducting research. In the methods section of this thesis I outline more detailed information on the case study approach.

The specific cases out of the EU-InnovatE project consist of HSL's KutsuPlus, Rockwool and Verbund. KutsuPlus is a mobility-based service that provides a cost-efficient alternative to overcome the trade-off between choosing regular bus services and taxis. In the field of housing, Rockwool developed an innovative tent design that was initially aimed at providing a living space for festival guests. The main goal of developing the product is to build shelters for refugees. Verbund is an electricity company based in Austria that provides charging stations for electric cars and hence serves as an example of sustainable energy solutions. Basis for the selection of the cases are discussions with my supervisor about the radicalness of the

different solutions with regards to sustainability-oriented innovation. The individual cases are more thoroughly described in the respective chapter.

As there already exists interview material from representatives of the corresponding companies, I consider these sources as primary input for my study. Additionally, secondary sources are research reports for each case as well as further documentation on the companies and projects. My first consideration of the case reports and interviews determined that the sources contain enough empirical material. Nevertheless, I conducted two additional interviews to strengthen my general understanding, apply the theoretical framework and write up the results of this study.

Considering the learning from the literature review, I assess company cases individually looking at the relevant materials from the data source. I then put my findings into perspective of the theoretical framework and subsequently define the core argument. I answer sub-questions separately in order to eventually respond to the main research question.

1.4. Definitions

Below definitions consider the meaning of terms for this specific study. Where possible, theoretical support from the literature is presented.

Stakeholder

Most quoted definition for this term is presented by Freeman (1984). 'A stakeholder in an organization is (by definition) any group or individual who can affect or is affected by the achievement of the organization's objectives' (p.46). I use this definition as a starting point in my thesis. Moreover, in the context of my work it is important to distinguish between primary and secondary stakeholders. According to Hall and Martin (2005), prior constitute mainly of customers, innovators, suppliers, investors and employees. Secondary stakeholder refers mainly to activists, local communities and safety advocates (p.277). Driessen and Hillebrand (2013) refer to primary and secondary as market and non-market stakeholders respectively. The role of the scientific community as well as governments and regulators can be either of primary or secondary stakeholder nature (Hall & Martin, 2005, p.277). For the purpose of my thesis, I further differentiate between internal and external stakeholders, from a company perspective. It is important to emphasize that I do not use these terms as direct substitutes for definitions presented by Hall and Martin (2005) as well as Driessen and Hillebrand (2013).

Organizational Capabilities

This terminology serves as an umbrella term for below two definitions. In general, organizations possess of capabilities in a strategic, managerial and process-related nature. Key is how these capabilities are best applied in order to strengthen company performance. According to Grant (1996a), organizational capabilities are a result of 'unstable market conditions caused by innovation and increasing intensity and diversity of competition' (p.375). In the context of my research, organizational capabilities refer to activities and methods employed by the case companies to engage their stakeholders into sustainability-oriented innovation processes. In this regard, firms can develop capabilities to engage with external and internal stakeholders. Moreover, there are certain capabilities that enhance internal processes and systems. I present concrete examples of organizational capabilities at the end of the literature review.

Dynamic Capabilities

Originally introduced by Teece and Pisano (1994) and further developed by Teece, Pisano and Shuen (1997), this terminology refers to how firms acquire and develop capabilities in order to gain competitive advantage. Organizations operate in dynamic environments. Therefore, they have to develop capabilities to dynamically adjust in changing market and technological environments. In accordance with Leonard-Barton (1992), 'dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage' (Teece et al., 1997, p.516).

Knowledge Management

As part of organizational capabilities, knowledge management focuses on the identification and development of knowledge in companies to assist them in building competitive advantage (Easterby-Smith & Prieto, 2008, p.239). At an earlier stage, Grant (1996b) introduced the 'knowledge-based view' of the firm. This approach is an addition to the resource-based view of organizations, which mainly considers resources for example in the sense of available workforce or financial resources.

Stakeholder Engagement

The open innovation paradigm as elaborated by Chesbrough (2005) deals with the in- and outflow of information to successfully advance innovation processes of firms. On the incoming side, communication with customers can be one form of stakeholder engagement. However, there are additional ways on how to engage a broad range of interest groups. For instance,

Ayuso et al. (2006) name stakeholder dialogue and stakeholder integration as specific means. Key in this argumentation is that, contrary to the closed innovation approach, active exchange with external parties assists firms in developing innovative products and services.

Sustainability-oriented Innovation

For the purpose of this thesis the terminology of responsible innovation is used as a synonym for defining sustainability-oriented innovation. Following Halme and Korpela (2014), sustainable innovation here is defined as 'a new or significantly improved product, service or business model whose implementation at the market solves or alleviates an environmental or social problem' (p.548). In addition, Bos-Brouwers (2010) defines the terminology 'as innovations in which the renewal or improvement of products, services, technological or organizational processes not only delivers an improved economical performance, but also an enhanced environmental and social performance, both in the short and long term' (p.419).

Radical Innovation

Garcia and Calantone (2002) describe this expression as creating a new market for innovative products. Incremental innovation deals with continuous development of products or services. Crucial for a radical innovation is the fact that customers do not know beforehand that they actually have a need for a new innovation. For the purposes of this study, the definition of radical innovation is extended to include the sustainability aspect. Moreover, taking into account the definition of sustainability-oriented innovation, a key element is how much the innovation improves the existing solution from an environmental and social standpoint in the short or long run. Radical innovations contribute to existing products, services or processes in a stronger way than incremental innovations.

1.5. Thesis Structure

Following the introductory part, this study is structured into four main sections. In the literature review, I consider past research with regards to the topic of this thesis. It deals with organizational capabilities, stakeholder engagement and innovation. Before presenting the theoretical framework, I combine the literature review of each sub-section in a synthesis to guide the reader in the direction of the core argument.

Third part of the thesis deals with the research design in more detail. A special focus is dedicated to the methodological approach. Besides the research strategy, I take a philosophical

standpoint with regards to this field of research. The cases are briefly presented and described, before I end this section with an analysis of the evaluation and ethical concerns of the study.
I discuss the selected case examples in the fourth section. This information is based on the case reports elaborated for the EU-InnovatE research project and covers a short introduction of the companies and the timeline of the events. Interviews with concerned individuals serve as data source for this section, besides the company reports. Taking into consideration the theoretical framework, empirical findings for each case round up the argumentation.

Final part of this thesis covers an analysis of the results as well as further discussions. I outline the core argument, followed by a more thorough application of the theoretical framework. Moreover, I answer the research questions based on the presented findings. Lastly, before presenting some concluding remarks, I outline limitations of the study and make recommendations for future research.

2. Literature Review

In this part of the thesis I discuss the existing literature in the area of research. My initial investigation concentrated on organizational capabilities. From there onwards, I extended the exploration to contributions that deal with stakeholder engagement. The research area of sustainability-oriented innovation is too broad when solely considered for this thesis. In that sense, I put the main emphasis on contributions of innovation that contain elements of the other two interest fields.

2.1. Development of the Literature Approach

At the beginning, I compiled a list of most cited works dealing with organizational capabilities. Following this, I analyzed key pieces based on early agreement with my thesis supervisor. Afterwards, based on the reference lists of the initially determined articles, I extended my search to previous contributions and elements of stakeholder engagement. I considered the fit with innovation in my search results at all times. Nevertheless, I read through influential studies only dealing with either organizational capabilities or stakeholder engagement as well, even if they had no links to sustainability-oriented innovation.

In my review of the existing literature I structure the findings by a separation of the different focus areas, namely being 'organizational capabilities', 'stakeholder engagement' and 'innovation'. Within these areas, I review the literature starting with the earliest pieces. Furthermost depth of review I do for organizational capabilities. My individual descriptions are followed by a synthesis of the review as well as conclusions. Eventually, I present and define a theoretical framework for applicability on the selected cases.

2.2. Organizational Capabilities

Whilst reading through some contributions in this field of research, it appears to me that the topic area of dynamic capabilities is most common when referring to the organization as a whole. Teece and Pisano (1994) define the two individual parts of this terminology as nature of the environment where business firms operate in (dynamic) and importance of strategy in developing skills (capabilities) (p.1). I further encounter dynamic capabilities whilst analyzing literature on stakeholder engagement and innovation. Therefore, I try to focus on this language. In addition to dynamic capabilities, two other areas in the field of organizational capabilities are knowledge management and social responsibility. These two topics are explored at a later stage.

2.2.1. Dynamic Capabilities

This terminology has been researched by a number of scholars over time (Teece & Pisano, 1994; Teece et al., 1997; Eisenhardt & Martin, 2000; Lawson and Samson, 2001). Beginning with the earliest of these writings, Teece and Pisano (1994) start by introducing as well as defining the term of dynamic capabilities in organizational science. The terminology consists of energetic environments of business firms (especially from a technology innovation perspective) and the corresponding skills of such firms in dealing with these kinds of situations. Already at that time companies disposed of a certain technological capital. However, it is vital to have the necessary knowledge in place in order to benefit from these assets in the innovation process. In addition, firms should not only possess such skills, but also develop new ones along the way to remain competitive in the market (Teece & Pisano, 1994, p.1). On the one hand, for rival companies it should not be possible to develop a similar kind of capability by replicating the business model of the firm in question. On the other hand, the fact that capabilities are made to fit a company's strategic and operational efforts confirm their uniqueness and importance for innovation purposes. Teece and Pisano further argue that trying to copy a unique skill might not bring any additional benefits (1994, p.8). This confirms the notion that dynamic capabilities offer most benefits to the company that brings them into life.

Another important property of dynamic capabilities is that they can be only developed further, if a company has certain learning processes in place. This point falls in the area of knowledge management, which will be analyzed later on in the process. For now, it is important to mention that dynamic capabilities facilitate the process of learning within the company walls (Teece & Pisano, 1994, p.10). When it comes to paths, Teece and Pisano (1994) stress that the development of dynamic capabilities in the future is depended on what a firm's actions were in the past and are in the present situation. In that sense, 'history matters' (p.13). Getting back to copying, Teece and Pisano (1994) further elaborate that replicating an existing business model might not be that simple, even though procedures seem observable from outside (p.16). The previously described reflection about history of a company further strengthens this statement. When focusing on dynamic capabilities, firms should always try to come up with innovative ways on how to combine their present skills. This makes it harder for competitors to replicate an existing business model and to adjust structures over time. Depending on the strategic orientation, some companies might still choose to imitate current success stories.

In their contribution to the literature, Teece et al. (1997) refer to the statements made by Teece and Pisano (1994). Most importantly, the authors elaborate that dynamic capabilities are challenging to replicate, due to processes of internal learning and historical developments as well as future directions of the leading innovator in a field (p.528). Furthermore, the contribution compares the dynamic capabilities approach with other forms of strategic thinking. In essence, comparison is made with Porter's five forces, strategic conflict and the resource-based perspective of the firm. Prior two paradigms fall into the category of market power, whereas resource-based view as well as dynamic capabilities focuses more on the efficiency of markets (Teece et al., 1997, p.511-515). Concentrating on dynamic capabilities, the authors stress especially that successful market players are able to cope with the energetic nature of the current business environment, whilst at the same time having adequate management processes in place to foster organizational learning and building of skills unique to the own business model (Teece et al., 1997, p.515). Worth mentioning at this point is the comment that strategic thinking is essential for a firm's success, but too much of it might harm the competitiveness of an organization (Teece et al., 1997, p.528).

As part of their leading article, Eisenhardt and Martin (2000) go back to the starting point and ask the question of what exactly dynamic capabilities are. The authors confirm the path dependency argument originally introduced by Teece and Pisano (1994) and further present the terminology of best practice (Eisenhardt & Martin, 2000, p.1105). Such best practices (i.e. dynamic capabilities) can be the driving force for competitive advantage. In order for this to happen, managers should successfully accomplish to build and align dynamic capabilities to the strategic direction and processes of the firm. Eisenhardt and Martin (2000) further describe the existence of high velocity markets in which dynamic capabilities themselves are challenged by the fast-moving business environment (p.1106). In those markets, managers are even more required to build capabilities that benefit the product development and strategy of the company.

Concretely, Eisenhardt and Martin (2000) define dynamic capabilities as follows: 'Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die' (p.1107). This definition stresses firm specific resources as the starting point to successfully build and sustain dynamic capabilities. In a broader sense, dynamic and in general organizational capabilities are part of the resource-based view (RBV) of the firm. However, due to the focus of this study the

latter theory is not at the center of argumentation. For now, it is important to understand resources as direct links to the creation of dynamic capabilities. Eisenhardt and Martin (2000) emphasize the importance of working in a team. According to the authors, corporate innovation processes benefit of, for example, brainstorming sessions as different people not only bring different experiences, but also various access into resources to a project (p.1109). In this regard, routines are mentioned as a form of skill within a firm. Considering competitors, it is vital that once dynamic capabilities are built and identified as such, managers further ensure that competing organizations can not easily copy the existing skill. In order to achieve this, Teece and Pisano (1994) already suggested that dynamic capabilities should constantly be developed further in order to achieve a unique character. Coming back to the introduction of best practices, Eisenhardt and Martin (2000) suggest that dynamic capabilities are not only firm specific as has been assumed by previous research. There are certain harmonies between corporations' unique skills as access to information about best practices is generally available for managers (p.1111).

Furthermore, learning is exchanged among business leaders in different kinds of forums, conferences and online platforms. Despite the fact that managers should be on top of these processes, sometimes even they are not able to explain why a certain capability of their firm is so successful (Eisenhardt and Martin, 2000, p.1114). The authors describe the term of 'sequence steps', whereby dynamic capabilities often are a result of already existing skills (based on routine work) and recently acquainted knowledge linked to the development of new products for the future (Eisenhardt and Martin, 2000, p.1116). Concluding their findings, Eisenhardt and Martin (2000) argue that rather than dynamic capabilities themselves, manager's ability to exploit them as resources for new combinations of unique skills give them the value of being essential to firm's performance (p.1117).

Taking a view that is more directed to corporate innovation, Lawson and Samson (2001) contribute to the literature by including this aspect. The authors propose seven elements that are part of innovation capability (Lawson and Samson, 2001, p.377). Before briefly elaborating these elements, I present below a short overview of the innovation process in order to facilitate the understanding:

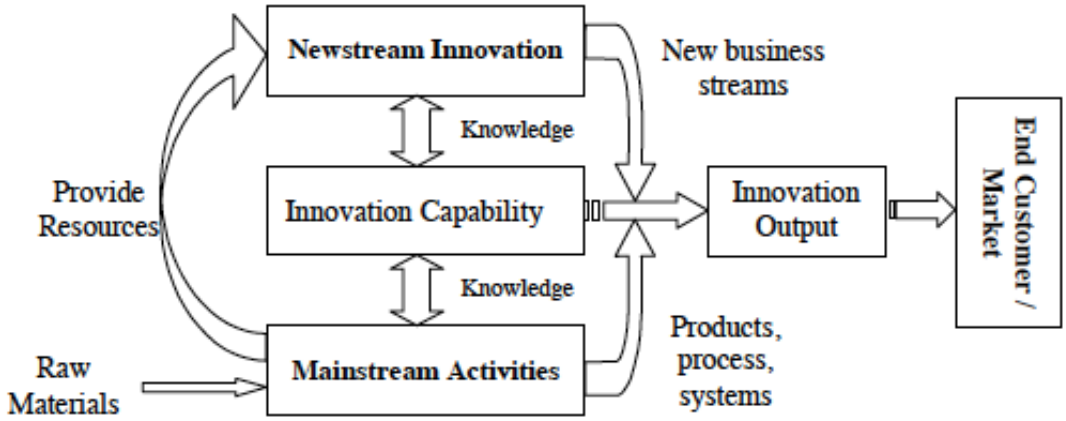

Figure 1: An integrated model of innovation

Source: Lawson & Samson, 2001, p.383

In this illustration, innovation capability lies at the center of the process, serving as a link of knowledge exchange between routine activities and new activities of the firm. A combination of both activities result in the innovation output for end customers and the market. Lawson and Samson (2001) argue that 'innovation capability brings together the efficiency of the mainstream with the creativity of the newstream' (p.384). The authors use the example of Cisco to strengthen their argumentation. Getting back to the seven elements that lie at the core of innovation capability, Lawson and Samson (2001) use below integrated model:

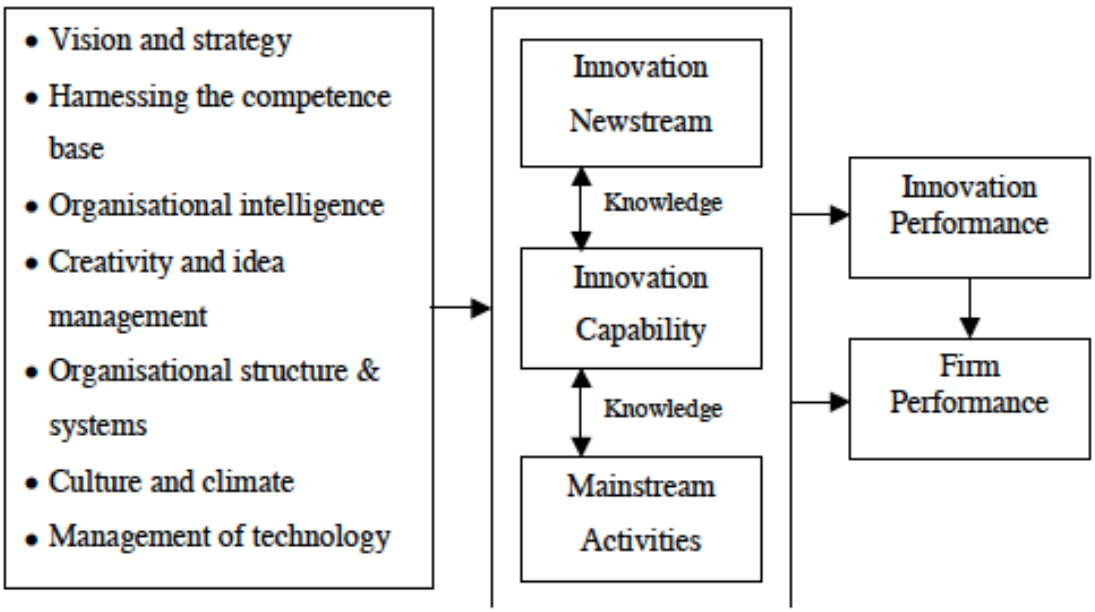

Figure 2: A model of innovation capability

Source: Lawson & Samson, 2001, p.388

Looking at the individual elements, vision and strategy stands for the idea that innovation should be part of the mindset within companies. In addition, organizations that focus on their future potential are generally more innovative. By harnessing the competence base, the authors refer to the efficient management of available resources to a firm. Moreover, organizational intelligence defines the ability of individuals in a company to gather information on both, customers as well as competitors and use this knowledge to foster the innovation process. Creativity often results in new ideas, which then need to be efficiently managed in order to provide useful insights for product development. Additionally, structures and systems are necessary as a support for the overall innovation process. The culture and climate within a company can either be beneficial or unfavorable for innovation capability. For instance, managers that put too much effort into tightly managing their employees might harm the creativity of their team members. Lastly, management of technology should be in line with innovation and business strategy (Lawson & Samson, 2001, p.389-395). The authors eventually stress the fact that there might be different characteristics of previously described elements when dealing with either incremental or radical innovation (Lawson & Samson, 2001, p.396).

2.2.2. Knowledge Management

The viewpoint of knowledge management is the second focus area in the field of organizational capabilities. Going back in time, Zander and Kogut (1995) contribute to the literature by considering transfer as well as imitation speed of organizational capabilities. Both aspects are relevant when it comes to competition in innovative markets (p.76). Path dependence is another relevant topic in knowledge management. According to Zander and Kogut (1995), knowledge development within firms should take into consideration the historical past of the organization (p.77). Furthermore, capabilities that are easier to teach run an increased risk of transferability. In that sense, firms that come up with innovative solutions should actively seek to shield competitors away from their knowledge base by constantly developing the invention further. By doing so, even though a competing firm acquaints the knowledge of a certain capability, the inventing firm will always be a step ahead in the product development phase. Grant (1996b) speaks about coordination and communication within firms. Zander and Kogut (1995) take up this point by stating that ‘ability to transform tacit capabilities into a comprehensible code […] is derived from the collective experiences of members to a firm organized by persisting rules of coordination and cooperation’ (p.78). Hence, experience in a certain knowledge area leads to the ability to communicate these skills and gain deeper understanding of the matter. Especially firms in the technology sector are affected by risks of competition, as information on knowledge is readily available for players in the market. Zander

and Kogut (1995) conclude their findings by arguing that firms should seek to combine individual elements of knowledge. This results in synergies between incremental innovation and organizational knowledge (p.87).

Shortly after Zander and Kogut's (1995) contribution, Grant (1996b) published an article introducing the knowledge-based view of the firm. As with dynamic capabilities, knowledge management is an extension of the RBV theory (p.110). Knowledge management is a strategic asset and part of companies' unique resources. In that sense, managing knowledge within organizations can be seen as source of competitive advantage. In addition to the transfer of knowledge, Grant (1996b) further names aggregation as well as specialization (besides others) as critical for knowledge management (p.111-112). Transfer of tacit is more challenging than transfer of explicit knowledge, as prior is usually not written down. Furthermore, individuals as well as systems have a certain capacity to accumulate and handle new knowledge. Individual employees should focus on becoming specialists in a certain knowledge area, rather than trying to know a bit of everything. In Grant's (1996b) understanding, the business firm in its existence serves as a social construct that provides an environment for successful knowledge management. As separate tools to achieve this, Grant (1996b) lists for instance rules and directives, sequencing, routines as well as group problem solving and decision-making (p.114-115). Sequencing describes processes that assign specialists to every single step in the production chain. If organizations succeed in developing their knowledge management skills into organizational capabilities, this competitive advantage is very hard to imitate (Grant, 1996b, p.117).

More recently, Easterby-Smith and Prieto (2008) provide a combined view on both dynamic capabilities and knowledge management. Grant (1996b) confirms that knowledge management deals with the distinction between implicit (tacit) and explicit knowledge. Focusing on the commonalities and differences between dynamic capabilities and knowledge management, Easterby-Smith and Prieto (2008) present an overview to visualize their suggested connection (p.240). Based on this figure, there are three points that exist both within the field of dynamic capabilities and knowledge management. For instance, organizational learning is a result of each of the two aspects. Additionally, the exploration-exploitation concept is relevant in both cases. This expression describes on the one hand generation of new ideas as well as appropriate selection (exploration) and on the other hand further development of existing concepts (exploitation). Using the terminology of Easterby-Smith and Prieto (2008), 'benefits of ex-

ploitation are thus based on increased efficiency, while that of exploration is based on increased innovation' (p.242). Besides prior outlined elements, knowledge management is an essential prerequisite for building sustainable and competitive advantage. Or in order words, sustain dynamic capabilities.

2.2.3. Social Responsibility

Due to the nature of this study, social responsibility is taken into consideration when analyzing the area of organizational capabilities. For this purpose, I briefly review the contributions by Sharma and Vredenburg (1998) as well as Black and Härtel (2004). Already before the turn of the millennium, Sharma and Vredenburg (1998) introduced proactivity in environmental strategies and resulting development of organizational capabilities. In line with Black and Härtel (2004), the authors confirm that interaction with stakeholders on social grounds assists the building of capabilities, which are valuable for the firm's competitive advantage (Sharma and Vredenburg, 1998, p.729). Furthermore, innovative environmental strategies result in the same outcome (p.730). The authors conducted a qualitative study whereby they experienced that environmentally proactive firms develop certain capabilities in order to achieve higher performance than reactive ones. Thus, the three main capabilities described by Sharma and Vredenburg (1998) are capability for stakeholder integration, capability for higher-order learning and capability for continuous innovation (p.735-742). According to the authors, all three capabilities are seen as equal (Sharma & Vredenburg, 1998, p.749). While partly following Ayuso et al. (2006), in the research design for this thesis I suggest that the development of organizational capabilities result in stakeholder engagement. Eventually, sustainability-oriented innovations are the outcome of the previous two elements.

With stakeholder integration (later described as engagement) Sharma and Vredenburg (1998) refer to especially noneconomic goals of specific interest groups. Socially proactive companies are open to develop their products together and in line with these external parties, often by use of communicative methods. Successful firms possess a certain level of trust that is neither imitable nor transferable (p.735-740). Dynamic business environments require companies to have certain organizational learning processes in place that foster the development of socially responsible products. Often in such circumstances a company lacks a certain amount of knowledge. Successful managers train their employees to deal with these situations and develop paths of organizational learning over time. Sharma and Vredenburg (1998) describe this as capability for higher order learning (p.740-741). Finally, continuous innovation is the third skill presented by Sharma and Vredenburg (1998). The authors emphasize that the develop-

ment of innovation capabilities will benefit firms that follow this type of philosophy. Furthermore, constantly developing innovations gives a company the advantage to stay ahead of competitors in the long run (p.741).

Black and Härtel (2004) propose that the ability of organizations to build and sustain social responsibility capabilities is a result of close interaction between employees with a specialist knowledge and management of the firm (p.128). Key in the argumentation is as well that social responsibility capabilities are developed by engaging stakeholders in the process. This area is more thoroughly analyzed in the next section. According to Black and Härtel (2004), there are two characteristics to stakeholder engagement. Firstly, stakeholder identity describes harmony of organization and stakeholder long-term goals. Secondly, managing stakeholders is defined by the capability to orchestrate various interests into strategic decisions (p.130). Firms that successfully engage with interest groups dispose of five capabilities, namely of stakeholder engagement, accountability, ethics, value-attuned public relations and dialogue (Black & Härtel, 2004, p.137).

2.3. Stakeholder Engagement

Second in building the argument towards the research questions is the field of stakeholder engagement. After Friedman (1970) suggested that the principal function of socially responsible firms is to increase their profits, him and other authors contributed to the research area of stakeholder theory in many different ways. Most relevant for this thesis are publications that deal with the inclusion (or engagement) of stakeholders in the development of sustainability-oriented innovations. Adding to this understanding, in the following section I review certain contributions over time (Polonsky & Ottman, 1998; Verona, 1999; Buysse & Verbeke, 2003; Ayuso et al., 2006, 2011; Peters et al., 2011; Driessen & Hillebrand, 2013). As with the section on organizational capabilities, this part is divided into subsections. First, I analyze elements in stakeholder engagement from an innovation perspective. Second, I discuss the capability perspective in the context of stakeholder inclusion.

2.3.1. Innovation Perspective

Polonsky and Ottman (1998) early on described what special interest groups might contribute to the development of sustainability-oriented innovations. In their article, the authors suggest that stakeholders often possess knowledge that is lacking within company walls. Therefore, it is of essential importance that firms engage these external groups in the knowledge building and especially development process for green products (Polonsky and Ottman, 1998, p.533).

In the understanding of the scholars, there is no specific difference between general innovation and innovating for sustainability. Moreover, the process for new green product development is characterized by various exchanges between the company and external parties (Polonsky and Ottman, 1998, p.535-536). Providing an overview of green product development, Polonsky and Ottman (1998) present five different steps in the process (p.537). Most notable is that every single step involves customers as one of the stakeholder groups that should be considered. This confirms the high importance of client engagement in sustainability-oriented innovation. In order to respect stakeholders' views in product development processes, firms should aim to align the specific wishes with the corporate strategy. Additionally, certain processes should be in place to successfully coordinate stakeholder engagement. Commenting on their study, Polonsky and Ottman (1998) argue that even though companies are aware of their stakeholders in order to engage them in sustainability-oriented innovation, there is no apparent and structured form of this mechanism (p.550-551). Considering later literature should reveal if this has changed over time.

Taking a step forward, Buysse and Verbeke (2003) argue that there is a broader range of stakeholders available to the firm than only governments and regulators. Important to note is that companies do not associate the same amount of importance to different stakeholders (p.453). There are four types of approaches to corporate social responsibility: reactive, defensive, accommodative and proactive. Certainly, last is what companies should strive for when considering environmental interests of their stakeholders. Elements of dynamic capabilities to sustainability-oriented innovation will be discussed in the next section. Nevertheless, Buysse and Verbeke (2003) present a valid definition of such competencies. They 'reflect unique combinations of resources that are rare, nonsubstitutable, difficult to imitate and valuable to customers' (p.454). The focus in the argumentation is on stakeholders and environmental management. Within customer groups, there exist different interests and values. Hence, an organization should develop separate strategies for each of these stakeholders. Proactiveness in environmental strategy likely leads to a more open dialogue with external parties and subsequently to the development of better competencies to foster innovation processes. A reactive behavior can harm firm success if proactive environmental management becomes an industry standard among competitors (Buysse & Verbeke, 2003, p.459). Quoting Freeman et al. (2000), Buysse and Verbeke (2003) build upon the argument for environmental innovation: 'if we understand capitalism as a system of cooperation among stakeholders around important values, and if we understand business as being driven by enterprise strategy, then there are no

limits for greening of enterprise strategy' (p.460). This standpoint by one of the leading scholars in stakeholder theory confirms that sustainability-oriented innovation (following development of green strategies) certainly is strongly linked with the value companies' associate to their stakeholders.

Combining research on sustainability-oriented innovation and stakeholder engagement, Ayuso et al. (2011) try to evaluate the question if a stronger inclusion of external interest groups fosters green product development. Stakeholder engagement is in this sense framed as organizational capability (p.1399). The authors argue that green innovation requires more resources than conventional product development. Furthermore, to successfully come up with sustainability-oriented innovations, companies have to balance interests from a wider range of stakeholders. In this sense, active dialogue with external parties benefits the innovation process (Ayuso et al., 2011, p.1400). The framework below illustrates this argumentation and presents the relationship between organizational capabilities and sustainability-oriented innovation orientation:

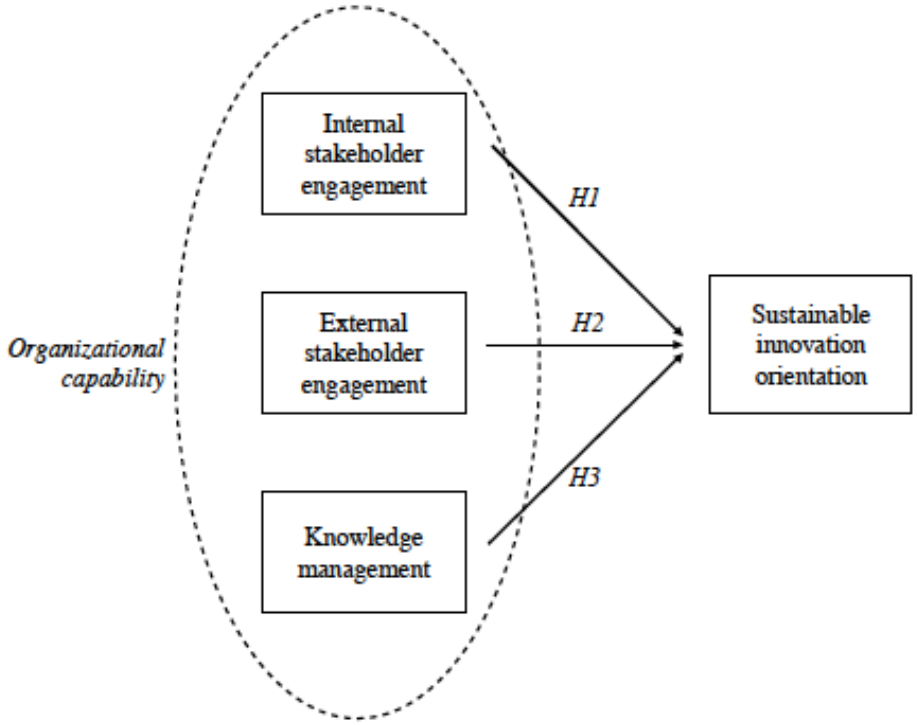

Figure 3: Stakeholder related innovation in the context of sustainable development

Source: Ayuso et al., 2011, p.1402

As the model shows, internal as well as external stakeholder engagement, combined with knowledge management are distinct organizational capabilities. In turn, these capabilities should foster sustainability-oriented innovation. Looking at each capability separately, internal stakeholder engagement refers to relationships with employees. In this regard, it is crucial for the firm to initially recruit individuals that fit to the company strategy regarding sustainable development. As a second step, those individuals should actively be integrated in new idea generation, where they are able to proof their skills when it comes to innovation. Moving to the other side of the company walls, engagement with external stakeholders focuses on the involvement of these interest groups in new product development. A crucial fact for the firm is the distinction between primary and secondary stakeholders. Prior term refers to more classical interest groups, such as customers and employees. However, for sustainability-oriented innovation it is important that secondary stakeholders are respected as well. Communities, governments and NGOs (Non-Governmental Organizations) can be part of this group. After gaining insights from internal as well as external stakeholders, companies should have practices for knowledge management in place in order to organize and deal with the relevant information. There are tools and systems in the market that assist firms in this. Nevertheless, the appropriate management of knowledge should at a later stage transform into organizational learning behaviors in order to successfully foster sustainability-oriented innovation (Ayuso et al., 2011, p.1402-1404).

The results of the conducted quantitative study confirm the hypothesized model presented in the paper. Knowledge management has the strongest influence on innovation for sustainability. Hence, besides ensuring engagement of internal and external stakeholders, it is vital for firms to know what to do and how to process the gained information. Arguing in direction of the open innovation paradigm as introduced by Chesbrough (2005), Ayuso et al. (2011) conclude their findings by stating that ‘organizations must acknowledge that the locus of knowledge generation, innovation and ultimately value creation will increasingly be located outside the boundaries of a single firm’ (p.1412). In other words, in order to be innovative and gain competitive advantage, companies are obliged to open up their corporate doors and manage the in- and outflow of information relevant for green innovations.

A more recent contribution by Driessen and Hillebrand (2013) explores how concerns by a wide range of stakeholders are successfully integrated in the development of new products. In this regard, stakeholder issue identification and integration are defined as organizational ca-

pabilities. More precisely, issue identification techniques, coordination mechanisms and prioritization principles are presented as elements for stakeholder integration capability (Driessen & Hillebrand, 2013, p.364). One challenge of integrating multiple stakeholder issues is that a large number of stakeholders results in contradicting viewpoints among them. Successful managers are able to deal with such conflicts in a way that benefits the innovation process of companies. Most relevant tools in this regard are coordination mechanisms and prioritization principles (Driessen & Hillebrand, 2013, p.365). As Buysse and Verbeke (2003) confirm earlier, Driessen and Hillebrand (2013) state that companies with proactive behavior towards environmental innovation are more successful in dealing with a wider range of stakeholder issues (p.367).

An important distinction between stakeholder concerns is further the value attributed to market and non-market stakeholders respectively. Prior group consists mainly of customers and competitors, whereas second group relates more to regulators, employees and special interest groups (SIGs). Environmental concerns are more likely to be raised by non-market stakeholders. Therefore, identification of these parties is vital for the new product development process within organizations (Driessen & Hillebrand, 2013, p.370). One way how to identify non-market stakeholder concerns is by engaging them in open dialogues. This is in line with the findings presented by Ayuso et al. (2011) and the open innovation paradigm. Considering coordination mechanisms, there exist two types of them. Formal mechanisms consist of mostly written documents and quantitative methods. Informal mechanisms suggest more open communication about green product development. Finding the right mix of different mechanisms assists companies in coordinating their multiple stakeholder issues (Driessen & Hillebrand, 2013, p.372-373). Once issues are organized in an efficient manner, they need to be prioritized. Companies that successfully advance their green product development attach more weight to non-market stakeholder concerns when making trade-offs between stakeholder issues. Non-market stakeholders are more concerned with the development of sustainability-oriented innovations. By adapting issue identification techniques, coordination mechanisms and prioritization principles, companies develop new learning and knowledge over time. This eventually assists them in building up standard routines that facilitate sustainability-oriented innovation. Driessen and Hillebrand (2013) eventually conclude that ‘stakeholder integration capability is the result of a learning process’ (p.375). However, there is lack of research on how this capability is build over time.

2.3.2. Capability Perspective

In the literature, stakeholder engagement can be defined as a capability in itself (Ayuso et al., 2006, 2011; Driessen and Hillebrand, 2013). In my understanding, the development of organizational capabilities leads to stakeholder engagement in sustainability-oriented innovation. Verona (1999) discusses four capabilities that facilitate the transition from stakeholder input to a more efficient and effective product development. Relevant for my thesis are 'external integrative capabilities' and 'internal integrative capabilities' (p.135). In essence, besides engaging external interest groups it is further relevant to consider the coordination of internal stakeholders. From this perspective, Verona (1999) suggests that companies should have managerial processes in place that increase integration. Besides others, internal communication, political and financial support as well as subtle control fall into this category. Furthermore, managerial systems such as collective brainstorming and incentives assist integration. Moreover, companies should establish integrative structures as well as foster cultures and values for internal stakeholder integration (p.135). Most importantly, Verona (1999) emphasizes that often situations of uncertainty support the development of internal as well as external integration capabilities.

Ayuso et al. (2006) present stakeholder dialogue as one such capability that fosters sustainability-oriented innovation. Besides communication with stakeholders, the authors define the integration of stakeholder knowledge as additional capability (Ayuso et al., 2006, p.475). Gaining access to external resources and knowing how to deal with this information provides companies with an additional source of capital. In this sense, Ayuso et al. (2006) introduce the term of 'stakeholder capital' (p.478). This defines in essence the knowledge available from external interest groups that have a stake in the company's operations. As outlined in the motivation for this thesis, there is a lack of research that considers stakeholder integration in the understanding of sustainability-oriented innovation. To strengthen their argument, Ayuso et al. (2006) investigate two company cases in Spain as to whether the interaction with stakeholders results in the development of sustainability-oriented innovations. Mainly, current situations with regards to employee as well as customer relations and knowledge management are observed. Ayuso et al. (2006) present a framework that summarizes their argumentation (p.486):

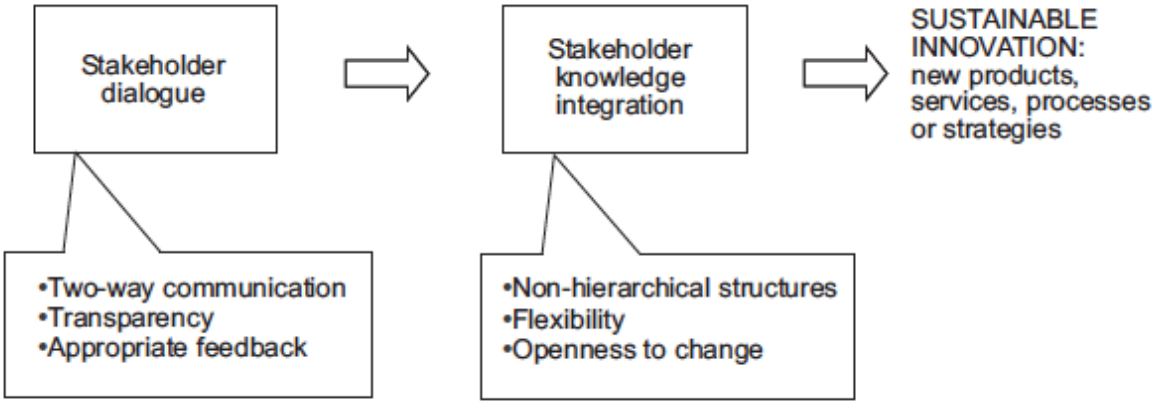

Figure 4: Dynamic capability underlying sustainable innovation

Source: Ayuso et al., 2006, p.486

The two capabilities underlying sustainability-oriented innovation are stakeholder dialogue and stakeholder integration. For prior, strong relationships with external interest groups have to be built over time. This requires a level of trust that can be achieved for instance with clarity and transparency. Furthermore, managers should be willing to provide appropriate feedback in response to concerns raised by stakeholders. When it comes to stakeholder knowledge integration, flat structures within the firm as well as a flexible organization are keys to success. What of course always has to be ensured is a general acceptance for change. This openness translates in the understanding within a company that a former external group (stakeholders) has to be integrated in order to develop sustainability-oriented innovations (Ayuso et al., 2006, p.486). Eventually, the authors stress that future research should investigate what other types of stakeholders, such as owners or local communities, contribute to the responsiveness of firms when it comes to sustainable development.

In their study about sustainable supply chain strategies, Peters, Hofstetter and Hoffmann (2011) argue that in order to develop voluntary sustainability initiatives companies should focus besides others on external stakeholder integration, cross-functional integration as well as the management of loosely coupled business units (p.52). As Verona (1999) emphasizes earlier, the integration of internal actors plays an important role when developing sustainability-oriented innovations. Peters et al. (2011) support this view by discussing cross-functional integration and the management of loosely coupled business units. For prior, I find it significant to mention that it is important to align responsibilities from different internal stakeholders in order to promote the sustainability-oriented innovation within a company. Moreover, firms should define one responsible person to act as a coordinating element between internal

as well as external interest groups (p.71). Considering the management of loosely coupled business units, relevant for my thesis is here that individuals working on the sustainability-oriented innovation should be shielded away from other operational activities of the firm. This can be achieved in form of a separate business unit, innovation department, project team or research center (p.71). Peters et al. (2011) stress that 'managers of the respective organizational units are challenged to balance the exploration of radically innovative strategies in the separated business units and the fine-tuning and operative roll-out within the company' (p.72). In that sense, managing a loosely coupled business unit is a capability in itself. With regards to external stakeholder integration, Peters et al. (2011) mention the strong collaboration with NGOs (p.66). This goes in line with what Ayuso et al. (2011) describe about the integration of secondary stakeholders.

2.4. Innovation

So far, discussions about organizational capabilities were at the core of this thesis. In addition, I presented the engagement of stakeholders from various angles. As Ayuso et al. (2006) show in their model, the final goal of these two elements should be the development of sustainability-oriented innovations. For my study, I concentrate the argumentation on innovation in itself. Thereby, I assume that findings are applicable on ordinary as well as sustainable ways of innovation. Garcia and Calantone (2002) discuss the difference between radical and incremental innovation. Eventually, my argumentation moves to innovation capabilities. Leonard-Barton (1992) as well as Rodriguez et al. (2002) serves as background material for this discussion.

2.4.1. Radical versus Incremental

An important differentiation in innovation management is between radical and incremental novelties. Garcia and Calantone (2002) present an overview of terminologies used to describe the level of originality assigned to a product or service. The authors stress that researchers in academia often regard their work as being of highest importance and novelty, when instead it is strongly based on previous findings (p.111). This same thinking can of course be applied to business organizations. Furthermore, Garcia and Calantone (2002) present a comprehensive definition of innovation in their own words. According to the scholars, 'innovation is an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention' (p.112). This definition does not include properties of radical or incremental innovations as of yet. Looking at the life cycle of a prod-

uct, radical innovation is often found in earlier phases, whereas incremental innovation is rather placed towards the end of the lifespan of a product. Furthermore, radical innovations often create new markets and industries (Garcia & Calantone, 2002, p.112 and 117). The aim of my thesis is to analyze company cases, which develop radical innovations. In this sense, such novelties not only create discontinuity in various senses on a micro level, but do so on a macro level as well. In addition, radical innovations often create a new market infrastructure and raise needs within customers that they did not know existed before. Radical innovations are rare. According to Garcia and Calantone (2002), only one tenth of all product novelties are truly radical. This is acknowledged by the fact that there is a further distinction of innovations, namely really new ones (p.120-122). This category defines inventions that might be a novelty, but certainly do not create new industries within a market. A last important element in the definition of radical innovations is that firms should not only possess of the technological abilities, but a whole new set of other organizational capabilities is needed to deal with a radically new invention (Garcia & Calantone, 2002, p.122). This statement confirms the relevance of the described subject for my research focus in this thesis.

2.4.2. Innovation Capability

In addition to organizational capabilities in the context of new product development, Leonard-Barton (1992) introduces core rigidities as a paradox in innovation processes. This terminology refers to the fact that capabilities can at the same time promote and hinder the development of sustainability-oriented innovations (p.112). In the expression of Leonard-Barton (1992), core capabilities are a set of knowledge that provides the firm with competitive advantage. Relevant elements of this set are employee knowledge and skills, technical systems, managerial systems as well as values and norms (p.113). Below illustration assists in visualizing the context:

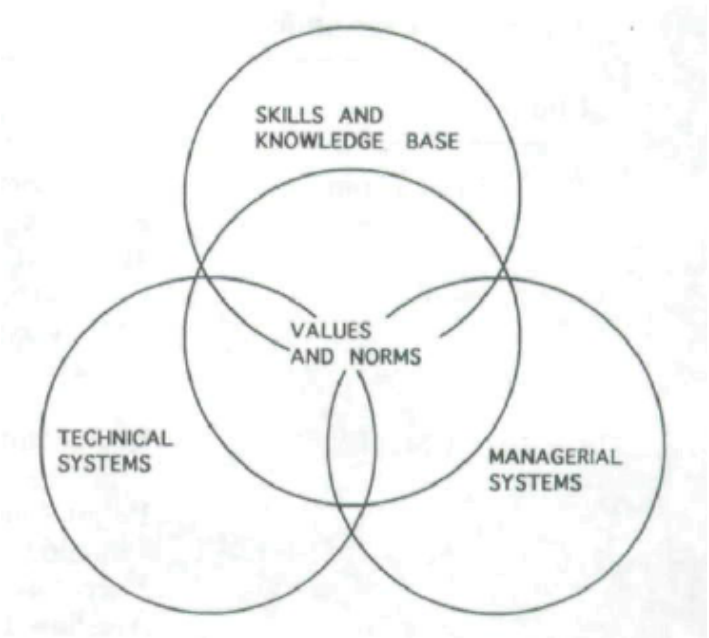

Figure 5: The four dimensions of a core capability

Source: Leonard-Barton, 1992, p.114

Elaborating on the individual elements, a strong understanding of the major products and their technical features is most relevant when considering the skills and knowledge base of employees. Some of those employees retain their technical understanding readily available for the whole firm as part of the technical systems dimension. This can be in the form of software solutions as well as detailed procedures to guide new starters in their baby steps within the corporation. From a management perspective, it is important to have systems in place that promote successful employees and provide them with incentives to keep motivation levels high. Furthermore, talented individuals should get educational assistance in order to constantly develop their skills and knowledge. Currently, with new recruitment and talent management systems, this has grown in significance especially for Human Resource managers. Values and norms figure as intersection between the three described dimensions. In this understanding, values and norms are what keep the different elements of a company together. Leonard-Barton (1992) additionally defines 'empowerment of project members' and 'status assigned to various disciplines on the project teams' as parts of values and norms (p.117). As elaborated at an earlier stage, capabilities can hinder the development of sustainability-oriented innovations. Taking values and norms as an example, certain cultures may be less beneficial for sustainable development than others (Leonard-Barton, 1992, p.119). Concluding her argumentation, Leonard-Barton (1992) states that managing the paradox between core capabilities and rigidities is a strong tool for initiating change (p.123).

Ten years later, Rodriguez et al. (2002) introduce a view of the firm that fosters competitive advantage based on knowledge and innovation. The authors label their contribution 'a dynamic and sustainable view of the firm' (Rodriguez et al., 2002, p.135). In the authors' understanding, companies build a unique set of capabilities that give them competitive advantages over their rivals. Due to the dynamic nature of those capabilities (i.e., the company constantly improves and develops internal knowledge) competitors hardly achieve to substitute or imitate the innovative products and services of a firm. Organizations nowadays operate in a different landscape. The scarcity of natural resources has encouraged stakeholders of all sorts to demand firms' compliance with environmental and social standards. The increased interaction with stakeholders results in new resources, capabilities and activities (Rodriguez et al., 2002, p.140). With the changed landscape companies face the challenge of managing different types of stakeholder groups.

Rodriguez et al. (2002) define three groups of stakeholders. On the consubstantial level, firms deal with interest groups that are essential for business operations to function. Within this group, a strong culture and high level of trust are required to succeed in managing the tensions. Contractual stakeholders are those with whom the company has relationships build on contracts. Despite the contractual nature of these relationships, any party might become essential in developing new innovations that are relevant for the market and society. Interest groups that affect a company within the business context it operates in define the third group, contextual stakeholders. In following the credo that a business should benefit all three spheres (economic, environmental and social) companies can successfully lay the basis for collaboration with this group of stakeholders (Rodriguez et al., 2002, p.141-142). Moving again to innovation, the authors mention that 'stakeholder relations […] may not guarantee, but certainly increase the probability that the innovations that directly or indirectly result from them are those needed by the market and society in general' (Rodriguez et al., 2002, p.143). This process is iterative in nature, as innovations serve as competitive advantage that in turn lead to new innovations by engaging stakeholders relevant to the firm. Next section of this thesis provides a synthesis of the literature review that eventually results in a theoretical framework to assess the selected cases.

2.5. Synthesis of Literature Review

To briefly recapitulate, this study addresses the research gap within the fields of organizational capabilities, stakeholder engagement and innovation. Each of the three sub-sections has a certain amount of previous literature available. However, and to smoothly develop a theoreti-

cal framework, I aim at presenting a coherent synthesis of the literature. In current part of the thesis I address this challenge.

What springs to mind immediately is that within each individual section the discussion on dynamic capabilities is somehow present. This fact certainly speaks for the importance of this area for the present study. Characteristics of dynamic capabilities can serve as linkage between the three individual elements of this research. Further important for this thesis is that the various topical areas can be combined to one comprehensive theoretical framework. For instance, the development of organizational capabilities leads to stakeholder engagement in sustainability-oriented innovation processes. This thinking lies at the core of my argumentation. I promote the suitability of the separate areas for a combined set of research questions by logically designing a comprehensive theoretical framework.

As much as the topics are interlinked, at the same time there are certain differences that I present at this point. Based on the literature review, the topic areas were researched during different times and with various motivations. Hence, there might not always be a straight link between an organizational capability and the innovativeness of a firm. I address these observations in a stronger way during the evaluation of separate cases for this study. Each individual topic area is extensively described by various scholars and sometimes drifts into a certain direction that is not directly relevant for the big picture of my thesis. I consider this challenge when drawing the theoretical framework. The fact that all three, organizational capabilities, stakeholder engagement and innovation are somehow interlinked, certainly reduces the risk of having a too broad model in order to assess the company cases.

Working towards the theoretical framework, I outline certain excerpts of the literature review hereafter. Starting with the topic of dynamic capabilities, Teece and Pisano (1994) stress that they are strongly connected to learning processes within a firm. Such organizational learning is necessary to build unique skills and requires management systems and processes (Teece et al., 1997). The described skills are often referred to as dynamic capabilities, which are a set of routines that are combined to result in new resource configurations (Eisenhardt & Martin, 2000, p.1107). Lawson and Samson (2001) describe innovation capability as linkage between existing routines and new activities. Knowledge management is an essential property of organizational capabilities. Zander and Kogut (1995) point out that innovating firms should constantly work hard to develop their inventions further in order to protect their knowledge

base. Grant (1996b) confirms this statement by arguing that organizational capabilities resulting from knowledge management skills are very hard to imitate (p.117). Adding to the discussion, Easterby-Smith and Prieto (2008) assert that organizational learning figures in both organizational capabilities and knowledge management. Taking the view of social responsibility, Sharma and Vredenburg (1998) introduce three main capabilities, namely stakeholder integration, capability for higher-order learning and capability for continuous innovation (p.735-742). Black and Härtel (2004) complete this assertion by adding that the engagement of stakeholders strengthens the previously mentioned capabilities. Polonsky and Ottman (1998) address the importance of stakeholder engagement in knowledge building and green product development (p.533). Furthermore, Buysse and Verbeke (2003) mention proactive environmental strategy as lead to a more open dialogue with external parties. Ayuso et al. (2011) use the distinction between internal and external stakeholders, combined with knowledge management as organizational capabilities. Taking this discussion further, Driessen and Hillebrand (2013) introduce the terminologies of market and non-market stakeholders. Verona (1999) argues that in addition to external interest groups, integration and coordination of internal stakeholders is important as well (p.135). Besides defining stakeholder groups, Ayuso et al. (2006) name two concrete capabilities for stakeholder engagement: stakeholder dialogue and stakeholder knowledge integration (p.486). Peters et al. (2011) describe the management of loosely coupled business units as a method to coordinate internal stakeholders (p.71). Moving on to innovation in general, Garcia and Calantone (2002) differentiate between radical and incremental innovation and explicate that prior often raises customer needs for a new market that did not exist before. Looking at capabilities in the context of innovation, Leonard-Barton (1992) elaborates on the paradox between core capabilities and core rigidities (p.112). Concluding the literature review, Rodriguez et al. (2002) point out the importance of stakeholder relations in creating innovations that are needed by the market and society (p.143). In the next paragraph I present a visualization of these findings in one model.

2.6. Conclusion of Theoretical Framework

The literature review for this study has revealed that there are strong similarities between the individual topic areas. At the same time, differences are not too apparent as the level of coherence in all descriptions is rather high. Therefore, the below theoretical framework should address all relevant viewpoints of the literature review, whilst at the same time being not too extensive for the analysis of individual company cases. Some elements from the previously described frameworks constitute the basis of this visualization.

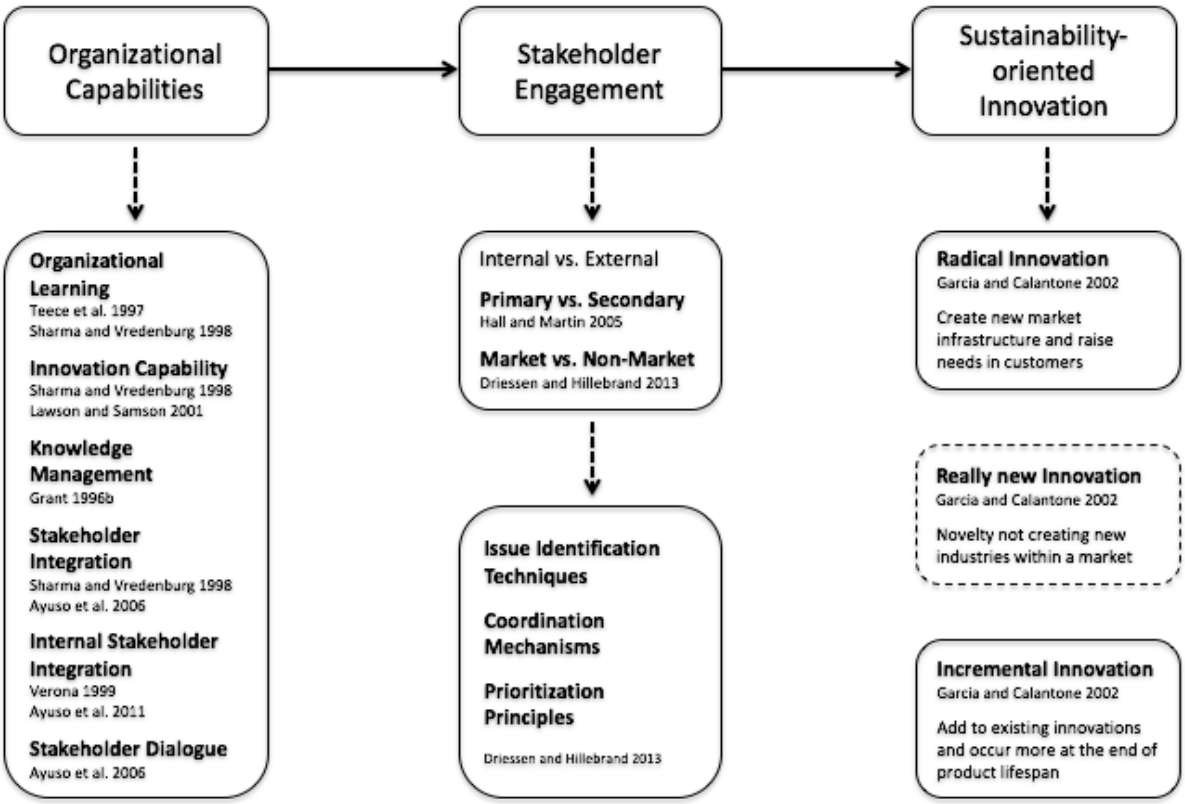

Figure 6: Theoretical framework

Source: Own illustration

The model consists of three individual parts. First, organizational capabilities are seen as input. Scholars who contribute to the existing literature discuss certain organizational capabilities. Teece et al. (1997) as well as Sharma and Vredenburg (1998) refer to learning processes within organizations. Latter authors contribute further to the discussion about innovation capability together with Lawson and Samson (2001). Knowledge management and resulting capabilities are discussed by Grant (1996b). External as well as internal stakeholder integration are seen as different capabilities and discussed by a number of authors (Sharma and Vredenburg, 1998; Verona, 1999; Ayuso et al., 2006, 2011).

Second, stakeholder engagement is achieved by developing the prior discussed organizational capabilities. In this regard, the distinction between market and non-market (or primary and secondary respectively) stakeholders is key as elaborated by various scholars (Hall and Martin, 2005; Ayuso et al., 2011; Driessen and Hillebrand, 2013). In addition to this, Driessen and Hillebrand (2013) present methods that enable organizations to deal with multiple stakeholder issues. Namely the authors refer to issue identification techniques, coordination mechanisms and prioritization principles. Last element in the framework, sustainability-oriented innova-

tion is the desired outcome. Considering innovation, I judge the contribution by Garcia and Calantone (2002) discussing radical ideas as important for developing my work.

The use of this framework for present thesis points out the coherence and similarity between topic areas. I will test its suitability to assess the company cases during the analysis of empirical findings. For now, I use as a guiding model when concentrating on empirical data. Moreover, I aim at guiding the reader by providing a combined overview. In the next chapter of my thesis I focus on the research design and chosen methodological approaches.

3. Research Design and Methodology

This chapter of the thesis introduces the reader to my methodological reflections whilst conducting the study. I begin by re-stating my research questions and highlighting the importance why I want to study this phenomenon. After providing information on the context of the study, my aim is to introduce the reader to the general qualitative tradition I am following in my reasoning. Moreover, I will describe my data collection method and how I got access to certain types of data. Furthermore, my plan on how to analyze the data is part of this chapter as well. Lastly, my goal is to evaluate my research and address ethical concerns where necessary.

3.1. Importance of the Study and Philosophical Background

To briefly recapitulate, with this study I am trying to answer the question *which organizational capabilities are needed to engage stakeholders into sustainability-oriented innovation processes*. I have phrased three sub-questions that should lead me to my final answer.

> *Q1: How are sustainability-oriented innovation processes organized in the studied case companies?*
> *Q2: Which capabilities are essential for stakeholder engagement?*
> *Q3: How do the case companies develop capabilities for recognizing their most crucial stakeholders in sustainability-oriented innovation?*

There are different reasons why it is important to study this phenomenon. From a personal perspective, I have a strong interest in sustainability-oriented innovation. By conducting this research, I aim to deepen my personal knowledge in this field and explore how the engagement of stakeholders by developing organizational capabilities leads to more open ways of innovation in sustainable development. I aim to add to existing literature by combining the fields of organizational capabilities, stakeholder engagement and innovation and by bridging the research gap that I identified whilst thoroughly reading existing literature in the respective fields. For businesses and practitioners, I believe it is important to be in constant exchange with primary as well as secondary stakeholders. This open innovation approach adds value not only for companies that wish to innovate for sustainability, but also for society as sustainability-oriented innovations benefit people and the environment in the long run.

Considering some philosophical aspects, I believe that my research aims are most accurately addressed with the onto-epistemological reasoning of a critical realist. Arguing with the words of Sayer (1992), on the one hand I believe that 'the world exists independently of our knowledge of it'. However, on the other hand I agree that 'science or the production of any kind of knowledge is a social practice'. Hence, I conclude that 'in order to be able to explain and understand social phenomena, I have to evaluate objects in my study critically' (p.5). Hand in hand with this philosophical position goes the epistemological direction of substantialism. According to Eriksson and Kovalainen (2008), 'substantialism takes reality as material, but acknowledges that people interpret it differently in different times and contexts' (p.15).

3.2. Research Strategy and Context

Based on the philosophical positioning of my research, I conclude that this study is of qualitative nature. My research questions refer to a rather complex phenomenon, which I aim to study in its own context. This goes well in line with what Eriksson and Kovalainen (2008, p.3) as well as Yin (2009, p.4) argue for. Starting by contextualizing my research, at first it seems that the initial research question is formulated quite broad. Hence, I added three sub-questions in order to define the focus of the research. The companies I am considering all operate in Europe. This is mainly due to the European-based project, in which researchers explore how certain firms integrate their end users. The selected companies all have their business operations in different geographical areas, which should add to the diversity of my results. I do not think that the fact they work in different industries is problematic for the focus of my study. Quite the contrary, I am convinced that analyzing data from various backgrounds will eventually enrich the end result. Taking the contextual perspective more on a global level, companies are increasingly exchanging knowledge with their primary and secondary stakeholders. Regardless of the company size, industry and product, developing organizational capabilities that facilitate engagement with stakeholders should be a key interest of a firm. In that sense, there is clearly potential that my findings can be applied to other business contexts as well.

Within qualitative research there are many possibilities how to design a research process (Eriksson & Kovalainen, 2008, p.7). In my case, I have decided to follow the design of case studies. On the one hand, this is justified with the fact that I have access to existing case data. On the other hand, the qualitative nature of my study as well as my onto-epistemological starting point require that I study rich phenomena with an extensive real life context. Moreover, as an investigator I have little or no control over events (Yin, 2009, p.2). Traditionally,

case study research is positioned in the positivist camp (Yin, 2009 & Eisenhardt, 1989). More recently, case studies have been interpreted to function as a link between positivist and constructivist ontologies. This conforms with what Piekkari, Welch and Paavilainen (2008) contribute to the methodological literature. My onto-epistemological stance is one of a critical realist with substantialism as my guiding epistemological direction. This understanding of social phenomena sits in between the two more traditional fields (positivist and constructivist) and hence case studies seem from my point of view the adequate strategy to address my research interests.

Going a level deeper in case study research, there are two additional ways how to explore social phenomena with this research tradition. There is the possibility to conduct research with a single case. In addition to this, there might exist a set of embedded units of analysis within the same single case. Alternatively, research can be conducted by analyzing two or more cases. This approach is referred to as 'multiple case-study design'. Again, there can be a set of embedded units of analysis within the same case. Yin (2009) presents a comprehensive overview in his book (p.46). As I am considering three cases in my study, I follow a multiple case-study design. Stoecker (1991) suggests two types of case study research; intensive and extensive. Eriksson and Kovalainen (2008) add further that intensive case study research explores a single case from within and provides in-depth descriptions of it. Contrary, extensive case study research compares more than one case and aims at contrasting findings between them (p.118). For my study I will use three cases and my aim is to conduct an extensive multiple case-study analysis. First of all, having more than one case gives me the opportunity to actually compare knowledge produced from different sources. When doing a cross-case comparison and testing my findings against the literature, I accept that there is some existing knowledge in the world. However, it all depends how my study objects and myself as a researcher interpret the existing knowledge. In that sense, the chosen methodology fits with my onto-epistemological orientation.

3.3. Case Selection, Description and Access

In order to choose the appropriate cases for my study, I went through some existing examples within a wider European project. I created an overview of the different cases and grouped them into respective industries. Together with my supervisor, we then went through the individual cases and decided for each example whether it was a radical innovation with regards to sustainability. Garcia and Calantone (2002) describe radical innovation as creating a new market for innovative products. However, this definition seems not appropriate enough for the

kind of innovation I am dealing with in my thesis. Therefore, I selected three cases that are interpreted radical from a sustainability-oriented innovation point of view with some guidance by my supervisor. According to Eisenhardt (1989), an investigator has to decide on the right amount of cases, on the depth of analysis as well as on the method of data collection and analysis. She suggests that an ideal number of cases lies somewhere between four and ten. With less than four cases, 'it is often difficult to generate theory with much complexity' (p.543). Nevertheless, for my study I decided to work with three cases, as they fulfil the requirement of radicalness and fit with my study aims as well as my research questions. This position is in line with what Eriksson and Kovalainen (2008) suggest. Additionally, the authors emphasize that 'there is no single rule concerning the minimum number of cases that should be selected for a given multiple-case research project' (p.124). Yin (2009) further adds that researchers should select such cases that assist them in answering their research questions (p.26). The aim of my thesis is to bridge the research gap I have identified from the literature review. Hence, I feel that the amount of cases I have selected is appropriate for this purpose.

For my research, I am looking at two cases that innovate in the mobility sector and one case that deals with sustainable housing. Subsequently, I describe the cases companies in more detail.

KutsuPlus

Within mobility, KutsuPlus is a service that combines the advantages of buses and taxis. This new solution in public transport gives passengers the possibility to order a minibus at a predefined stop and share their ride with individuals that travel in the same direction. Currently, KutsuPlus runs in the network of HSL (Helsinki Region Transport). HSL offers public transportation services in the greater Helsinki area. At the moment this includes besides the capital city six other municipalities. HSL names planning and organizing public transport as well as improving operating conditions as main activities. Moreover, the company is responsible for procuring bus, tram, metro, ferry and commuter train services and approves the public transport fare and ticketing system as well as ticket prices (HSL, online). Even though HSL is responsible for public transport marketing and passenger information, KutsuPlus maintains an own website to inform customers about the service.

Rockwool

Rockwool is the second case I am investigating for my research and innovates in the field of sustainable housing. The company uses rock wool to build alternative housing. So far, the Rockwool tent solution has been tested at a music festival in Denmark. The aim is to use the sustainable solution as emergency housing for refugee camps. Rockwool Group is the leading supplier of innovative products based on stone wool in the world. Stone wool is the basis of the Rockwool Group businesses. Mainly, the company provides building insulation, acoustic ceiling systems as well as noise and vibration control. Furthermore, stone wool is known for its fire safety and the ability to control extreme temperatures by insulation. This helps customers to save energy in cold and warm times of the year (Rockwool, online). The sustainability-oriented innovation at Rockwool is not directly mentioned on the website. However, there is access to media reports and articles about the collaboration of the company with the music festival in Denmark.

Verbund

The third case is in mobility and operates in the field of electric vehicles. Verbund is an Austrian company that manages a network of charging stations for this innovative mode of transport. Verbund is Austria's leading energy company and one of the biggest hydropower energy producers in Europe. Over ninety percent of Verbund's energy production is gained from renewable and climate friendly hydropower. The company promotes innovative solutions by finding trends, designing new business models and developing services that provide added value to all customer segments. The prosumer movement is supported by solutions in the fields of photovoltaics and heat pumps (Verbund, online). After developing the sustainability-oriented innovation, Verbund handed over the project to Smatrics, a company that now takes care of the service roll out and further improvement of the charging network for electric vehicles.

With regards to research material, I have access to a full case report for each of the three cases. The reports are all between thirty and fifty pages of length and contain in depth findings composed by the research team of the European project. As this material mostly deals with end user integration, it is relevant as secondary data source for my research to a large extend. In addition to the case reports, I have access to a number of interviews from each company. I use this material as primary data source. For KutsuPlus, interviews were conducted with the Chief of Customer Relations at HSL (who is part of KutsuPlus development team) and the

CEO of Ajelo (company that initiated and developed the sustainability-oriented innovation). In the case of Rockwool, I have access to existing interview material conducted with the Director of Innovation at Orange Innovation (organizers of the music festival in Denmark), the Prototype Coordinator at Rockwool as well as a joint interview with the Vice President and the People & Process Manager of Research and Development (R&D) at Rockwool. An Executive Partner at Winnovation (international innovation consulting firm focusing on open innovation), the Project Leader and a Project Manager at Verbund Solutions (former employees of Verbund AG and Verbund Sales) and a Senior Engineer in the Mobility Department of the Austrian Institute of Technology constitute the interview materials for the Verbund case. At this point I should remark that most of the interviews for the Verbund case were conducted in German. However, as this is one of my native languages it should not pose any challenges to the data analysis.

With three full case reports and eight interviews I feel that I have access to quite a lot of materials. Nevertheless, there are some additional primary data sources in my thesis. As the case companies have already collaborated largely with researchers in the project, it will not be possible to gather any primary data directly from company representatives anymore. However, I can rely on the inputs from the team of researchers.

3.4. Data Management and Analysis

Primary data sources for my research include eight interviews with individuals linked to the case companies. As additional, primary data material, I conduct two interviews with researchers in the European project. The first one was conducted face to face with a researcher who is based in Northern Europe. I chose this person because of the extensive knowledge with many of the cases in the project. The interview lasted for 30 minutes and 14 seconds and I transcribed it word by word. The purpose of this discussion was to familiarize myself with the context of the European research project, as well as with the role of the person. I organized my interview schedule in a semi-structured way in order to leave space for the researcher to develop own arguments in the context of our discussion. This corresponds to what Eriksson and Kovalainen (2008) as well as Holstein and Gubrium (1997) suggest with regards to constructionist interviewing. According to the scholars, this approach focuses on the production of meaning and knowledge during the interaction between interviewer and interviewee.

For my second interview with a PhD student who is based in Southern Europe I had some guiding questions at hand but left much more room for the researcher to narrate the answers. I

got the contact details from my first interviewee and chose this person because of the research question in the doctoral dissertation, which is very close to my own research focus. The interview was conducted through an application that facilitates voice calls and I recorded it by using a separate tool. It lasted for 25 minutes and I transcribed it word by word. Compared to the first interview, there was less interaction but I was able to collect rich answers from the inputs of the researcher. Both interviews are analyzed together with the existing primary data material. In addition to interviews, I will conduct electronic research (Eriksson & Kovalainen, 2008) focusing on available information on the websites of involved parties in the selected cases.

The collection and analysis of qualitative data are iterative processes that can be done at the same time (Eriksson & Kovalainen, 2008, p.128). For my thesis, I have started analyzing existing interview data whilst I was collecting additional primary data myself. In doing so, I aim at increasing my reflections about findings and apply them in both phases of data collection and analysis. Yin (2009) proposes that a researcher should start the analysis part by defining questions and searching for answers from the empirical material. This procedure is repeated until the main research question of the study can be answered (p.128). Following Yin's (2009) suggestion, I have defined three sub-questions to specify my main research question. The first deals with sustainability-oriented innovation processes, the second with organizational capabilities and the third with stakeholder engagement. My data analysis plan consists of four steps that are visualized in the table below:

Table 1: Data Analysis Plan

Step 1	*Step 2*	*Step 3*	*Step 4*
Within-case analysis	**Cross-case comparison**	**Thematic analysis**	**Find patterns and support with theory**
Thoroughly read through empirical material for each case and code information according to sub-questions	Create overview, compare findings between the separate cases and look for similarities and differences	Define predominant themes based on coding of empirical material and look for connection with existing literature	Define patterns and verify if emerging patterns are linked to existing theory

Source: Own illustration

Based on my sub-questions I define separate color codes for each of them. Within every case, I analyze the existing empirical material for information related to the sustainability-oriented

innovation (green code), organizational capabilities (yellow code) and stakeholder engagement (orange code). I feel that this selection might be biased due to the fact that I have access to case reports that are already structured in a certain way. However, my coding scheme is backed by the method with which I have approached the literature review. My initial search resulted in a mind map that groups academic contributions into organizational capabilities, stakeholder engagement and innovation. Moreover, I have structured the literature review in the same way. Based on this fact I judge that my coding scheme is appropriate to assist my analysis. As soon as every interview is coded, I go through the organized data again and try to find redundancies, whilst re-grouping statements where necessary.

Second step in the analysis plan deals with the comparison between the individual cases. For this phase in the process, I refer to Miles and Huberman (1994). In their book, the authors deal with descriptive methods for cross-case analysis. As the scholars suggest, I summarize the data from each separate case in a matrix (Miles and Huberman, 1994, p.177-183). By doing so, I facilitate the cross-case comparison of the individual cases. The combined overview will reveal in which cases individual aspects of my research focus are more prevalent. This leads to the description of similarities and differences across the cases.

In a third step, I undertake a thematic analysis of the predominant findings that result from the individual case analysis and cross-case comparison. During this phase, it is likely that I go back to existing literature and revise my literature review in some instances. Referring back to academic contributions increases my understanding of the contextual social phenomena resulting from my initial analysis. Consequently, during the last step of the analysis I define patterns and verify if they correspond with the theoretical framework I designed as part of the literature review. In this phase I might adjust the theoretical framing of my research if it does not correspond with the findings from my analysis. However, I am aware that not all emerging patterns might relate to existing literature. Being conscious and reflective about this point enables me to accept that my analysis can shed light on new findings.

By following my data analysis plan, which leads to a thematic analysis, I aim at discovering evidence that defines and supports a certain set of organizational capabilities that lead to stakeholder engagement, which in turn fosters sustainability-oriented innovation. I think that using this method accounts for my position as a critical realist. My findings will strongly depend on the way interviewee's told about their experiences and how I construct knowledge

based on the interaction with them and interpretation of empirical material. Moreover, my main research question specifically asks for a certain set of capabilities. I got access to some of the preliminary findings in the doctoral dissertation of my second interviewee. This existing list of organizational capabilities will guide me in defining categories of the relevant information from the primary and secondary empirical data.

Yin (2009) defines four general strategies for analyzing case study evidence. *Relying on theoretical propositions* (p.130) focuses on the theoretical framing that lead to the case selection. This strategy is not really relevant in my research, as I selected the cases before reviewing literature and framing my research phenomenon. However, as I conducted two additional interviews I believe that there is still some relevance for this strategy. The theoretical insights clearly guided the design of my interview scheme and the way I interacted with the interviewees. *Developing a case description* (p.131) deals with the organization of case studies by defining a descriptive framework. In my work I will certainly pay attention to describe the cases based on findings from the case materials. I am not using the third and fourth strategy presented by Yin (2009) as they are intended for advanced researchers and scholars (p.132-135).

In addition to the general strategies, Yin (2009) presents five techniques to analyze qualitative data (p.136-160). From the presented approaches I will refer here to cross-case synthesis. This technique goes is in line with my analysis plan for the combined cases. Yin (2009) argues that evidence from more than one case supports emerging patterns in a stronger way (p.156). At the same time, a major challenge for researchers is to 'develop strong, plausible, and fair arguments that are supported by the data' (Yin, 2009, p.160). Eisenhardt (1989) describes a certain 'information-processing bias' (p.540). According to the author, researchers are biased by the way they prematurely conclude findings based on a limited amount of information. In that sense, Eisenhardt (1989) agrees with Yin (2009) that analyzing multiple cases and search for similarities and differences among them increases the plausibility of the final results.

3.5. Evaluation of the Study and Ethical Concerns

Yin (2009) contributes to the discussion about evaluation in qualitative research by presenting four sets of criteria for judging the quality of research designs (p.40-45). *Construct validity* mainly refers to the usage of multiple sources of evidence, whilst establishing a link between them during the data collection phase. In my research, I use evidence from various primary and secondary data sources. In a first step, I collect the insights I gain from the empirical material in separate overviews. In a second step, I go through them and try to find connections

between the evidence. Miles and Huberman (1994) refer in their book to the concept of reliability/dependability/auditability. They argue that 'the underlying issue here is whether the process of the study is consistent, reasonably stable over time and across researchers and methods (p.278). Moving back to Yin (2009), *internal validity* is mostly relevant for exploratory case studies, where a researcher tries to identify what events lead to a certain outcome. In some way, my research tries to explain which organizational capabilities lead to stakeholder engagement in sustainability-oriented innovation. Hence, I aim at increasing internal validity by thoroughly analyzing the empirical data and making sure I do not miss out on any possible capabilities that eventually lead to the result of sustainability-oriented innovation. *External validity* is achieved by using replication in multiple-case studies. By comparing the findings across my selected cases and use a pre-defined coding scheme, I can at the same time investigate whether certain events are the same across case companies. The last criterion deals with *reliability*. Researchers should keep a study protocol and summarize their individual steps in a study database. In that sense, mapping literature review, transcribing interviews and summarizing within-case analysis in a database document my research progress.

Contrary to the contribution by Yin (2009), Eriksson and Kovalainen (2008) challenge this view by stating that scholars and literature have differing opinions about the accuracy of evaluation for qualitative research with assistance of classic criteria (p.292). Moreover, if onto-epistemological starting points are constructivist, it is advisable to replace standard evaluation criteria with an adjusted approach (Eriksson and Kovalainen, 2008, p.294). As I take the position of a critical realist in my research, I aim at following Yin's (2009) advise in evaluating the contents of my study. The fact that I am a rather novice researcher, and that there might be more literature available on classic evaluation criteria, further adds to the plausibility of my decision. However, I will still take into consideration the suggestions by Lincoln and Guba (1985). According to the authors, the researcher's interpretation should agree with the subject's opinion (credibility). Moreover, researchers should be careful and consistent in their work (dependability). Additionally, results should be applicable do a different setting (transferability). Lastly, researcher's interpretations should be logical and unbiased (confirmability).

Considering ethical aspects for my study, there are a number of guidelines available that assist novice researchers in dealing with this concern. The Code of Ethics issued by the International Sociological Association (2001) as well as the Ethical Principles of Psychologists and Code

of Conduct by the American Psychological Association (2010) are examples of such guidelines. For the purpose of my study I will refer to what Eriksson and Kovalainen (2008) propose regarding ethical concerns in qualitative research (p.70-75). For the interviews I conduct, I ensure that individuals participate voluntarily by agreeing that it is fine with them to be part of a qualitative interview. Additionally, I prevent technical-ethical issues by asking the interviewees if they agree that I record our conversation before I switch on the recorder. For the existing primary and secondary data, I trust that researchers have applied ethical codes of conduct as results have already been published to a wider audience. Informed consent goes in line with voluntary participation. I provide the interviewees with basic information about my research focus, the company cases I am considering, my supervisor and how their contribution will benefit my study. Professional integrity is assured by reporting my results in a logic way that is understandable to an academic as well as non-academic audience. Moreover, this chapter on methodology increases the level of professional integrity by openly presenting the methods I have applied whilst conducting my research and reporting my findings. Concluding this part, I do not silence other researchers and scholars by ensuring that I adequately cite their work and make reference to their contributions. Furthermore, I avoid plagiarism by rephrasing important ideas by other academics and running my work through a software solution provided by the academic institution. Throughout my work I aim at reflecting on ethical concerns and prevent issues by following existing advice and codes of conduct.

4. Empirical Findings

Having the theoretical framing and the methodological approach in place, this section of the thesis focuses on empirical findings resulting from case data. The aim is to provide a brief description of the case companies and their sustainability-oriented innovation. After identifying key stakeholders in the process, methods of engagement will be analyzed and the discussion then moves on to respective organizational capabilities. In line with the methodological reasoning, in a first phase I present an extensive analysis for each separate case. During the second phase, I compare the findings and present a cross-case analysis for all three cases.

4.1. KutsuPlus

KutsuPlus is nowadays part of HSL, the regional transport network of Helsinki in Finland. The initial idea originated from Aalto University, a leading academic institution in the country. Later on, the research project gave birth to Ajelo, a technology spin-off that promotes sharing transportation. After four years of independent work, a US-based company acquired Ajelo in November 2014 in order to introduce its technology for shared transportation in the United States (Ajelo, online).

4.1.1. Sustainability-oriented innovation

Individuals living in metropolitan areas regard public transportation often as more efficient than using a private car or a taxi. However, in some instances this view might differ due to specific needs of the commuting person. Moreover, one of the main challenges in Helsinki is that there are many private cars with often only one or two people traveling in them. HSL and Ajelo believe that this society could be organized a little bit differently. Hence, they have addressed this challenge by developing a service that combines the lower price level of traditional public transport and the higher flexibility of taxis and private cars. KutsuPlus offers users the opportunity to use a service where one can decide the journey, the specific time and the traveling speed. The CEO of Ajelo emphasizes that ‘the solution is a real time system on demand for a totally new kind of mode in transportation’ (CEO, p.6). Once a user registers on the website for the service, trips can be ordered by computer or mobile device and payments are effected by transferring a certain amount of money beforehand to a personal account for the service. After that, users can enjoy a relaxed ride to their destination, whilst sharing the vehicle with people that travel in the same direction (KutsuPlus, online).

Looking at the timeline of the innovation development, the core process is distributed over a period of eight years. Early on in 2007, Aalto University started a research project on demand-responsive urban transport. During the years 2009 and 2010, a first user integration phase was conducted with the help of focus group discussions. In the same year 2010, Ajelo was established as a spin-off from the research project. Consequently, in 2011 HSL, Ajelo and Aalto University signed a consortium agreement. One year later in 2012, the usability testing phase started. Later on in the same year, KutsuPlus started as a technical pilot and was launched in testing mode for Aalto University staff and students. Once this initial pilot was running, the service opened up for usage of the wider public. In 2013 KutsuPlus was promoted and marketed as a new service (Korsunova, 2015, p.18). Currently, HSL is negotiating about the continuation of KutsuPlus in the wider metropolitan area of Helsinki. The organization of the innovation process is summarized in below illustration:

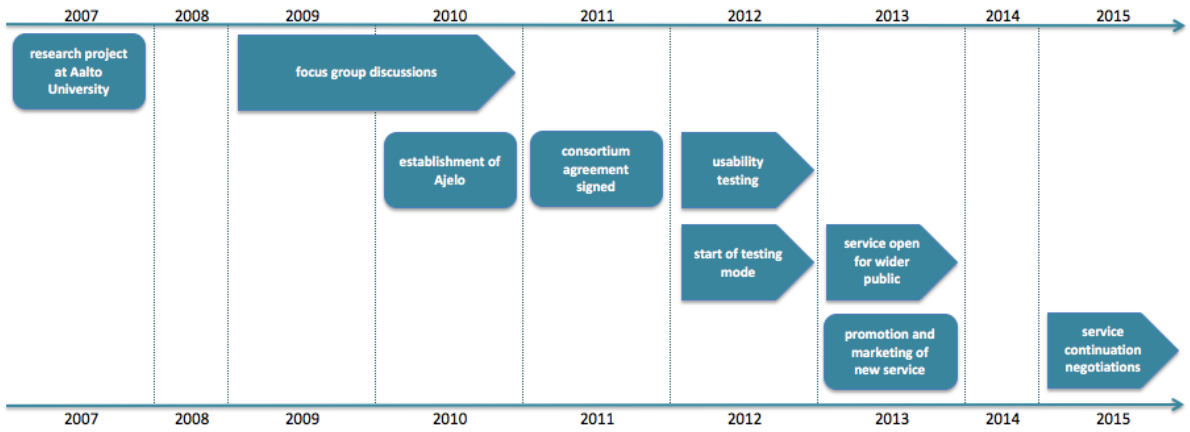

Figure 7: Timeline KutsuPlus

Source: In accordance with Korsunova, 2015, p.18

This timeline shows the various steps involved for the sustainability-oriented innovation at KutsuPlus. At this point I would like to remark the length of the process. It clearly becomes evident for me, that introducing an innovation in the field of sustainability is indeed not a short process. Companies need to dedicate time and resources to the successful development of the innovation. At the same time, the cases I analyze rely on internal and external interest groups to assist the advancement of the solution. In the next part I present findings about involved stakeholders in the case of KutsuPlus.

4.1.2. Stakeholders involved in the process

My analysis of the stakeholders in the case of KutsuPlus reveals a large number of involved parties. The relevant interest groups are listed below together with a brief description of their role in the process.

Table 2: KutsuPlus involved stakeholders

Stakeholder	Role in the process
Aalto University	Individuals out of 5 schools at the university were involved in testing the service as a first target group. Moreover, as Aalto is a multidisciplinary institution, people from different schools were involved in the project coordination. The academic institution further initiated the research project in the beginning of the process.
Tekes	Tekes is the Finnish Funding Agency for Innovation and acted as the main financer in the development of the service.
HSL	Helsinki Region Transport was heavily involved in the process as service provider for KutsuPlus. The service is integrated in the HSL public transport network and currently, HSL is negotiating about the future of KutsuPlus.
Ajelo	Ajelo started as a spin-off from the research project at Aalto University and is specialized in demand-responsive urban transport. The company mainly develops the technology behind KutsuPlus and recently got acquired by a US-based firm in order to introduce the service to the American market.
Political actors	Besides the Ministry of Transport and Communication, politicians in the government are making decisions about the usage of the service in different municipalities. Furthermore, the government is involved in the current negotiations together with HSL.
Municipalities	In the beginning, KutsuPlus operated in the municipality of Helsinki only. In the meantime, the service area includes certain parts of Espoo as well. Depending on the current negotiations, KutsuPlus might be able to operate in the whole greater Helsinki metropolitan area.

Potential users and customers	Initially, the potential target group for the service was defined as all people in the Helsinki metropolitan area. In the beginning, university students and staff test used the service and provided feedback. In a second phase, the service opened for a wider audience and individuals using it provided feedback as well. The project coordinators divided future users into very potential, possible and not interesting groups. Besides seniors and car drivers, companies are seen as a potential user group.
Bus drivers	During the testing phase, drivers had the role of commenting if they notice particular feedback from customers or bad routes and bad timings. KutsuPlus always aims to keep its drivers and current customers content.

Source: Own illustration

The extensive involvement of internal and external interest groups increases the need for coordination between individual activities. This is one aspect that I analyze when looking at specific organizational capabilities of the case companies. I summarize my findings in the following part.

4.1.3. Development of organizational capabilities

In this part of the analysis I describe the capabilities that become apparent from reading through the case material. Interviews were conducted with the Chief of Customer Relations at HSL (who is at the same time part of KutsuPlus development team) and the CEO of Ajelo. The views expressed in the discussion are combined for the purpose of describing organizational capabilities that facilitate stakeholder engagement.

External Dialogue

With regards to interaction with stakeholders, there are multiple approaches in the case of KutsuPlus. An important way how to communicate with stakeholders were focus group interviews. During those sessions, participants were divided into different segments and individuals from HSL as well as Ajelo took an active role in the research by moderating and promoting the discussion. Throughout the whole process, there was a constant focus on end user side and potential customers were asked about their opinion in surveys conducted in the first pilot phase. The brand identity of the vehicles for KutsuPlus was ensured by using the colors blue

and white, such as for the HSL public transport buses. Discussing the aspect of branding a bit further, people on the street were asked about their assumption of the service and their image about it when they saw the vehicles. Customer feedback was collected in different phases of the project. For instance, users were able to fill out questionnaires and sharing their experiences about the service. Moreover, customers had access to a link where they could simply insert a plus or a minus to summarize their overall experience with the journey, as emphasizes the Chief of Customer Relations at HSL:

'When a person has ordered a trip, he or she always gets a receipt to his e-mail (kuitti) - there is also a link where you can put your pluses or minuses, which you felt there during the trip' (CCR, p.5).

As part of so-called research days, project members shared journeys with users and observed them during the ride. Afterwards, the researchers conducted interviews with the users where they got a deeper insight into their experiences. An additional mean of external dialogue was a campaign, where customers had the possibility to suggest usages for the service. Furthermore, KutsuPlus engaged users by showing them their website and communicating through newsletters and information materials on campuses. Eventually, HSL supported companies that were interested in using the service giving lectures or delivering presentations for certain groups.

Internal Coordination

As important as it is to engage stakeholders, at the same time the alignment of internal activities is equally relevant in the case of KutsuPlus. For instance, the imagination of employees for the new service is of central importance. In this regard, there were mental simulations with the goal of understanding how the end user would see the product. This creativity in communication translated into a cartoon where potential users can see the trip flow from the beginning to the end. It is important that end users can not only read about the product, but also see with assistance of an animation how it will work. The CEO of Ajelo describes this process in the statement below:

'So it was so that...in the research project we had that one paper.. of course, we kind of tested the concept with like mental simulations.. trying to analyze how users would see the concept..

One really.. One thing that made the project go forward was that Timo Halko and myself - we made a user ... what is it called... like a cartoon' (CEO, p.3).

This imagination of the end product clearly benefited the engagement with stakeholders in the process. HSL has created a separate department to deal with the operations for KutsuPlus. This approach is new for the company and hence the structures are coordinated almost like in an internal venture. I interpret the fact that the company conducted such a change in the internal set up as sign that there is a certain amount of internal support for the idea of the service.

Learning Process

In the case of KutsuPlus learning process becomes apparent in the engagement of external stakeholders. It was critical to test the idea with users, learn from them and be open for their comments. Customer feedback was collected form several sources and during multiple phases in the project. The company actively listened to users and improved the service along the development process. As an example, KutsuPlus drivers constantly provide feedback about travel routes and bus stop infrastructure. The Chief of Customer Relations at HSL summarizes that 'the driver's job is a part that they comment if they notice bad routes or bad timing.. or something else.. customer wishes - they put in the screen and collect them' (CCR, p.9). HSL respected this information and adjusted the routes and stops accordingly. A third source of learning was the feedback that drivers got from customers directly. They put them into a screen and transferred the information directly to the project members at HSL. In my opinion, it was vital to the development of the service that customers knew their wishes were communicated to the people that are in charge of improving the solution.

Pilot Testing

As for other innovation projects, pilot testing was an important element in the development of KutsuPlus. The project started with the opportunity for students and employees of Aalto University to test the service and share their initial experiences with the project team. In a second phase, a wider group of potential customers was able to test the usability of the service. Both steps happened before the service was officially launched. As an incentive to be part of the pilot testing, students and employees of Aalto University were able to use the service for free during the first test rides. Once the testing opened to a wider public, there was a minimal fee that incrementally increased over time. However, the fee was still comparably cheap for the type of service that was offered, as emphasizes the Chief of Customer Relations at HSL:

'Yes, they were free.. then we put some kind of fee there.. And then we opened it for everyone, and then a little bit more fee.. It's cheap yet anyway, even now' (CCR, p.8).

My analysis of the KutsuPlus case reveals that the sustainability-oriented innovation process took place over a longer period of time. In addition, a high number of stakeholders are involved in the process. Along the way, I find evidence of certain organizational capabilities for stakeholder engagement at KutsuPlus.

4.2. Rockwool

As the company name suggests, Rockwool is a Danish firm specialized on house insulations by using so-called stone or rock wool. Recently, Rockwool started cooperating with Orange Innovation, which organizes a yearly music festival in Denmark. The festival is known to be a testing ground for new and innovative solutions. This is where Rockwool first brought its shelter solution to a wider audience. The experiences from customer feedback are constantly influencing the product development. Eventually, Rockwool aims at providing the Danish army as well as the United Nations with the emergency housing shelters.

4.2.1. Sustainability-oriented innovation

The core business of Rockwool lies in insulation of houses. This is one of the most important features of the shelter solution. Inside the tent, individuals enjoy an agreeable temperature, are not disturbed from external noises and have the security to be surrounded by material that does not burn. Moreover, the aim of the company is to make the solution as user friendly as possible when it comes to setting up and taking down the shelter. The Prototype Coordinator at Rockwool further describes a special feature of the hut for festival guests:

'This was out there last year, and on top of the roof we had 100mm Rockwool and cans of water, and we make this kind of hole, so people could take a shower. But we had no rain out there' (PC, p.7).

Based on this remark it becomes evident how important the music festival is as a testing ground for Rockwool. Besides the tent alternative, Rockwool further tested a cooling house for storing food and beverages at the festival. It operates completely without external power by producing energy from sun panels and wind mills at its top. Thereby, it uses up to seventy percent less energy than other cooling solutions. In addition, Rockwool provided festival guests with a mobile charging station for their cell phones. In order to absorb the smell of

urine, the company put stone wool in the ground along a fence where festival guests usually went to urinate. Probably the most sustainable aspect of the material is that 'it gives back hundred times the energy that you use for producing it' (VP, p.16). The Vice President of R&D at Rockwool further emphasizes the cultural and sustainable aspect by stating 'that's a part of it...it's made of natural materials. So, it is really a part of our culture, it is about sustainability. And that's what we like about it..' (VP, p.16).

The timeline of the sustainability-oriented innovation so far stretches over the total period of seven years and is summarized as part of the overview below:

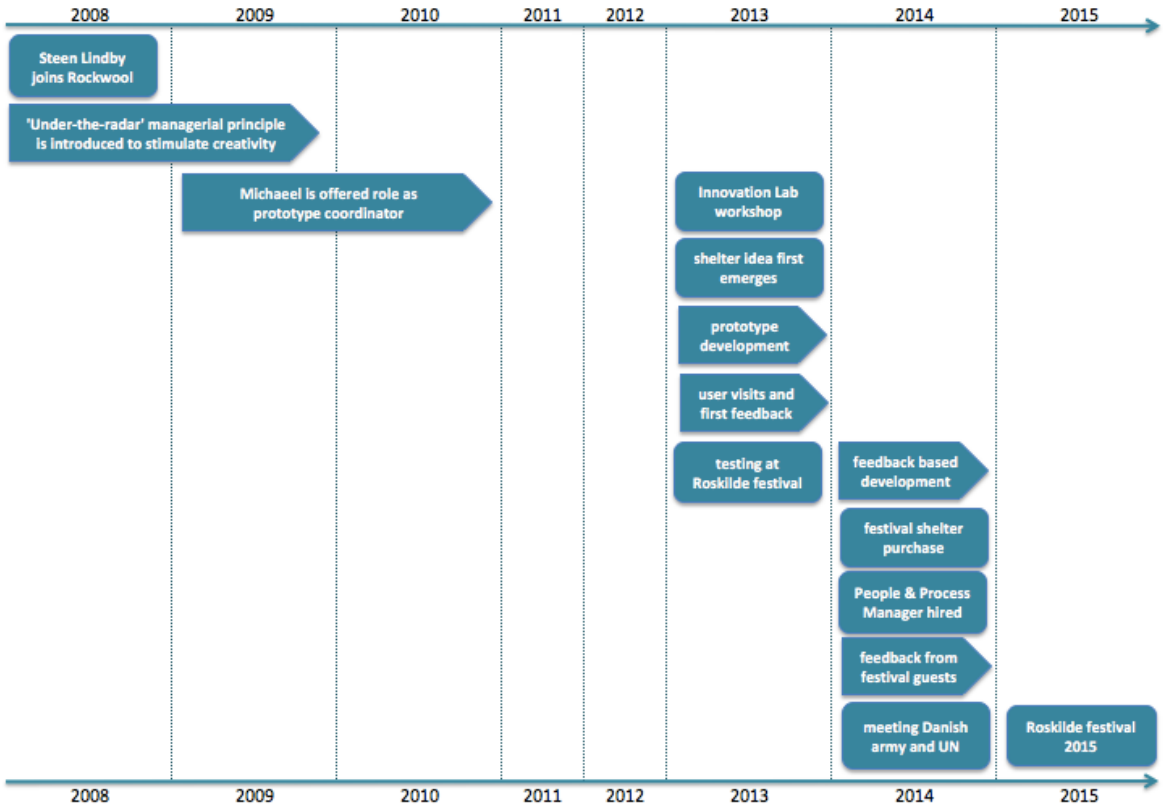

Figure 8: Timeline Rockwool

Source: In accordance with Korsunova, 2014, p.32

During the financial crisis of 2008, the Vice President of R&D joins Rockwool and introduces the 'under-the-radar' managerial principle with the goal of stimulating creativity. A year later, an employee in the departments takes the position as Prototype Coordinator and three years later meets with representatives of Roskilde festival during an innovation workshop. This point in time marks a start for the main development of the shelter solution. The Prototype Coordinator meets with the Director of Innovation at Orange Innovation and the idea of the

shelters is discussed for the first time. This instance is followed by prototype development meetings, which take place twice a month and first user feedbacks from visits to the site. In the summer of 2013, the solution is tested for the first time at Roskilde festival. Based on this experience, the solution is developed during the following year. Eventually, Roskilde festival agrees to purchase a number of tents for regular use. The second year of testing at the festival gives Rockwool even more insights and input for development from festival guests. A People & Process Manager is hired to boost growth of ideas before Rockwool meets with the Danish army and the United Nations to discuss further usages of their emergency housing solution (Korsunova, 2014, p.32).

The innovation process at Rockwool is spread over a longer period of time. However, the main development started in 2013 when the Product Coordinator meets with the Director of Innovation at Orange Innovation. This organization is one of the key stakeholders in the process. In the next part I focus on relevant internal and external interest groups.

4.2.2. Stakeholders involved in the process

Orange Innovation is certainly interpreted the most influential external party as the People & Process Manager at Rockwool puts it: 'They made it happen' (PPM, p.12). In addition to this organization, there are other very relevant stakeholders involved in the process of developing and influencing the sustainability-oriented innovation. In the following table I summarize the main parties and their role in the development of Rockwool shelters.

Table 3: Rockwool involved stakeholders

Stakeholder	Role in the process
Orange Innovation	As organizers of the music festival in Denmark, the organization has an influential role in the development of the Rockwool solution. The Director of Innovation collaborated strongly with the Prototype Coordinator at Rockwool and their discussions often resulted in new ideas and further development of the solution. It seems as they have encouraged and motivated each other to continue working on the sustainability-oriented innovation.
Prototype Coordinator	This individual is a key figure in the development of the Rockwool shelters. The person is described as somebody who thinks

	outside the box. The job as a creative mind is to come up with new ideas and get them out to the market. In some instances, the person did so without the management at the company even knowing about it. The close collaboration with the Director of Innovation at Orange Innovation motivated the Prototype Coordinator to continuously work on and further develop the shelter solution.
Roskilde festival	Gathering 130,000 people each year, Roskilde festival becomes the fourth biggest city in Denmark. The festival is known for being a place where innovative products and solutions are tested. Moreover, the visitors are very open to communicate their feedback directly to the companies that use the festival as a testing ground.
Rockwool management	With 'under-the-radar', the management at Rockwool introduced a practice that gives employees more freedom to develop their own ideas. Additionally, ten percent of the yearly budget is allocated for the development of new solutions. Employees in R&D have access to an innovation lab where they can test their ideas. In general, the management is very eager to hear about and support new solutions that have the potential to innovate in existing markets.
NGOs and other public institutions	So far, NGOs, refugee and health organizations played a minor role for Rockwool. However, the company is constantly trying to discuss with such institutions to find new markets for the shelter solution. At the end of 2014, first talks started with the Danish army and the United Nations.
Academic institutions	The two academic institutions in Denmark, Copenhagen Business School (CBS) and Technical University of Denmark (DTU) have multiple roles in the development of the product. On the one hand, both institutions are actively engaged in designing the tents. On the other hand, undergraduate as well as graduate students are eager to write about Rockwool in their theses and hence do research connected to the innovative solution.

Source: Own illustration

Looking at the involved stakeholders, it seems they are interlinked and complement each other. This does not happen by chance but with a lot of coordination by the innovating company. In the next section I consider organizational capabilities at Rockwool that are necessary for successfully integrating stakeholders in innovation processes.

4.2.3. Development of organizational capabilities

Following the example in the first case, I have grouped capabilities based on my interpretation of their importance. In addition to the four categories defined for the first case I describe here a fifth and sixth one called 'Entrepreneurial Spirit' and 'Organizational Culture'. Interviews were conducted with the Director of Innovation at Orange Innovation, the Prototype Coordinator as well as the Vice President and People & Process Manager of R&D at Rockwool.

External Dialogue

Rockwool manages to engage stakeholders through external dialogue capability predominantly at the music festival. During those days, company representatives are very close to the customer and able to communicate as well as question them about their experiences with the solution. Referring to the cooling house solution, festival guests can see directly how it is running and learn first-hand about the possible energy savings. In general, Rockwool is able to collect a lot of information during the festival days as people are very straightforward and not biased when they share their feedback with the company. Being part of the festival further opens doors to academic institutions in Denmark. Following statement of the Prototype Coordinator confirms this fact:

'And also it would be nice if you will write something about it in your university, and it will come around, so the other people can talk about it and see it' (PC, p.10).

Open innovation is common within Rockwool. During the pilot phase of the project, individuals were invited to visit company premises and test the huts on site. Phone interviews with organizations as well as testimonials from users help develop the solution. Openness is further expressed in the way Rockwool collaborates with Orange Innovation. After the initial meeting at a sustainability conference, periodical meetings served as platform for brainstorming, debates and open discussions. Talking about possible allergic reactions of human beings to stone wool, the Prototype Coordinator emphasizes that 'we are honest about this thing, so if we know something, we will do anything to getting it away or stop the production of this particu-

lar product' (PC, p.12). Other means of external dialogue at Rockwool are their Facebook page and videos on the festival homepage.

Internal Coordination

My analysis of the empirical material reveals that especially the management at Rockwool has deep understanding for the importance of the internal coordination capability. As part of the managerial principle 'under-the-radar', the management offers employees additional time and resources to work on own projects. This creative environment gives workers the possibility to test out new ideas besides must-do projects. The management of R&D is well aware that uncertainty drives innovation and that creative minds have to be somewhat out of control. Hence, once the management sees real market potential for an idea they assist the employees to put it above the radar and allocate additional resources to really give speed to the idea. The Director of Innovation at Orange Innovation talks about this in some statements:

'..you need to give the developing department workers some free space.. you need to have some of your working time where you can do something you're not sure what the impact is.. basically trusting in your workers that they will develop the right way.. taking a part of the budget, which is for the workers to do new stuff - that's not normal' (DI, p.9).

From an employee perspective, they certainly appreciate this fantastic platform for innovation and the fact that they can work freely from product related things. The Prototype Coordinator emphasizes the ability to 'take a break and just think about what we are doing' (PC, p.12). Nevertheless, informing the management team is still an important aspect in the daily work. Rockwool management strongly pushes open innovation by providing a living laboratory, setting frames and simply see what happens and get ideas from that.

Organizational Culture

As I define organizational culture to be closely interlinked with internal coordination, I continue by introducing this new capability. Reading through the interview material it appears to me that the management at Rockwool is eager to promote an organizational culture that supports creativity and innovation. Giving people freedom and not interfering are both signs of understanding that too much management kills motivation. Rockwool as a company is generally fast in reacting to external changes and individuals working for the firm are proud of being part of Rockwool. The Vice President of R&D emphasizes managerial control in the ar-

gumentation. ‘So it's really about loosening up, and making sure that you know that you can actually be in control, but in another way’ (VP, p.15). Part of the culture at Rockwool is further that the company constantly aims at improving core competencies and innovation. This is seen as a form of sustainability that individuals are responsible and passionate about.

Learning Process

Organizational learning is important at Rockwool from different perspectives. During the meetings between the Director of Innovation at Orange Innovation and the Prototype Coordinator at Rockwool, they constantly discussed new experiences and learned from each other. Once Rockwool developed the first prototype, the feedback from test users on site was utilized to develop the solution further. Moreover, key is that the development was at all times done internally, which advanced the solution from an initial rock wool only hut to a full tent with the purpose of serving as emergency housing. When Roskilde festival decided to buy fifty tents to rent out for their guests, Rockwool was able to learn from an even wider audience. In this regard, the Director of Innovation at Orange Innovation emphasizes that as a company, ‘you have to test something, which goes wrong’ (DI, p.6). Considering open innovation there were a lot of things the management did not know about. By running through the iteration process multiple times the company learned and is still learning to successfully conduct open innovation.

Pilot Testing

When it comes to prototyping and testing, Orange Innovation added a lot of value to the development of the sustainability-oriented solution. The organization emphasizes that innovative ideas should be tested right away. Rockwool achieved this by inviting users to test one of the first prototypes on site. Individuals were able to step inside the hut and experience the real product. After the test Rockwool communicated with users and collected feedback from them. Furthermore, a lot of testing was done at Roskilde festival. The Prototype Coordinator argues that the ‘festival is good for testing crazy ideas’ (PC, p.7). Once the festival decided to buy fifty tents the testing opportunities for Rockwool strongly increased. The festival guests were aware that the hut they are using is a prototype and that they are part of an experiment. This freedom of testing by engaging a large amount of users benefits the development of the shelter solution.

Entrepreneurial Spirit

I added the capability of entrepreneurial spirit especially based on my analysis of the interview with the Prototype Coordinator at Rockwool. It seems that the person is ahead of the own company by thinking all the time about new crazy ideas to get out to the market. This strong personal drive is expressed in below statement:

'And suddenly we... "let's make some housing tents, whatever.."... So it was like that: we were standing by the coffee machine and just talking, and then suddenly we had an idea because we have talked to some other guys, girls, whatever..' (PC, p.2).

The Director of Innovation at Orange Innovation had a strong influence on the Prototype Coordinator. They influenced and motivated each other. The person is described as one that does things in a different way and constantly thinks outside the box. Both characteristics of entrepreneurial individuals.

Summarizing my analysis of this case, same as with the first one the innovation process is spread over a longer period of time. The evidence suggests that some stakeholders are more crucial in the process than others. However, I do not encounter any concrete evidence how Rockwool prioritizes the involved stakeholders. In addition to the four capabilities that I identify in the first case, in the Rockwool case I come across two additional capabilities.

4.3. Verbund

As Austria's leading energy provider, Verbund is in a key position to come up with innovative solutions for the future. Change in this industry is generally slow and firms are seldom eager to try out new things. Nevertheless, Verbund manages to revolutionize the market for electric vehicles in Austria by setting up the largest charging station network in the country. What started as a nationwide project, eventually resulted in the formation of a spin-off company looking for innovative solutions to shape Austria's electric vehicle future. Recently, a first charging station was opened in a neighboring country. This shows the success of this project. In current part of the thesis I will present my findings regarding the sustainability-oriented innovation.

4.3.1. Sustainability-oriented innovation

From my personal experiences, I encountered charging stations for electric vehicles mostly when spending time in Northern Europe. When it comes to the central parts of the continent,

it seems that the development of the service only recently picked up. The Austrian energy provider Verbund addressed this challenge by collaborating with other leading institutions in a national project called EMPORA (E-Mobile Power Austria). This marks the start of the sustainability-oriented innovation process in the Verbund case. Below illustration visualizes the individual steps over time:

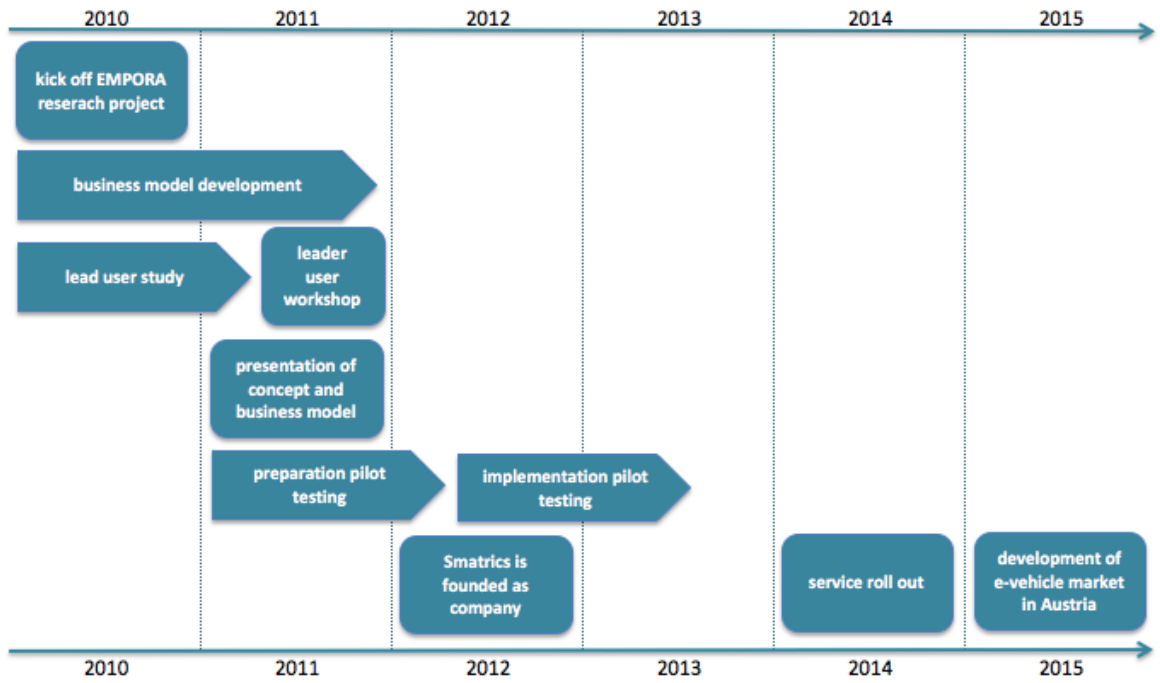

Figure 9: Timeline Verbund

Source: In accordance with Purtik, Zimmerling & Dribbern, 2014

With EMPORA research project officially kicking off in 2010, Verbund starts developing the business model for the sustainability-oriented innovation. The company is assisted in this process by some external agencies. One of those is Winnovation, a consulting firm focusing on open innovation. Winnovation conducts a high number of interviews and eventually identifies a group of lead users, with whom Verbund conducts a study between 2010 and 2011. At the end of this process the company organizes a lead user workshop. During this two-day workshop the group of users as well as representatives from Winnovation and Verbund discuss the challenges and opportunities for the charging network solution. Verbund collects the inputs from the workshop in a concept and consolidates the findings in a presentation of the business model. Still in 2011, Verbund prepares the pilot testing which is due to start in the next year. In order to further develop and bring the solution to the market, Verbund and Siemens jointly venture a new company called Smatrics. The pilot testing runs until 2013 and after that, in

2014, Smatrics takes over the responsibility of the project and rolls out the service to the market (Purtik, Zimmerling & Dribbern, 2014). During the current year, the electric vehicle market in Austria experiences some major changes. Mainly, the government incentivizes the acquisition of electric vehicles by offering tax reductions and other financial benefits. For Smatrics, this development enables the company the continuously expand the service in Austria, even providing a first charging station in Germany (Smatrics, online).

Focusing on the sustainability-oriented innovation, Smatrics plays the role of E-Mobility provider for Verbund customers. During the initial interviews conducted by Winnovation, the agency defined 'park and load', 'reduced risk' and 'without limits' as predominant trends and fears for the development of the new service. Especially with regards to the last point, it seems that conventional cars are used for longer trips due to fears regarding the range of an electric vehicle. Smatrics is certainly addressing this challenge by continuously expanding the charging network in all parts of Austria.

The service introduced by Verbund is regarded as a radical innovation. This is expressed by the Executive Partner at Winnovation, stating that 'in the area of electric vehicles, there was and is a need for radical solutions' (EP, p.17). People in Austria have a preference for flat rates. Smatrics offers a range of different packages with fixed prices, depending if the customers only charge in the network or buy a private wall box for charging at home. The Project Manager at Verbund emphasizes the convenience of the package solution in a statement:

'We calculated that our package did not even cost as much as the energy that the customer uses when driving with the electric car every day' (PM, p.13).

The radicalness of the solution comes from the fact that prior to Verbund, there was no countrywide charging network available for electric vehicles. The future of mobility is a stronger integration with public transport. Verbund and its partners are thinking ahead in this regard by considering a modular solution that eventually can be integrated in existing infrastructure. Penetration of electric vehicles in Austria and central Europe is gaining momentum. Smatrics is in a strong position 'to cope with this enormous change and providing innovative solutions for the market' (EP, p.20).

4.3.2. Stakeholders involved in the process

The development of the sustainability-oriented innovation starts with a nationwide research project. This project consists of leading institutions in the area of electric mobility. In later stages of the development, Verbund collaborates with various interest groups. I summarize the relevant stakeholders and their roles for the Verbund case in the table below.

Table 4: Verbund involved stakeholders

Stakeholder	Role in the process
Winnovation and Austrian Institute of Technology	As a leading consultancy for open innovation, Winnovation had an important role in the development of the Verbund solution. In early phases of the project, the agency conducted a large number of interviews with potential users and provided Verbund with an initial market study. At a later stage, Winnovation suggested a group of lead users to Verbund and was an active part of the two-day workshop. The agency was in constant contact with Verbund and supported the firm in many steps of the process. Moreover, the Austrian Institute of Technology (AIT) designed user survey's, organized the GPS tracking and evaluated the qualitative as well as quantitative data gained from this research.
Smatrics	In 2012, as a result from a joint venture between Verbund and Siemens, Smatrics was founded as a company. Smatrics initially rolled out the solution to the market and is now thoroughly working on the expansion of the charging network. Customers associate Smatrics with the leading provider of electric vehicle charging points in Austria. In future, Smatrics will innovate concepts for the usage of electric mobility in the market.
Model regions	The role of model regions was important for Verbund, especially in the pilot testing phase. Most household interviews were conducted in the region of Vorarlberg (referred to in the project as VLOTTE). This is due to the fact that individuals living in this area often possess of tertiary education and are in general more environmentally friendly. In this regard, Vorarlbergers can be seen as pioneers in Austria.

Lead users	With the help of Winnovation, Verbund invited a group of lead users to a two-day workshop. These individuals mostly had experience with electric vehicles and wanted to have an impact on the service development process. Hence, their motivation to participate in the lead user study was mainly based on intrinsic motivation. As the Executive Partner at Winnovation puts it, 'solutions that are not motivated through financial rewards are better in the long-run' (EP, p.8).
Test users	Contrary to the lead users, test users have little or no experience with electric vehicles. The feedback was important to Verbund as to how potential new customers feel about driving in an electric car. For this purpose, Verbund organized test days where they invited customers to try out the car. In addition, car dealers of electric vehicles emphasized the opportunity to become a test driver to their interested buyers. Verbund offered test users indirect rewards by providing them with vouchers for driving security trainings and memberships with ÖAMTC (Austrian automobile, motorbike and touring club). In addition, users have the possibility to claim financial incentives by the state when investing in an electric vehicle.
Other departments at Verbund	For the development of the sustainability-oriented innovation, Verbund established a separate innovation department. At the same time, interaction with other departments is strong. Especially the legal and marketing departments collaborate with the Project Leader and are eager to take on extra work and responsibilities linked with the advancement of the innovative solution.
Political actors	Currently, the electric vehicle market in Austria is experiencing a hype. This is strongly linked to the incentives the government is providing to individuals that decide to buy an electric car. There exists a lot of political pressure for the market penetration of electric mobility. From a different perspective, the European Union is pushing research agencies to focus more on open innovation.

Source: Own illustration

From the beginning and along the process, Verbund had to deal with a large number of internal and external interest groups. This challenge requires the company to engage stakeholders in an organized way. I discuss the main organizational capabilities for the Verbund case in the next section.

4.3.3. Development of organizational capabilities

The interview material for the Verbund case is more extensive than for the other two cases. In addition, I translated the main statements and grouped them according to my existing coding scheme. For the Verbund case, I define 'Stakeholder Incentivization' as additional category of organizational capabilities. Interviews were conducted with the Project Leader and a Project Manager at Verbund, an Executive Partner at Winnovation and a Senior Engineer in the Mobility Department of the Austrian Institute of Technology.

External Dialogue

Verbund collaborated with different parties to ensure external dialogue with stakeholders. On the one hand, Winnovation started by conducting large household survey and phone interviews. The results of this initial market survey were then presented to Verbund. In a second stage, interviews were conducted to determine a group of lead users, which in turn took part in a two-day lead user workshop together with Verbund and Winnovation. Verbund was eager to be in continuous contact with potential end users and open about the role of the consumers, as the Project Manager explains:

'Clients knew form the beginning that they are part of a research project. They knew as well that we will ask them questions and that we want to know if they did not like something that is linked to the service' (PM, p.14).

Verbund actively informs new clients and binds existing ones by keeping them up to date. Newsletters are one mean of communication in this regard. From the beginning of the process, Verbund realized that the days of only inhouse innovation are over. The company took initiative and engaged in discussions with other parties in the EMPORA research project. Certainly, a lot of initiative came from Winnovation. The extensive methodological experience of the agency assisted Verbund in successfully collecting the relevant data to advance the development of the innovative solution. Moreover, the Austrian Institute of Technology has knowledge about innovative forms how to engage stakeholders. Besides collecting driving routes from households, AIT placed GPS trackers in test user cars to determine the distance of

their journeys. Furthermore, specific questionnaires were designed to address the requirements of first-time and experienced users.

Internal Coordination

In the EMPORA research project, Verbund took immediately over the lead and established clear organizational and meeting structures. The Senior Engineer at AIT further emphasizes that 'the boundaries for working in the project were clear and communication paths were established' (SE, p.15). Within Verbund, there is a strong feeling of ownership for the project. Moreover, Winnovation appreciates the personal openness as well as the goodwill from the company side. The project lead at Verbund is very convinced about the project. In addition to the support from colleagues and other units, the innovation department at Verbund has full commitment from the board and the management. Early on in the development of the new solution, the company integrated the topic of innovation by establishing a separate department for this project. Innovation is still something very new in Verbund's industry but with the decision to establish an innovation department the company is certainly a pioneer in the field.

Verbund was at all times well aware where they lacked knowledge and skills about certain methods. As lead in the EMPORA research project, Verbund defined individual working packages. Within such packages, the responsible parties had a lot of responsibilities and decision making power. However, decisions were made as a whole group and development of the project was discussed with all involved parties. Project members compiled a presentation of each phase as well as a final concept report. Verbund tried to distribute gained knowledge within the organization and among project members.

Learning Process

Verbund did not only learn from other members of the EMPORA project, but also from its clients. With the help of Winnovation, it was possible for Verbund to closely look at and find out about user needs. Several people from Verbund were present in the lead user workshop. During this occasion, they had the possibility to interact not only with knowledgeable users, but also with some experts in the field of electric mobility. From the discussions and gained knowledge, it was possible for Verbund to come up with a business model for the solution. The members of EMPORA research completed each other with knowledge in different fields. Winnovation possesses strong competences in market research and was important for the

learning process at Verbund. The Executive Partner discusses analog markets as a possibility to engage even more stakeholders in the process:

'We found them by analytically breaking down these topics and checking in with other fields we find the same topics' (EP, p.7).

Verbund took on a pioneering role in the market for electric vehicles. Early on, there were a lot of uncertainties about the success of this project. Nevertheless, the company was eager to try something new, engage in experiments and follow a completely new path. Even when the knowledge was not there in the beginning. AIT contributed their part to the learning process. The company worked with scenarios and simulation models, measured quantitative as well as qualitative data and ensured the reliability of the data by doing plausibility checks. The GPS tracking of household routes was a special method used by AIT. In all discussions with project members at Verbund results were analyzed and experiences influenced the further development of the solution. Eventually, Verbund trained their own employees and most importantly, transferred all the learnings to the Smatrics team.

Pilot Testing

The sustainability-oriented innovation at Verbund is more of a solution than a product. Hence, there was not a prototype that could be tested with potential customers. Nevertheless, Verbund defined a working package dedicated to demonstration testing. Within this work package, the company did own test drives and analyzed them afterwards. More importantly, AIT helped organizing test drives with potential users. Individuals had to fill out a questionnaire and describe their positive and negative experiences straight after the ride. Moreover, Verbund offered free testing of demonstration vehicles to potential users. The Senior Engineer at AIT describes this in a statement.

'There was an internal demonstration project at Verbund. Besides EMPORA, Verbund procured two testing vehicles and offered free rides of one hour to its customers. I assume as kind of an image campaign' (SE, p.10).

Stakeholder Incentivization

I decided to define the capability of stakeholder incentivization because from my analysis it appears to me that this is an important and often mentioned point in the Verbund case. There

are external players such as the Austrian government. Together with Raiffeisen bank, customers get offered favorable leasing conditions when buying an electric vehicle. In the course of next year, the Austrian government will offer additional incentives to users of electric vehicles. These include for instance tax incentives and lower insurance premiums. The government aims at promoting clean mobility even stronger in the country (Smatrics, online). From the company side, Verbund offered a range of incentives to potential clients. Test users were given vouchers for driving security training. Individuals participating at a household survey received a USB stick in return. AIT distributed vouchers for a tourist tour in Vienna when conducting their surveys. In some cases, test users got offered a car at favorable conditions and the installation of a private wall box at home in order to test the usage and charging of cars. The Project Leader at Verbund emphasizes that it was at all times important to 'offer the clients something that directly benefits them' (PL, p.18). For the lead users it was a bit different as they were intrinsically motivated to take part in the study and workshop. Verbund showed a lot of appreciation towards these individuals by highlighting that their inputs will have a long lasting impact on the electric mobility market in Austria. Moreover, Verbund and now Smatrics address the preference of Austrian for flat rates by introducing transparent and clear pricing models for their service.

The development of the sustainability-oriented innovation at Verbund takes place over a shorter period of time than in the first two cases. Again, the company has to balance inputs from a large group of stakeholders. Verbund develops one additional organizational capability that facilitates engagement of stakeholders.

In this part of the thesis I displayed my within-case analysis from the perspective of organizational capabilities, stakeholder engagement and the sustainability-oriented innovation. Moving on to the cross-case comparison, my aim is to compare the cases based on the organizational capabilities I identified in this part of my study.

4.4. Cross-Case Comparison

As Miles and Huberman (1994) suggest, I summarized the organizational capabilities that I found during the within-case analysis in a partially ordered meta-matrix (p.177). In a first step, I group the individual capabilities per case. Miles and Huberman (1994) refer to this practice as case-ordered descriptive meta-matrix (p.187). In a second step, I go through the matrix and highlight similarities across capabilities. Common activities for each organizational capability are summarized in the table below:

Table 5: Cross-case comparison of capabilities

	External Dialogue	*Internal Coordination*	*Learning Process*	*Pilot Testing*
KutsuPlus	Questionnaire Interviews Focus Groups Plus/Minus Evaluation Website and Pages Campaign for Customers Campus Information Focus on End User Side Surveys to Users	Internal Venture Mental Simulation Imagination of End Product	Customer Wishes Learn from User Testing	Aalto Pilot Usability Testing
Rockwool	Questionnairing Interview Phone Interview Interview with Refugees Getting Feedback Facebook Page Festival Homepage Write in University Open Door to University Close to Customer Inviting Users Doing Open Innovation	Free Space for Workers Creative Environment Living Laboratory Figure a Hut somewhere See the same Design Inform the Management Open Way Employees Smart enough	Learn Learn about these 50 Tents Learning Point Learn what was not good Things have to be learned Learn to do Open Innovation Things we don't know about	Test 50 Tents at Festival Step in and be inside Doing like it is real
Verbund	Different Questionnaires In-depth Interviews Phone Interviews Focus Groups Impression after first use Image Campaign Interact with User Market Survey Big Household Survey Open Innovation Method	Own Innovation Department Own Company Commitment from Board Free Hand by Management Personal Openness Company Openness Ownership in Company	Learn from Clients Closely look at User Needs Not sure at the beginning Knowledge was not there A lot of Uncertainties	Free Testing Demo Vehicle Test Drive Questionnaires Demonstration Testing Own Test Drive

Source: Own illustration

Within the external dialogue capability, most common methods to engage stakeholders are questionnaires and different types of interviews. Focus groups are predominantly used in the case of KutsuPlus, with a short reference in the Verbund case. Getting immediate feedback from customers is common in all three cases. In the cases of KutsuPlus and Rockwool, web pages as well as Facebook pages are used as mean of communication with users. KutsuPlus and Verbund make use of surveys and run campaigns for their customers. Collaboration with academic institutions is common in the cases of KutsuPlus and Rockwool. Similar across all three cases is the fact that companies are eager to closely interact with their end users. This is linked to methods of doing open innovation, as explicitly apparent in the cases of Rockwool and Verbund.

Comparison for the internal coordination capability is more challenging than for dialogue with external interest groups. What I find here is that all the cases somehow dedicate a separate entity or department for developing the innovation. Such a separated role from the rest of company operations seems to benefit the sustainability-oriented innovation. In the cases of KutsuPlus and Rockwool, an internal method is to use imagination of the end product and service. Support from the management and commitment from the board is a similarity in the cases of Rockwool and Verbund. Same cases share the fact that internally, there exists a significant amount of openness towards the sustainability-oriented innovation and open innovation in general. Moreover, project ownership of smart-enough employees is important in both Rockwool and Verbund.

Across all the three cases, I find that there is a strong willingness to learn. Be it internally or based on external inputs. Common for KutsuPlus and Verbund is that in both cases there is a focus on customers as well as their wishes and needs. This is an example of external learning. At Rockwool, learning is influenced from outside the company but mainly focuses on internal processes, such as how to do open innovation. Furthermore, similar at Rockwool and Verbund is that both companies are aware that there are a lot of things they do not know about. Nevertheless, the internal coordination capability supports here by creating structures that assist the companies in taking this new road. Eventually, this benefits the development of the sustainability-oriented innovation.

Testing of products and services is an important activity across all three cases. Stakeholders in the development of the solution are encouraged to try the sustainability-oriented innovation. The Aalto pilot, Roskilde festival and cooperation with car dealers to offer free test drives are activities used in the three cases. For KutsuPlus and Verbund, test drives with potential users are organized in a way that ensures feedback collection during and especially straight after the usage. The outcomes of this testing influence the learning process within the companies. A similarity across the cases is further that testing was first done internally before engaging external stakeholders. When it comes to testing, I find from the case data that it is important to try out and show the real product and service.

As part of the next chapter of my thesis I link empirical data with existing literature, try to answer the research questions and discuss the final thoughts of my work.

5. Analysis and Discussion

In the final part of this thesis I discuss my empirical findings and compare them to my initial literature review. As I mentioned in the methodological chapter, I am not scared of naming emerging patterns, which are not explained yet by existing literature, at this point of my work. The academic field I am conducting research in is quite new. Therefore, whilst analyzing the empirical data, I try to be aware all the time that I might find capabilities that I have not came across in my literature review. Moving on, in this chapter I apply my theoretical framework to the empirical findings. Based on this information, I start answering the sub-questions, eventually getting to the main research question. I finalize my work by discussing limitations of this study, proposing recommendations for future research and concluding the argumentation with some final thoughts.

5.1. Building the Core Argument

My analysis of the empirical data shows that four capabilities are common across the cases. There are three additional capabilities that are more specific and based on empirical findings from the individual cases. Before I deal with emerging patterns, I try and back the common capabilities with my findings from the literature review.

5.1.1. Correspondence with Existing Literature

External dialogue, internal coordination, learning process and pilot testing are capabilities that I came across in the literature review and analyze subsequently.

External Dialogue

This capability is most strongly backed by the contribution of Ayuso et al. (2006). In their study, the authors name stakeholder dialogue as initial element that leads to sustainable innovation. Specifically, Ayuso et al. (2006) present two-way communication, transparency and appropriate feedback as skills that lead to a stakeholder dialogue capability (p.486). Some of the activities I found during the case analysis can directly be assigned to the skills named by Ayuso et al. (2006). For instance, interviews and focus groups are examples of two-way communication. Additionally, the case companies in my study assure transparency by being open about their innovation processes and strongly focusing on the end user side. Moreover, the responsible individuals within the case companies aim at providing appropriate feedback to stakeholders by actively engaging them in discussion and the innovation process.

Internal Coordination

Scholars referring to this capability include Verona (1999), Peters et al. (2011) as well as Ayuso et al. (2011). Verona (1999) argues for managerial processes that increase internal integration (p.135). Considering the cases in my study, internal communication is assured by constant exchange and information between individuals responsible for the sustainability-oriented innovation and the management as well as board of the firm. This leads to political and financial support for the development process of the innovation. Subtle control is expressed in the case companies by forming separate departments or project teams for the development of the sustainability-oriented innovation. Peters et al. (2011) touch upon this point by arguing for the management of loosely coupled business units in order to develop voluntary sustainability initiatives (p.52). Separate business units, innovation departments and project teams or research centers (Peters et al., 2011, p.71) are present across the company cases for this study. Ayuso et al. (2011) describe that it is important for a firm to recruit individuals that fit with the internal innovation strategy. Moreover, those employees should be empowered by active participation in idea generation (p.1402-1403). Among the company cases for my study certain individuals were hired specifically for the development of the sustainability-oriented innovation. In two of the three cases existing employees got assigned new roles directly linked to the development of the innovation. Individuals from the separate business units, research centers and project teams are constantly part of new idea generation and exchange their findings with the respective management teams of the firms.

Learning Process

Capability for organizational learning falls into the categories of dynamic capabilities and knowledge management. Teece and Pisano (1994) argue that dynamic capabilities facilitate the process of learning (p.10). Additionally, Teece et al. (1997) emphasize the importance of management processes that foster organizational learning as essential to build unique capabilities for a firm (p.515). Lawson and Samson (2011) define organizational intelligence as the ability of employees to gather information from different stakeholders and use this knowledge to develop the sustainability-oriented innovation. Considering the case companies, despite uncertainties at the beginning of the process, there is a strong willingness to learn from end users and other involved stakeholders. What I find further is that there is a lot of understanding on employee and management level for the importance of learning from stakeholder inputs. Open innovation is apparent in all cases and hence the companies integrate gained knowledge into the innovation process. Sharma and Vredenburg (1998) refer to higher order

learning when managers sensitize employees for organizational learning to bridge the knowledge gap (740-741).

Pilot Testing

This capability is not directly discussed in my review of the existing literature. Nevertheless, based on my analysis of the case companies I find that there is a strong link to the capability for learning process. Certainly, within the three cases different methods of testing are used. At the same time, I sense that in each case most useful input form stakeholder side was collected through pilot testing of the product or service. Interviewees expressed in multiple occasion the importance of this feedback and how they applied the learnings in the process of developing the sustainability-oriented innovation.

5.1.2. Emerging Patterns

Entrepreneurial spirit, organizational culture and stakeholder incentivization are capabilities that are specific for one of the cases in my study. Furthermore, they are not strongly supported by existing literature. Hence, I define these capabilities as emerging patterns.

Entrepreneurial Spirit

In the case of Rockwool, the entrepreneurial spirit of one single employee within R&D is the main driver to advance the sustainability-oriented innovation. The Prototype Coordinator is constantly ahead of the own company, strongly engages with different types of stakeholders and is responsible for throwing out new ideas as well as testing them in the market. This is a unique situation within the cases I analyze. Furthermore, I have not encountered discussion about entrepreneurial spirit capabilities in existing literature.

Organizational Culture

As with the previous capability, organizational culture is a specific example in the Rockwool case. Lawson and Samson (2001) briefly touch upon this by arguing that a certain culture within an organization can be beneficial for the development of sustainability-oriented innovations. The authors present the example of harming creativity of employees by too tight management practices. The managers of the R&D department at Rockwool go the other way and give a lot of freedom to their employees. They try not to interfere and believe that too much management kills motivation. This is part of the organizational culture at Rockwool. Most importantly, mangers of the R&D department at Rockwool know they are in control, even if this happens in a different way.

Stakeholder Incentivization

At Verbund, test users and other involved stakeholders get incentivized for their contributions in the development of the sustainability-oriented innovation. The company uses different modes of incentivization but mainly focuses on the usefulness for stakeholders. I have neither encountered this capability in the other cases nor in my analysis of the existing literature. An important distinction here is that some stakeholders can be motivated intrinsically out of pure interest for being part in the development of a radical innovation.

5.2. Application of Theoretical Framework

In order to refer back to my initially presented framework I include it hereafter. My aim is to verify the findings from the analysis of empirical material against the discussions I encounter during the literature review. Eventually, this part leads over to answering my research questions.

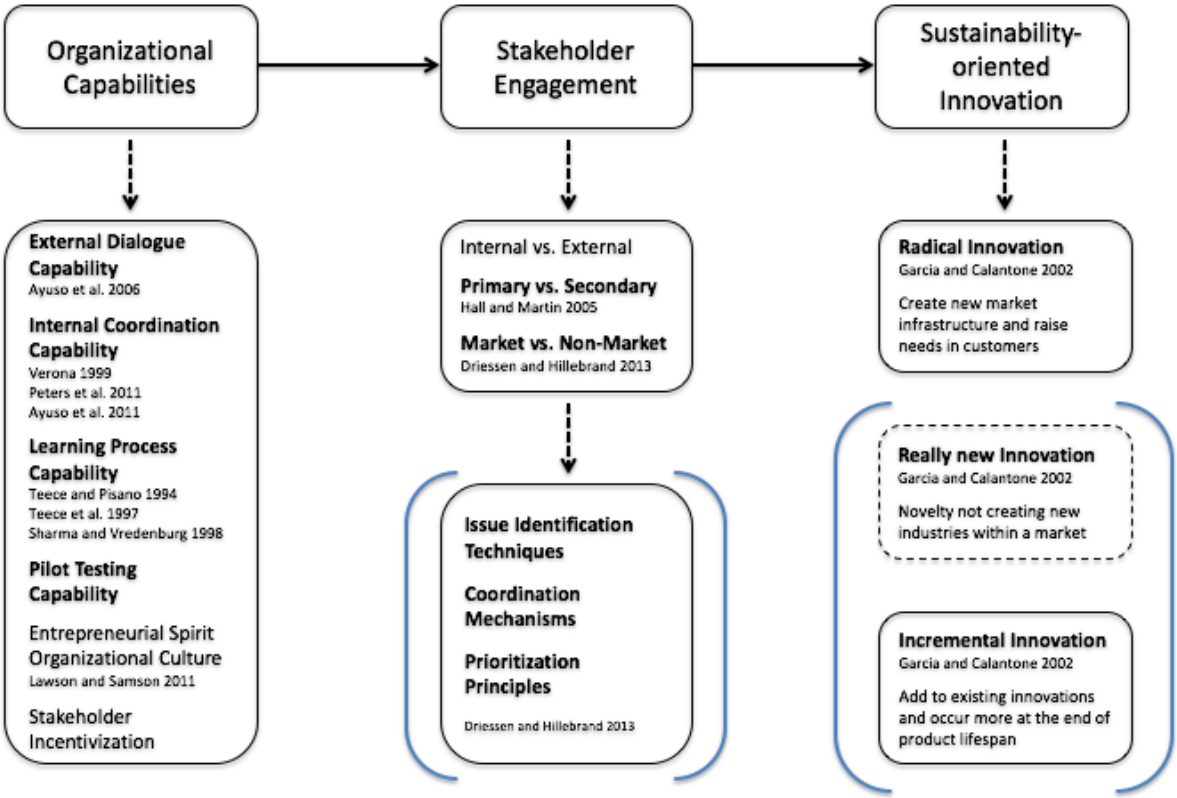

Figure 10: Modified theoretical framework

Source: Own illustration

The modified version of the framework contains the capabilities, which I identify in my analysis of the empirical data and discuss in the previous section. External dialogue, internal co-

ordination, learning process and pilot testing are common across all three cases. Contrary, entrepreneurial spirit, organizational culture and stakeholder incentivization are specific for individual cases and not extensively discussed in previous literature. All three case companies deal with a large number of stakeholders. Some are of primary nature (such as test users and employees) and others are more of secondary nature (such as NGO, agencies and academic as well as other public institutions). From the empirical material I did not find evidence that refers to capabilities linked to managing multiple stakeholder issues as proposed by Driessen and Hillebrand (2013). It appears to me that the issue identification, coordination and prioritization of stakeholders are naturally part of the iterative development process of the sustainability-oriented innovations. Hence, this aspect is of secondary importance in the modified version of the framework. I interpret from the empirical data that the products and services developed by the case companies are of radical nature. Least radical might be the innovation at Verbund. However, when seeing what effects the service has on the market development and support from the government in Austria, I judge this innovation as a radical one. Therefore, incremental as well as really new innovations are of secondary importance in my reasoning. My analysis of the modified framework now leads to answering the research questions for this study.

5.3. Answering the Research Questions

At the beginning of my study I formulate a main research question, which is supported by three sub-questions. In this part of the thesis I start by answering each of the sub-questions first. This eventually leads me to my main research question.

Q1: How are sustainability-oriented innovation processes organized in the case companies?

Across the three cases it becomes apparent that sustainability-oriented innovation is not something, which happens over night. On average, the length of the process for analyzed case companies was almost six years. At the beginning of the development timeline there is often a certain event that starts off the process. In two of the cases a research project marks this moment in time. In the third case, hiring an individual leads to a cultural change within the organization. As theory on organizational intelligence suggests, the three case companies continue the process by collecting data about the market and potential users. In my study this is done with the assistance of secondary stakeholders. This further confirms the importance of these interest groups. Once a first prototype of the product or service is developed, the case companies test it with a selected group of potential users. Depending on the type of innova-

tion, these groups of individuals differ. For my cases the groups consist of either university students, lead users or festival guests. Feedback from testing activities is systematically collected and integrated in further development of the solution. In all cases, this method is an iterative process and promotes organizational learning within the companies. Once the sustainability-oriented innovation is continuously developed, companies decide to proceed with the roll out. All of the cases that I analyze are currently in a phase where they await support from external interest groups. In all cases they are of secondary nature.

Q2: Which capabilities are essential for stakeholder engagement?

Similar in all three cases is that they use certain organizational capabilities to engage their stakeholders. External dialogue capability refers to methods how organizations interact with external stakeholders. This capability is strongly relevant early in the development process when firms gather market and potential user information. Moreover, external dialogue capability is important along the process when companies collect additional feedback in order to develop the sustainability-oriented innovation. Communicating with external interest groups and being open about internal processes increases the trust between firms and stakeholders involved in the development of a new solution.

The second capability that is common for all three cases is internal coordination capability. This deals with how companies organize the engagement and organization of internal interest groups. In this regard, an important role is attributed to the management of firms. By providing support and a creative environment, managers enable internal stakeholders to engage in the development process and bring in their own ideas and suggestions. In the case companies I further find evidence that promotes the building of loosely coupled business units. It appears that if individuals are shielded away from daily operation tasks, they are able to fully focus on developing the sustainability-oriented innovation. This is especially true in the Rockwool case, where employees in R&D enjoy a lot of freedom from the management. They can use a certain amount of their time to work on projects that are not part of the current business model. Moreover, employees in R&D have access to a separate infrastructure where they test and develop their ideas. According to Peters et al. (2011), managing loosely coupled business units is a capability in itself. Moreover, in internal coordination it is important to openly communicate towards the management and cooperate with other business units and departments in the organization. As part of the Verbund case I find evidence that strongly supports this position.

Learning process capability and pilot testing capability are common for all three cases. By testing the product or service with potential users, companies get direct feedback from the market. Besides developing the sustainability-oriented innovation, the case companies benefit from increased organizational intelligence by engaging in learning processes. This is an iterative process and can be repeated multiple times. As the literature suggests, learning processes promote the development and uniqueness of organizational capabilities. Considering my findings in the case data, collaboration with external agencies is a strong tool to increase organizational learning. Sometimes, potential users can be consulted as experts. Verbund addresses this with the lead user workshop. In other cases, companies have access to a larger playing field to test out their ideas and learn from potential users. In the Rockwool case, the Project Coordinator tested the sustainability-oriented innovation at a large music festival in Denmark. An external and more independent innovation agency facilities in this process. Academic institutions are not only a source of knowledge, but can also be considered important for organizational learning. In the case of KutsuPlus, strong collaboration with Aalto University was one of the success factors for the development of the sustainability-oriented innovation. I further find evidence in the case companies that the more testing they do and the more feedback they collect and exchange with stakeholders, the higher the trust becomes between the firm and involved interest groups. Hence, learning process capability and pilot testing capability strengthen the relationship between the company and primary as well as secondary stakeholders.

There are some capabilities that are specific for one case or not extensively discussed in the literature. Entrepreneurial spirit capability describes the importance of individuals in an organization to bring a new idea forward. Organizational culture capability is linked to internal coordination but less discussed in existing literature. It is certainly a question of culture if firms decide to give employees absolute freedom to work on their own ideas. As with the internal coordination capability, the role of managers is crucial to develop an organizational culture capability. Stakeholder incentivization capability is important to engage additional stakeholders in the development process. Some groups might be intrinsically motivated to participate in testing and other forms of engagement. Others require additional incentives to engage with a company. Most important here is that stakeholders interpret incentives as useful for them.

Q3: How do the case companies develop capabilities for recognizing their most crucial stakeholders in sustainability-oriented innovation?

Driessen and Hillebrand (2013) suggest in the literature certain capabilities how organizations can identify, coordinate and prioritize stakeholder issues. However, in my analysis of empirical data I do not encounter any these methods. What I find is that the case companies interact with stakeholders that are relevant for the development of the sustainability-oriented innovation in a natural way. I do not suggest that this happens by coincidence. Nevertheless, the analysis of empirical material does not provide any additional evidence to answer this research question.

Q: Which organizational capabilities are needed to engage stakeholders into sustainability-oriented innovation processes?

To answer my main research question, I suggest that external dialogue capability, internal coordination capability, learning process capability and pilot testing capability are needed to engage primary as well as secondary stakeholders into the development of radical sustainability-oriented innovations. In addition, based on the empirical material I suggest that depending on the case there are other capabilities that are applied. These include entrepreneurial spirit capability, organizational culture capability and stakeholder incentivization capability.

5.4. Limitations of the Study

In following Lincoln and Guba's (1985) advice, during the working process I constantly aim at agreeing with the opinions expressed by the interviewees in the empirical material and hence ensuring credibility. Furthermore, I try to ensure dependability by being careful and consistent throughout my work. Moreover, I formulate my findings so that the results are applicable to different settings (transferability) and interpret the empirical data in a logical and unbiased way (confirmability). Nevertheless, there are certain limitations in my study, which I discuss at this point.

Most crucial in my perspective is that I base my findings predominantly on existing primary and secondary data. Even though I have conducted two semi-structured interviews myself, the transcribed material is mostly relevant for my general understanding of the research context. The existing primary and secondary data offers rich description of phenomena experienced at the case companies. Nevertheless, I feel that it would have been beneficial to collect primary data directly from the case companies. Despite this, eventually I am able to present findings that are backed by existing literature as well as some emerging patterns.

By conducting a multiple case-study I agree that empirical evidence found across more than one case increases the generalizability of the study. However, some findings I present are based solely on evidence found in a single case. A larger set of cases would certainly increase transferability of my findings. I address and discuss this concern where necessary in my argumentation.

Conducting research from the viewpoint of a critical realist is strongly based on the interpretations of the researcher. I am conscious that my findings could be interpreted differently by other academics. However, by testing my results against existing literature I increase the applicability of my findings for the area of research. Moreover, I did not encounter any evidence that answers my third sub-question. This is something future research should address. I present my recommendations hereafter.

5.5. Recommendations for Future Research

With this study I contribute to the fields of organizational capabilities, stakeholder engagement and innovation. My aim is to bridge the gap between these fields. To address this challenge, I present a list of capabilities to engage stakeholders into sustainability-oriented innovation processes. I encourage future researchers in this topic area to further explore the connections between the different fields of research. Concretely, support of existing capabilities and evidence of emerging patterns will increase the popularity and importance of this field. Future research should take up the capabilities I encounter in individual cases and verify if they occur in different settings. In my study I analyze three cases out of a European research project. Future research should look at different company cases and consider smaller and larger organizations at the same time. Additionally, researchers in the field should not only focus on radical innovations but simultaneously test the applicability of the framework to incremental as well as really new innovations.

Driessen and Hillebrand (2013) suggest capabilities to deal with multiple stakeholder issues. As I did not encounter any specific evidence in my analysis, future research should take up this point and try to test empirical findings against the literature. Depending on the access to data and methodological approach, studies could focus solely on the capabilities suggested by Driessen and Hillebrand (2013). Alternatively, a combined study aiming at addressing organizational capabilities to engage stakeholders and dealing with multiple issues resulting from this engagement would be an invaluable contribution.

5.6. Concluding Remarks

Generally, more research in this topic area will increase the available amount of literature for interested academics. This adds to the current discussion in the field of research and promotes the idea for companies to develop organizational capabilities specifically for stakeholder engagement that fosters sustainability-oriented innovation.

With this study and my contribution, I take one step in this direction. Considering my personal interest in sustainability-oriented innovation, it was interesting to conduct deeper research in the fields that influence and are influenced by this development. Namely, organizational capabilities and stakeholder engagement. Consequently, I summarize my main findings.

First, I encountered a significant amount of evidence that suggest some specific organizational capabilities in the case companies. These are external dialogue, internal coordination, learning process and pilot testing. In addition, individual cases make use of further capabilities. For Rockwool, these are entrepreneurial spirit and organizational culture. In the case of Verbund the company uses stakeholder incentivization as additional, organizational capability.

Second, the described capabilities are build and developed over time. This process promotes stakeholder engagement. In all three cases the companies deal with a large number of different stakeholders. Considering the various inputs and requests from involved interest groups further strengthen the development of organizational capabilities. However, I did not encounter any evidence that suggests how case companies select and prioritize various inputs that result from engaging their stakeholders.

Third, I analyze the sustainability-oriented innovation process. Thereby, I find that for each case company the process stretches over a longer period of time. Moreover, stakeholders engage differently at various stages in the process. What would be interesting to see in future research is if the specific capabilities are already existing at the beginning or are rather developed along the process.

Summarizing these concluding remarks, my main findings support the idea that there is a strong link between the separate areas of research. I feel that my contribution adds to future discussions in the field of research and I am excited to see how the topic area develops in the years to come.

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Appendices

Coding scheme for KutsuPlus

First order coding	Second order coding	Theme building
try to make the threshold so low that car drivers want to change their mode of moving	questionnaire	External Dialogue
all the time we have had, we have all the time in the cars some questionnaire where they can put answers and collect, and follow them	research days	
research days - so that our persons are in the vehicles with, giving those formulas and they fill	interviews	
researchers are with in the buses and they follow what the customers are doing, and then also make some interviews later	observation	
observation	focus groups	
focus groups	plus/minus evaluation	
kind of observations where persons tried to order the trip and then find the bus stop, and then drive - and then we made some interviews afterwards	website and pages	
several internet questionnaire among those who had registered. We have their e-mail addresses and can send questionnaires	campaign for customers	
there is also a link where you can put your pluses or minuses, which you felt there during the trip	information on campuses	
customer feedback from several sources	support start using service	
shown them the website, and the different pages		
we even asked in some campaign for customers that.. or everyone, people: "How could you use KutsuPlus?" And we got 1 000 suggestions how to use KutsuPlus	internal venture	Internal Coordination
campaign		
we have used websites, and many web places for marketing	customer feedback different sources	Learning Process
focus groups and observation	customer wishes	
use a different methods and more	first rides	Pilot Testing
different and more ways to be wiser and check, and show.. and then correct, and show and then that kind of person, who wants to try something new		
internal venture, or start-up		
marketing work together		
information at campuses: screens and newsletters		
first rides, the first month the rides were chargeless		
customer wishes - they put in the screen and collect them		
promoting in some kind of occasions there or giving lectures or some presentations for some groups, and then supporting them to start to use the service		
multidisciplinary research project	focus groups	External Dialogue
focus groups where we, we divided end users to 5 segments	focus on end user side	
first focus groups	brand identiy of vehicles	
mental simulations.. trying to analyze how users would see the concept	surveys to users	
presenting how end user will see the concept (creativity in communication)	moderators in group	
cartoon presenting how the trip flow goes: from the beginning to the end	show design of vehicle	
helped us to understand the concept, but also to explain the concept better		
really key element of the success	mental simulation	Internal Coordination
to reflect that concept to user needs, that's really critical	creativity in communication	
you can see that (imagination of end product)	imagination of end product	
validate the concept and business viability out of that		
10 focus groups, and 3-5 persons in each	learn from user testing	Learning Process
we were wise enough to get a deal that HSL and Aalto didn't come as owners to Ajelo		
focus on end user side	Aalto pilot	Pilot Testing
the brand identity of vehicles - it's really.. they are using the colors of HSL (blue and white)	usability testing	
with a really dynamic concept and habits of public transport entity		
focus groups		
Aalto pilot		
surveys to the users		
so it was usability testing (or concept testing) before we launched		
closed testing		
we were like moderators in the group - trying to promote the discussion (be active part of the research)		
show design of the vehicle - like a branding - to people at street and asking "what kind of service is this?", "what kind of image does that give to you?		
fall in love too much to your concept before you test it with users and market		
it's really critical to test the idea with users, learn from that - not to be ... what is kuuro.. deaf?		
To the end users		

Coding scheme for Rockwool

First order coding	Second order coding	Theme building
task force, which should focus fully on developing new products	brainstorming	External Dialogue
because in the whole maker-setting is to take products, new thoughts, and try to do it - and especially what Michaeel is doing	sustainability conference	
brainstorming	be open about it	
sustainability conference where we told about our work	debate	
in my philosophy it's very important to test it right away	Facebook page	
but we succeeded and he succeeded to convince his boss that we should do it	close to customer	
they suddenly saw a CSR story telling. But Michaeel and me saw a real product	communicating	
very much prototyping.. and very much testing	questionnaring	
convinced me that the way we are working is right		
all the time being very open about it	task force	Internal Coordination
had a prototype, and debated .. and then back.. and develop more	convince boss	
a lot of experienced people in taking up and taking down stuff	see real product	
we asked for them on our Facebook page	show pictures	
"would you like to come and test the new solution?"	free space for workers	
Michaeel is working on this solution also for the Danish market	trust in workers	
show the pictures		
but now we have learned	learn	Learning Process
two solutions and then we grow into some kind of compromise between the two	discuss new experience	
and to each meeting we are discussing a new experience	test something which goes wrong	
small debates	re-developing	
prototyping		
close to our customers	test it right away	Pilot Testing
communicating about them, questionnaring about them, but also testing them	prototyping & testing	
here he was really ahead of his own company	step in and be inside	
invited them here to step in and be inside the hut, and so on	doing like it is real	
you're doing it like it was real	experimenting	
so when you come with something new and want to test it - it normally never fits the rules		
you have to test something, which goes wrong	ahead of own company	Entrepreneurial Spirit
it's not normal to have a header person like me, and now I'm focusing on building new products		
re-developing	part of own culture	Organizational Culture
intellectual property		
buy an IKEA kitchen and we will WITH YOU make the re-design		
give the developing department workers some free space		
trusting in your workers		
taking a part of the budget, which is for the workers to do new stuff		
start small		
part of their own culture		
experimenting		
ok, get out there, and have some fun	little video on festival's homepage	External Dialogue
we had 3-4 groups and every group had to come up with something	interview	
we were standing by the coffee machine and just talking, and then suddenly we had an idea	advertisement	
because we have talked to some other guys, girls, whatever..	people will see how it is running	
my job is to get some crazy ideas and get them out fast	write something about it in your university	
when I do something, they can never ... I'm too fast, so.. I'm in the market before they have seen it	honest about this thing	
own press people	show him the case	
before we get out there we will inform the management team in Rockwool		
we will do nothing from our side to promote them		
a really nice way to do a test with 50 tents out there, and see how it functions, how many are getting broke	inform the management team	Internal Coordination
all the kind of things you will learn about these 50 tents	we can play	
little video on festival's homepage	take break and just think about what we are doing	
interview with this couple who lived in Rockwool tent	free of all these product things	
the first tent that we made - it was not quite good.. it was too loose		
this year we have iron and then we have wood inside. It's more stable, more strong, yeah, but last year we had only this wool. So the new one is the iron	learn about these 50 tents	Learning Process
festival will buy this one, not with Rockwool on it, but with some kind of advertisement	last year we had only this wool	
we will learn them some.. to make their business	do the development ourselves	
we have to do the development ourselves	learning point	
this year we will have some instrument on it, and some people will see how it is running	learn after that it was not good	
learning point for us to make the tents stronger	things have to be learned	
for my crazy ideas the festival is good for testing	a lot of these investigation	
just to show the guys that if you do like this, then you will stop this smell and the pee		
that's me! I'm thinking all the time: "what could do the world easier, if we put some Rockwool inside" . That's the plan, all the time	test with 50 tents out there	Pilot Testing
that's the most funny thing I have in this job: get some ideas and get them out to the market	crazy ideas the festival is good for testing	

I don't know anything about building, and sometimes I think it's better to not know - because you can just do it, and you can learn after that it was not good.. but then you try again, and suddenly you have something that is very good	showing this prototype	
it would be nice if you will write something about it in your university, and it will come around, so the other people can talk about it and see it	freedom to show it	
especially with my boss asking "have you seen?" and I say "no". it's already nice to know before he sees it		
we have around 30....how do you call it?... fabrics? Around in the world, so we make Rockwool in all places around	standing by the coffee machine and just talking	Entrepreneurial Spirit
if you want to sell something you have to think like this	out-of-the-box thing	
these things have to be learned and they have to put Rockwool in the right container	enthusiastic guy	
we have made a lot of these investigation, so we can say that it's not.. it's not influencing allergic and cancer of course	job is to get some crazy ideas	
we are honest about this thing, so if we know something, we will do anything to getting it away or stop the production of this particular product	thinking all the time	
and that's novel in Rockwool.. I'm the guy.. outsider, or what do you call it.. I do the things in another way	get some ideas and get them out to the market	
I think it's 4 years ago when my director asked me if I want to do something else, and I said "aaah, I think it's a nice one", and then we started this 4 years ago	do the things in another way	
the beginning we had only 500m2, and now we have around 100000m2, so we can play		
to think a little bit what we use the money for	fast to react	Organizational Culture
sometimes it's also a good idea just to take the break and just think about what we are doing		
normally Rockwool is always fast to react		
I haven't yet seen any companies whom doing like Rockwool		
you have to be free of all this product things.... and only go down and get some crazy ideas		
I think they say if I just can get through with one idea per 5 years, or per 7 years, that will be nice		
this out-of-the-box thing, and make some crazy funny..perhaps good ideas, and make them real - that could be nice		
it could be fun if we had something like you in our company		
just we are showing this prototype twice in Denmark and know some companies called "Old bricks", who will make this		
there has to be this enthusiastic guy who has to take through the system... or out of the system in a new way		
you have to have this freedom to just get the thing done, then when you have something done - then you have to show it		
but I think it will take some time before people really find out what it is		
I had him out there also to show him the cases		
I'm on the site with him when he does all his innovation	testimonials	External Dialogue
but we actually do tend to give people freedom to find out what is going on	doing open innovation inviting them	
treated it in a much more open way, because we have nothing to lose	getting their feedback	
we are very open, as long as it's stonewool fibers	phone interviews	
"under the radar" - which is a managerial principle	information during festival	
we don't want to interfere. At all. We believe that the employees are smart enough to cope with it	tours	
all our creative innovations, all our break-throughs since 2008 have come through this way of working	interviews with refugees	
you have to set the scene, you have to make sure that you have a creative environment	massive information	
we have actually an account where we put approximately 10% of our external budget for free.. so that anyone having an idea can fund it themselves	opened door to universities	
but our employees do. They go there for trying these things out, and soon they blend in with people who have an idea	people were not biased	
then when they present it to us - it's not just a thought, and the communication thing is there, it's for real		
So I get to know about all the ideas, but I try not to interfere	on the site with him	Internal Coordination
what we call them must-do projects	open way	
try to work for these under-the-radar: saying that there's a lot of things going on, 10% of our time, and resources are down there	under the radar	
put it above the radar and allocate resources to really give it speed	employees are smart enough to cope with it	
it's all about the drive, the personal drive that is what makes an idea come into real life	creative environment	
we do what we call technology push. Then we do a testimonials after the real persons trying it out, and then we go back to the business showing the result of what was...the real customer	10% of our external budget for free	
our role is basically to stay out - most of the time. I just have this funny midwife role in-between	must-do projects	
what is driving innovation - that is the uncertainty	10% of our time and resources are there	
paradox, because if you have too much of that - it destroys everything	put it above the radar and allocate resources to really give it speed	
creative minds obviously have to be somewhat out of control	funny midwife role in between	
if you have too much management - you kill the motivation	driving innovation that is the uncertainty	

wow, fantastic platform for innovation

the change the process in itself was exciting, which is a story in itself

organizational culture has changed

I feel an extreme pride of being at Rockwool, and doing what they are doing
didn't even know it was on the festival before you were called up by journalists
why don't we use this as a kind of open innovation process
to see, to learn how do we do open innovation, and how far can we go in this way
figure a hut from somewhere ...Africa, warm country, catastrophic area.. they see the same design
we made a test this weekend - 10 minutes to raise it

it's about doing this open innovation inviting them in, get their feedback

two-three circles in the iteration process

they had phone interviews with some organizations, get the feedback of the requirements for these tents

lacking is still the input from the UN - organization taking care of the bigger refugee camps

a lot of information these days during the festival
and there are things that we don't know about
we have a few other people interested in seeing them, so we will have tours on Thursday and Friday
it's going to be very exciting to really have interviews with the refugees
that's the point here that most critical path about innovation is not about processes, it's about ..the human beings
really a living laboratory
they set the frames, and say "we have this problem"
they can do because they are a festival and they are non-profit
go there, see what happens, get the ideas - and then 3 years later maybe give money to these ideas
you can use Roskilde festival as a way to test it out
it's really about loosening up, and making sure that you know that you can actually be in control, but in another way
in 10 days we get a massive amount of information, plus we get the opened door to the universities

people were not biased at all. They would just simply say "this is crap" or "I don't like that"

that we will use every year to prove our core competence, and innovation. And for us - that is sustainability
innovation is somethings destroying other people's visions about the future, and their plans

it's about being responsible; and there is passion; and being entrepreneurial

creative minds have to be something out of control
fantastic platform for innovation
change the process in itself was exciting
didn't know it was on the festival
open innovation process
figure a hut somewhere
see the same design
living laboratory
set the frames
go there, see what happens, the the ideas
innovation destroys people's vision of future

back to business showing results of what the real customer says
learn how we do open innovation
iteration process

things we don't know about

the communication thing is there

test this weekend

Roskilde festival as a way to test

drive, the personal drive

being entrepreneurial

give people freedom

try not to interfere
too much management you kill the motivation

organizational culture

extreme pride to be at Rockwool
loosing up making sure you can be in control but in another way
prove core competence innovation
that is sustainability
being responsible
passion

Learning Process

Pilot Testing

Entrepreneurial Spirit

Organizational Culture

Coding scheme for Verbund

First order coding	Second order coding	Theme building
in einer eigenen Innovationsabteilung	market survey	External Dialogue
eine eigene Gesellschaft, die Verbund Solutions heißt	lead-user study	
Auftrag, neue Produkte und Services zu entwickeln, für den Gesamtkonzern	explain a lot to end user	
weil wir ja unterschiedliche Kompetenzen auch brauchen	be open about research project	
ob wir von denen etwas lernen können	big household survey	
Marktforschung	different questionnaires	
Pilotierung	lead-user workshop	
bei dem einen ist ein [...]-Gutschein dabei, und bei dem nächsten eine Versicherung	basic research	
Lead User-Studie	phone interviews	
Demonstrationsbetrieb	two day workshop	
dass wir erstens mal Kunden haben werden, dass wir die mit Fahrzeugen ausstatten, dass die so und so Ladeinfrastruktur bekommen und von den technologischen Entwicklungen profitieren	newsletter	
wir haben es eigentlich am Anfang nicht ganz so genau gewusst, was wir mit diesem Demobetrieb alles erreichen werden und können	active informing	
dass die Kunden gerne so Alles-Inklusive-Packages hätten	customer retention	
dem Endkunden sehr viel erklären muss, was er tut und damit ihm nichts passiert		
wild gesucht wird nach User-Erfahrungen	own innovation department	Internal Coordination
das haben wir dann umgesetzt in ganz konkrete Angebote, die wir dann diesen 25 Endkunden gegeben haben	own company	
die haben wir natürlich beauftragt, weil wir die Methodik einfach gar nicht sozusagen parat haben	no knowledge about methods	
Demonstrationsbetriebs	own working package	
neue Bedürfnisse herauszufinden, die wir in dem bestehenden Modell noch nicht sehen	decide as a whole group	
aus den Erkenntnissen Geschäftsmodelle zu basteln	a lot of responsibility to working packages	
wir haben ein super Angebot, Sie können Teilnehmer bei einem Forschungsprojekt werden, Sie leasen ein Auto, das dann gefördert ist	decision making power	
die Kunden haben von Anfang an gewusst, sie sind Teil von einem Forschungsprojekt, und Sie werden auch mal mit Fragen belästigt, und ich hätte auch gerne Rückmeldung, wenn Ihnen das nicht passt	include rest of firm	
dass die Reichweitenangst damals doch noch so groß war	support from colleagues	
ein eigenes Arbeitspaket gehabt	commitment from board	
relativ große Haushaltsbefragung	convincing about new project	
unsere eigenen Testfahrten analysiert	additional work	
GPS-Tracker	free hand by management	
verschiedene Fragebögen	distribute knowledge	
alles was ich, oder was wir in diesem Demobetrieb gelernt haben, haben wir dem Pilot und der Firma der Smatrics weitergegeben	lighthouse project	
sehr aus unseren Fehlern gelernt. Oder ja, aus den Rückmeldungen der Kunden	develop business model and services	
ganz normale Bedürfnisse, die auf Kundenseite kommen	linear process	
wenn Sie das Auto jetzt Probe fahren wollen, dann müssen sie nachher einen Fragebogen ausfüllen, und sie haben einen USB-Stick als Geschenk bekommen		
Fahrsicherheitstrainings verschenkt	different competences	Learning Process
man hat die Lead-User-Studie durchgeführt, und dort den Input abgesaugt	learn from clients	
Lead-User-Workshop	not sure at the beginning	
grundlegenden Bedürfnisse von Basis-Recherchen, von Telefon-Interviews	build business model from knowledge	
wir haben das dann noch einmal geschärft, mit einem Lead-User-Workshop	GPS tracker	
zweitägigen Workshop	transfer learnings to Smatrics	
wir haben viel im Konsortium als ganzes entschieden	knowledge was not there	
sehr viel Verantwortung auf den einzelnen Arbeitspaketen	employee training	
sehr viel Verantwortung, aber auch sehr viel Entscheidungskompetenz überlassen haben		
der Kern, die da den Demobetrieb organisiert haben	piloting	Pilot Testing
wo man auch andere, ganz andere externe Partner braucht, damit es wirklich funktioniert	demonstration testing	
ich glaube schon, dass es so was braucht, die neue Themen aufgreifen können, weil man nicht alle Themen, die sehr, sehr neu sind, unbedingt in bestehende Business Units einfach werfen kann	own test drive	
Einbindung der bestehenden Gesellschaften braucht		
weil das Wissen nicht da war	offer voucher and insurance	Stakeholder Incentivization
mit der Unterstützung der ganzen Kollegen, die dafür notwendig sind	offer cars to clients	
	offer all inclusive packages to clients	
Commitment im Prinzip des Vorstands	concrete offerings	
Super, ein neues Projekt, eine neue Idee	great offer	
also alle hatten zusätzlich Arbeit damit	USB stick as present	
Freifahrtschein vom Management	driving safety training vouchers	
wir haben an dem Projekt insgesamt sehr viel gelernt	support (gov)	
Gesamtpackage		
Betreffzeile von dem Newsletter war schon „Förderung von Elektroautos"		
haben wir sie auch aktiv informiert natürlich, weil das ja eine Vertragsänderung war, oder wie gesagt eine Übernahme		
Förderung gab es vier Jahre		

eine Geschichte, die wir dann halt anders gelöst haben		
das zeigt eben auch, dass der Demobetrieb, das waren Challenges, total		
Mitarbeiter zu schulen		
Wissen zu verteilen		
Unterschied zwischen Demobetrieb und jetzt dem realen Smatrics-Kunden		
bewusste Entscheidung, die mit Kundenbindung zu tun hat		
Leuchtturm-Projekte		
zuerst ein Business Modell und Services entwickelt und dann der Demonstrationsbetrieb bis jetzt		
linearer Prozess		
Lead User Workshop		
Demonstrationsbetrieb, den haben wir dann ja an uns gerissen		
Haushaltsbefragung in Vorarlberg		
Organisationen sagen, wir können nicht mehr inhouse nur innovieren	not only inhouse innovation	External Dialgoue
Bedürfnisse am Markt mit sehr speziellen Methoden, die wir mit Wissenschaftlern entwickelt haben, uns anschauen	special methods to determine market needs	
Lead User Workshops sind eine der Methoden, die wir anwenden	lead user workshop	
einen Call, für den Bereich Elektromobilität, wie das vor ein paar Jahren auch so modern war	open call for electric mobility	
wenn es in eine neue Technologie hineingeht, sehr genau die User-Bedürfnisse anschauen	take initiative and engage in discussion	
wir nicht zufällig auch initiativ gewesen wären, und da Gespräche gesucht hätten	in-depth interviews	
Bedürfnisse frühzeitig auch aus Tiefeninterviews erkennen kann	conduct 130 interviews to define 29 LU and select 14/15 for WS	
in mehr als 130 Interviews 29 Lead User identifiziert, und davon soweit ich mich erinnern kann, die Hälfte, ich denke 14, 15, für den Workshop vorgeschlagen	interact with user	
schauen uns User vorher an, User-Communities, wir posten dort auch Fragestellungen, damit sich interessante Leute selbst identifizieren	communities	
Broadcasting, wenn man einfach eine Frage stellt, und breit streut	broadcasting	
Pyramiding, wo man eben Interview macht, mit „verdächtigen" Wissensträgern, und sich dann die hochhangelt, bis man zu den wirklich hochinnovativen kommt	pyramiding	
analytisch diese Themen runterbrechen und schauen, in welchen anderen Feldern gibt es noch ähnliche Themenstellungen	german speaking workshop	
er hat aber auch gleichzeitig selbst schon Ideen, wie er das lösen kann	open innovation methods	
Lösungen wesentlich besser sind, wenn das nicht auf Honorarbasis passiert	radical innovation steps	
Lead User Workshop, der wirklich deutschsprachig war		
Lead Experts, manche haben, einzelne Teilnehmer haben einen Expertenstatus, am Rande, aber Lead User stehen im Vordergrund	innovation is still something very new	Internal Coordination
auch im Fall von Verbund waren mehrere seitens des Verbundes dabei	only recently established innovation department	
wir ihnen in dem Sinne sehr geholfen haben	integrate topic innovation	
für ein Elektrizitätsunternehmen ist Innovation noch immer etwas sehr neues	discuss on decision of direction	
Verbund, das ist ein Unternehmen, die hatten bis vor kurzem noch keine Innovationsabteilung	ownership in company	
Thema Innovation integrierter anzugehen war zur damaligen Zeit relativ neu	personal openness	
vom Unternehmen her war es sehr neu und mit vielen Unsicherheiten behaftet, in so ein Innovationsprojekt hineinzugehen	openness and goodwill from company side	
Open Innovation-Methoden helfen, die Flop-Rate beim Innovieren, und das ist ein wesentliches Problem, zu senken	one of the first ones	
Unternehmen wirklich auf Experimente einlässt, weil nicht alle Kunden haben bereits Erfahrungen mit der Lead User-Methode, so auch der Verbund	presentation of each phase and final concept	
wir probieren mal was Neues und wir lassen uns auch hier bewusst darauf ein, einen neuen Weg zu gehen. Auch wenn das Unsicherheiten mit sich bringt		
wir haben uns immer wieder alle paar Monate eng abgestimmt, und die wesentlichen Richtungsentscheidungen eben dann auch ausdiskutiert	closely look at user needs	Learning Process
Ownership im Unternehmen	similar topic	
ja wir machen ein großes Konsortium, wir bewerben uns mit EMPORA bei dieser Ausschreibung, und wir gehen da eine ganz neue Schiene	lead experts	
persönliche Offenheit, die kommt da natürlich noch dazu. Das ist auch sozusagen eine Einstellungssache	several people from Verbund	
man gibt das Heft dann wirklich den Lead Usern in die Hand	a lot of uncertainties	
Lead User-Methode eignet sich nicht für inkrementelle Innovationen, sondern für radikale Innovationsschritte	engage in experiments	
sehr viel Offenheit und Wohlwollen von Verbund-Seite uns gegenüber da war	try something new	
gegenüber anderen Energie- und Stromanbietern dann schon eher innovativer. Auch mit der neuen Abteilung	follow completely new path	
aber es ist halt etwas sehr Neues, und in der zeitlichen Schiene waren die sicher eine der Ersten		
es gibt von jeder Phase eine ausführliche Präsentation, und es gibt auch das Schlusskonzept	not on paid basis	Stakeholder incentivization
Verbund ist ja Projektleitung von EMPORA	regular discussions	External Dialogue
Folgeprojekten regelmäßigen Austausch, sage ich mal, als Arbeitspaketleiter, also im Prinzip ist das eine Leitung eines Arbeitspaketes, das ich da hatte	data from model regions	
Daten aus den Modellregionen, also direkt mit den Erfahrungen der Nutzer in der Nutzung mit Elektrofahrzeugen	impression after first usage	

jetzt steigen Sie ein in das Auto, jetzt fahren Sie einmal, und wie schaut jetzt die, also wie ist der Eindruck unmittelbar nach der ersten Nutzung
1.000 Haushalte haben wir befragt, und 100 davon halt detaillierte Haushaltserhebung gemacht

Szenarien durchgespielt

haben wir 100 Haushalte detailliert die, von allen Haushaltspersonen die Wege erhoben
prozentual hier, dass sehr viele Haushalte das wahrnehmen können
Simulationsmodelle. Gefühlt wie ist das Mobilitätsverhalten, unsere Modelle, und hat mit Parametern gespielt wie Reichweite, technologische Annahmen getroffen
für die Erstnutzer, weil wir konnte nicht viel über das Ladeverhalten, mit Kurzfragebogen befragt
erfahrenen Nutzer mit einem Langfragebogen über die Nutzung von Elektrofahrzeugen
allgemeine Haushaltsbefragungen durchgeführt
von diesen 140 glaube ich in Vorarlberg wurden detaillierte Haushaltsbefragungen gemacht, detaillierte Wegeaufzeichnungen
in Vorarlberg allerdings nur die Haushalte auch mit GPS-Geräten auch ausgestattet
Erhebungen mit den Erstnutzern und immer wieder, oder Anforderungs-Workshops in dem Projekt selbst, das wurde [...] während des Projekts
alle Nutzer die wir bekommen, das ist ein Privileg in diesem Fall ja, mit einzubinden in die Studie
im Rahmen dieses Projektes wurden eben Testfahrten durchgeführt, und diese Testfahrten haben wir mit Fragbögen begleitet
okay, ich bin jetzt ausgestiegen aus dem Fahrzeug oder bin gerade fertig mit der Fahrt, war das eher positiv, oder ein negatives Empfinden
sie haben sich zwei Demofahrzeuge angeschafft, und haben ihre Kunden, die Verbund-Kunden, eine Stunde Fahrt vormittags oder nachmittags kostenlos testen lassen
Image-Kampagne
Wertschätzung zu zeigen, und auch auf die Wichtigkeit des Themas hinzuweisen
da hat es schon regelmäßigen Austausch gegeben und Diskussionen

Informationen darüber sind auch aus diesem Arbeitspaket rausgekommen

zu Beginn einen Verantwortung-Workshop gegeben hat

ein Konzept, das man parallel zu dem ganzen, zu dem ganzen Projekt
Modellregionen-Workshops gegeben, an denen wieder Modellregionen teilgenommen haben und Projektpartner
hat man wieder diskutiert und das mit reingebracht
aber da hat es auch klare Strukturen und Meeting-Strukturen gegeben
also diese Kommunikationswege sind aufgebaut worden und ich habe nicht das Gefühl gehabt, dass hier nicht kommuniziert wird
dass wir uns nicht stützen auf ein einziges Befragung, die verzerrt sein kann und subjektiv.
Sondern dass wir auch versuchen quantitative Daten zu messen, das heißt, diese Ergebnisse unterstützen mit GPS-Messungen, mit tatsächlichen, gemessenen Werten, und dann daraus die Schlussfolgerung ziehen
Plausibilitätschecks zu machen
das zu untermauern, quantitativ festzuhalten und wirklich die Verzerrung ein bisschen zu entzerren. Sagen wir mal so
die Herausforderung ist immer, so gut vorbereitet zu sein, dass es reibungslos funktioniert
dritte Phase des Projekts anläuft

ganz klar die Bedürfnisse eigentlich. Also die Lösungen setzen wir drauf auf

reiches Set an verschiedenen Erhebungsmethoden bei uns
wir arbeiten auch sehr viel mit Fokusgruppen, auch da gibt es ganz innovative Integrationsmöglichkeiten von Usern

1,000 households surveyed

100 detailed survey
collected driving routes of all people in households
short questionnaire (first user)
long questionnaire (experienced)

general household survey (140)

GPS tracker for households
integrate in study
image campaign

regular exchange and discussions

model region workshop

needs

different modes of inquiry

focus groups

innovative stakeholder engagement methods

project lead of EMPORA — Internal Coordination
working package
responsibility workshop
clear organizational and meeting structures
establishment of communication paths

reduce bias to qualitative data
be prepared for smooth functioning

scenarios — Learning Process

simulation models

discuss again and include experience

measure quantitative data

plausability checks

test drives with questionnaires — Pilot Testing
positive or negative feeling straight after the ride
free testing of demo vehicle

show appreciation — Stakeholder Incentivization
tourist tour of Vienna
driving security training
financial incentive