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**A paradigm shift? User-centred business
model design for energy efficiency
services**

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Preface

As an Innovation Sciences student you are bound to encounter the promise of technology and the complexity of making it succeed. Many promising and often sustainably favourable technologies fail to break through in our society or enter our mainstream routines. Studying these introductions and transitions of technology requires multi-disciplinary acrobats; the study often breeds dreamers and 'in dreams begin responsibilities'. With this thesis I hope to shed light on ways to bring useful technologies, such as energy efficiency measures, to the market and the public and make this world a slightly better place.

This thesis will discuss the way businesses learn from us, the user, and how they adapt their ways of delivering us value. First a theoretical overview is given, based on a literature review. Secondly the context in which the analysed businesses operate is set. Finally the businesses and their business models are discussed and their process of interacting, learning and adapting is reflected upon.

The process of delivering this thesis has been a long process of ups and downs. A quick start with abundant literature and interesting interviews were promising; processing these however resulted in RSI (Repetitive Strain Injury), a handicap that turned out to be time consuming but mainly frustrating. Considering this, I am glad that this page will be the last to write in the near future.

The thesis as you see it in front of you would not have been as it is without some much appreciated support. First I would like to thank my supervisor, Boukje Huijben, for all the thoughts, suggestions and time put into my supervision and stimulating me to always take it one step further. Secondly I would like to thank Ruth Mourik, my daily supervisor at DuneWorks, for showing me to always be critical and giving me a glimpse into the practical world of researching which will hopefully help in my future career. Thirdly I would like to thank Geert Verbong for his feedback and for having me ask the seemingly straightforward but important questions.

Besides my supervisors I would like to thank my peers, friends and family for their constructive thinking and assistance, especially in times when I needed help most because of RSI. Without your help finishing this thesis would simply have been physically impossible. Finally, Lotte: thank you for the unconditional support and reflective conversations at any hour.

Enjoy reading,

Joost Tolkamp

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List of abbreviations

ACM: Authority for Consumer and Market	SDL: Service-dominant Logic
B2B: Business to Business	SME: Small and Medium-sized Enterprises
B2C: Business to Consumer	STEP: Stimulating measures for Energy Performance
BNZ: Ministry of Internal Affairs	TKI: Top-consortia for Knowledge and Innovation
CEO: Chief Executive Officer	WA: Random Write-off
DSO: Distribution System Operator	WBSO: Law to Stimulate Search and Development Work
EED: Energy Efficiency Directive	
EIA: Energy Investment deduction	
EPC: Energy Performance Coefficient	
EPI: Energy Performance Index	
ESCo: Energy Service Company	<i>The business model</i>
EZ: Ministry of Economic Affairs	VP: Value Proposition
FEH: Fund Energy saving Rental sector	CH: Channel
I&M: Ministry of Infrastructure and Environment	CS: Customer Segment
IEA: International Energy Agency	CR: Customer Relationship
MLP: Multi-Level Perspective	KP: Key-partnerships
NGO: Non-governmental organization	KA: Key-activities
PDL: Product Dominant Logic	KR: Key-resources
RVO: Netherlands Enterprise Agency	C: Cost Structure
	RM: Revenue Model

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1. Introduction

Amongst scholars it has become generally accepted that a transition towards a sustainable low carbon energy system is required. Pressing climate issues have turned the eyes of many towards minimizing the use of fossil fuels and switching to renewable energy sources. Besides greening the energy supply, a significant part of the transition is found at the demand side, where reduced and more efficient use of energy is aimed for. Energy efficiency measures, which aim to decrease energy demand, have shown to have great potential. These measures are defined as measures that reduce the amount of energy required for products and services (Behrangrad, 2015). In fact, energy use avoided through energy efficiency by member countries of the International Energy Agency was larger than actual demand met by any other single supply-side resource, making it the 'first fuel' in 2010 (IEA, 2014). Within industry as well as the residential sector there are enough options available to reduce energy demand, all profitable well within the lifetime of the measure taken (IEA, 2014). Despite this, the untapped potential is still huge. The market uptake of these energy efficiency measures is not going as fast as desired and needed to sufficiently mitigate climate change and stay within boundaries that limit global warming to two degrees (IEA, 2015). Yet, why is the market for energy efficiency not reaching its potential and how can we improve this?

For energy efficiency measures it looks like proven and novel technologies are not sufficiently brought to the market. At a point where technologies seem sufficiently developed to reach drastic energy efficiency improvements radical change might not be achieved by technological innovation but rather by social innovations (Vandevyvere & Nevens, 2015; Sabatier et al., 2012). Boons and Ludeke-Freund (2013) argue that the development of novel business models could help to tackle the issue. They frame a business model as a means to bring a technology to the market (Boons & Ludeke-Freund, 2013). Novel business models might help bring supply and demand for energy efficiency closer to each other. Business models are traditionally used in marketing to conceptualize the way a firm organizes his business (De Reuver et al., 2013). In this research the business model will be framed as a rationale of how an organization intends to create, deliver and capture value (Osterwalder & Pigneur, 2010). Focussing on the concept of business models further refines the question regarding the lack of market uptake: can *novel business models* help to improve the market uptake for energy efficiency?

As energy efficiency focusses on the demand side, the end-user has a pivotal role; not only in the purchasing decision but also in the use of a service or product. This thesis will focus on novel business models that take this into account. Business models that focus on the end-user and take a user-centred perspective will be analysed as well as more technology oriented firms with less focus on the end-user to show differences between these approaches. Within the field of business model development user-centred business modelling, focussed on value co-creation with the end-user, is a new area of interest. Vargo and Lusch describe a transition in the ways of thinking within firms, leading from product dominant business logic to service-dominant business logic (Vargo & Lusch, 2004). Firms reasoning with service-dominant logic tend to interact and involve the user more in the process of value creation; they often operate with a more user-centred approach (Vargo & Lusch, 2014). This transition to service oriented business models will be a central theme. The topic of interest thus lies in user-centred business models and their possible effect on the market for energy efficiency services.

Looking at a topic of which a lot of knowledge is still lacking demands an explorative perspective. This results in the following research question:

What are user-centred business models and how can these business models facilitate a better market uptake of energy efficiency measures?

The literature review that has been the starting point for this thesis shows that not a lot is known about user-centred business models, how firms interact with end-user or how to involve the end-user in the business model. The suggestion is made that different phases of development of the business model are important and that different types of user interactions exist. What these phases and types are and how they relate to user-centred business models remains the question.

Furthermore, research suggests that context can be an important influence on the business model (Huijben & Verbong, 2013; Provance et al., 2011). These findings, which will be discussed more thoroughly in the following theory section, lead to the following sub-questions:

SQ1: “In what phases of development do firms interact with the end-user?”

SQ2: “What types of interaction and involvement can be distinguished in the business model?”

SQ3a: “How is user involvement designed in the business model...”

SQ3b: “... and how does it influence the business model ex-post?”

SQ4: “How does context influence the development and implementation of user-centred business models?”

By answering these questions this thesis aims to provide contributions to the field of business models and more specifically user-centred business models. The thesis shows how the user can be involved in a business’s attempt at creating a value proposition and business model, and what the implications for the business model are when a user-centred perspective is chosen. This thesis also has practical empirical contributions to the field as this thesis was part of a larger research of the International Energy Agency (IEA) called IEA DSM Task 25, which aims to disseminate its knowledge to entrepreneurs and policy makers via multiple channels, e.g. blogs, policy reports and practitioners’ workshops (IEA, 2014). Insights from this thesis will be added to these workshops and other reporting and can be applied in practice.

The IEA DSM Task 25 aims to find new business models to increase the market uptake of energy efficiency services with a focus on the residential sector and SMEs. The Netherlands is one of six countries¹ involved in the research. The full research in the Netherlands was performed by DuneWorks, Ideate and Eindhoven University of Technology. Researchers from these parties have had important contributions to the background and theory at the foundation of this thesis: an example is the classification of categories within the field of energy efficiency. Five categories of business models could be distilled: retrofitting, lighting, heating solutions, smart solutions and total solutions. The broader research was financed by the IEA Task and will be referred to as ‘Task 25’.

The remainder of this thesis will be structured as follows: the next section will discuss the concepts and theories which form the foundation for the thesis and its results. Furthermore, a short recap of the findings of the literature research that preceded the research is given; this review shows the gaps in the literature and justifies the sub-questions stated above. Chapter three will describe the research methods used to carry out this research. Chapter four will discuss the context in which the firms and

¹ Partners involved in IEA DSM Task 25: Austria, European Copper Initiative, Canada, The Netherlands, South-Korea, Sweden and Switzerland

their business models find themselves; amongst others cultural and political influences are discussed. Chapter five will describe the cases in detail and discusses user-interactions and contextual influences on the business models. Chapter six will provide an overview of the implications that the findings discussed in earlier chapters have in a more integrated analysis. Chapter seven will finally present the conclusions of the research and provides a scope for further research.

2. Theory and concepts

The following sections will describe the theoretical notions and concepts that this thesis is based upon. First the concept of a *business model* is explained more thoroughly as it is the unit of analysis and needs to be understood. Secondly the Multi-Level Perspective (MLP) is described to provide the necessary context in which firms operate their business models. Thirdly the transition in dominant business model logic from product to service, which is occurring, is described. This transition strongly relates to user-centred approaches and is thus a relevant development in the management field. Finally the available literature on user involvement and interaction in the business model is discussed.

2.1 The business model

Business models have become a mainstream concept to describe how companies or organizations intend to create and capture value from providing a service or product for customers (Zott et al., 2011). Moreover, a business model can be used to create a competitive advantage as it is one of the aspects that can differentiate firms serving the same customer segment (McGrath, 2010). This is for instance done by experimenting and learning about the user (Zott et al., 2011). Linking business models to innovation is a relatively new area of research and the topic still has a lack of consensus on its concepts (Zott et al., 2011). For example, the business model has been referred to as an architecture, design, pattern, plan, method, assumption or statement (Morris et al., 2005). The definition of a business model by Osterwalder and Pigneur will be taken as a starting point, as their definition and business model canvas are widely used in scientific literature and business. As mentioned above Osterwalder and Pigneur pose that “*a business model describes the rationale of how an organization creates, delivers and captures value*” (Osterwalder & Pigneur, 2010); a definition that is derived from Osterwalder’s well cited ‘business model ontology’ (2004).

The business model canvas (fig. 1) is a framework used to analyse the business model of a firm (Osterwalder & Pigneur, 2010). Same as for the term business model, there does not seem to be full consensus on the components of which the business model and thus such framework should exist; different articles have an overlap in their definitions, but differences exist regarding which factors are included. Whereas McGrath (2010) speaks of a business model that consists of a central unit of business and other ‘key metrics’, Osterwalder and Pigneur (2010) are more explicit in opening up the black box; a reason why it can be more suitable for academic research. Osterwalder and Pigneur define nine building blocks of the business model (Osterwalder & Pigneur, 2010). Boons and Ludeke-Freund (2013) describe in their review of business model literature that there is consensus on the four main parts of the business model: the value proposition, supply chain, customer interface and financial model (Boons & Ludeke-Freund, 2013). The business model canvas not only describes the commonly mentioned four parts, but continuous to make the model more concrete. Osterwalder and Pigneur propose the following: as a technology or service is inherently linked to an end-user the firm needs to define a *customer segment* which it will serve. The needs of the customers are satisfied by a certain *value proposition* which states the bundle of products and services that actually create value (Osterwalder & Pigneur, 2010). Value is not present in a product or technology, but in the generated experience of using it (Vargo & Lusch, 2004). A value proposition should thus describe a job to be done and how this creates value for the end-user. The user wants more than just a product, rather a solution to a perceived need (Teece, 2010). This value proposition is delivered to the customer segment through communication, distribution and sales *channels* as visible in figure 1. This interaction builds up a *customer relationship*, which can be strong and personal or very minimal depending on the firm’s choices (Osterwalder & Pigneur, 2010).

When a value proposition is successfully delivered it generates *revenue streams*. However, a firm needs to be aware of the *key resources* it will need to deliver its proposition. These resources can be physical, intellectual, human or financial (Osterwalder & Pigneur, 2010). Furthermore, the *key-activities* describe the most important activities engaged in to make the business model work. The model also needs *partnerships* that are carefully chosen and created to reduce risk and be able to appropriate scale benefits; this can also help to acquire missing key resources or key activities that cannot be done by the firm itself. After all blocks are identified the *cost structure* is easier to define as all costs incurred to operate the business model should be clear (Osterwalder & Pigneur, 2010).

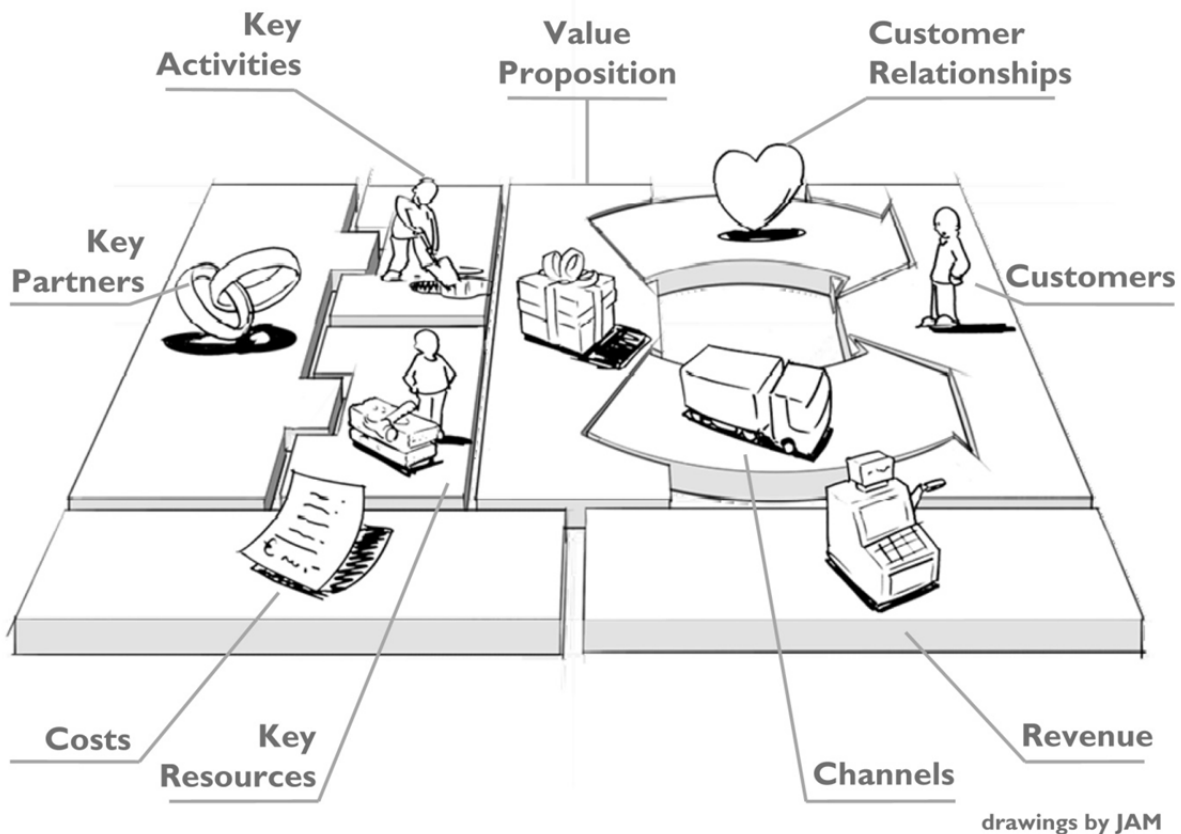


FIGURE 1: THE BUSINESS MODEL CANVAS (OSTERWALDER & PIGNEUR, 2010)

The business model will be analysed in relation to the MLP; a sociotechnical approach to systems and transitions. The framework, which has an evolutionary background, and the role of business models in it, will be discussed.

2.2 The multi-level perspective

Sociotechnical approaches to system changes look at the role that technology and technological innovation play in fulfilling a societal function. These approaches also emphasize that other, social factors, play a significant role in the sociotechnical system (Geels, 2004). Developments in the field of energy efficiency occur in a complex system. Especially the development of novel business models and the tension between this novelty and the dominant logic can be understood well when applying a more holistic view. Applying a holistic systems perspective such as the Multi-Level Perspective (MLP) could thus prove to be a useful instrument to analyse a transition and the multiple dimensions related to it. This section will discuss the MLP to give the necessary understanding of the complex situation we are dealing with.

The MLP divides a sociotechnical system into three levels; the macro-level called the landscape, a meso-level called the regime, which is the contemporary system, and a micro-level, called the niche. For a transition, or a shift in regime, in the system to occur large-scale changes in the way societal functions are fulfilled have to be made (Geels, 2010). Pressures can lead to changes in the way a societal function is fulfilled. These pressures can come from the landscape, which consists of a set of deep, structural trends and developments in the sociotechnical environment. When these trends are not aligned with the existing regime they potentially open up windows for change, opportunities for niche actors. In the case of energy efficiency macro political targets and guidelines, such as the energy efficiency directive (European Union, 2012), can steer firms and their business model in a certain direction. When analysing the business model the context of the firm should thus not be forgotten (Provance et al., 2011; Huijben & Verbong, 2013; Huijben et al., 2016). The effect of context could differ for user-centred business models. User-involvement could for instance be supported or prevented by financial measures or legislation. This led to one of the sub-questions described above: "How does context influence the development and implementation of user-centred business models?"

Besides the sociotechnical landscape there is the meso-level, called the sociotechnical regime. As defined by Geels (2002), 'the sociotechnical regime refers to a semi-coherent set of rules carried by different social groups' (Geels, 2002, p. 1260). These rules align the activities of social actors within the regime and in this way account for the regime's dynamic stability (Bidmon & Knab, 2014). In essence it represents the dominant way that a societal function is fulfilled and how this works in a self-supporting way; it is resistant to change. This resistance is embedded in several functional units within the regime (i.e. industry, policy, science, markets, user preferences, culture and technology) which are tuned for a specific system (Geels, 2002). As the contemporary system also influences novel business models it will be described in the context analysis (Chapter 4). Also business models can be part of this dominant structure. These rules and structures ensure a lock-in to this situation as novelty does not align as well with the other functional units; to overcome this disadvantage novelty needs a protected space to grow and be empowered to compete with the regime.

This is the function of the third and micro level called the niche; the niche is a protected space where novelty is created and nurtured (Geels & Schot, 2008) (Smith & Raven, 2012). Projects in this micro-level are often subject of research as it is more suitable for experimentation than the regime (Raven R., 2005). After experimentation a dominant design could emerge that tries to compete with the existing regime and potentially create new user practices within it. Most energy efficiency measures are either novel niche technologies or technologies that failed to make it to the regime level. When niche technologies are adopted by the regime or when they replace a regime technology a transition is occurring.

Business models can also be understood in terms of the MLP. Novel business models, just like novel technologies, for instance tend to find their origin in the niche level. Thus more radical technological and business model innovations are created and nurtured there (Bidmon & Knab, 2014). In this thesis, radical changes in the business model are referred to as changes that affect the daily routine in the firm and have an effect on multiple business model components. Non-technological innovations such as business models, as an analogy to technological innovations, have to compete with the dominant and mainstream business models in the regime. Business models in the regime level can be conceptualized as the dominant business logic. Firms tend to do their business with a certain business model and strategy in mind; in the regime this logic tends to be matched with other aspects of the regime. This way the regime stakeholders easily identify the value that other firms offer (Bidmon & Knab, 2014). However, this dominant business model logic is changing. The next section will discuss this shift in business model logic.

2.3 A shift in business logic

For decades the dominant business logic in western countries has been product dominant. From this goods-centred perspective the focus is on tangible assets (products) and transactions in which value is found (Vargo & Lusch, 2004). Firms tend to focus on minimizing costs while maximizing outputs; the user is a means to capture as much value from as possible. This dominant logic has evolved over these last decades, more and more towards the service-dominant logic (Vargo & Lusch, 2014). This logic goes beyond services that add-value to a good or sectors like healthcare which are typically characterised as service industries. Vargo and Lusch define services as “*the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself*” (Vargo & Lusch, 2004, p. 2). This definition includes the traditional views of services, but also goes beyond it. It captures the essence of how businesses create value for their users. Service-dominant businesses tend to go beyond cost minimizing or small add-on services; they aim for value maximization, not only for the firm, but also for involved stakeholders.

The phenomena of becoming more service-dominant and creating value through service-led strategies is often called ‘servitization’ (Story et al., 2015). This is visible in many sectors. Examples are successes like telephony through service contracts or platforms like airBnB and Netflix (Neely, 2014). Many of these tend to move away from the physical product and offering the job or service that users want to experience; it’s not the tangible hard-copy movie that creates value, but watching and experiencing it. Research on the service-dominant business logic focusses on general management (Vargo & Lusch, 2004; Neely, 2014); the field of energy efficiency is not specifically analysed. There are however reasons to believe that the same transition to service-dominant logic is occurring. Energy suppliers are for instance changing their business model. This move might be driven by context factors such as fierce competition, low margins and the Energy Efficiency Directive; these influences are described in the context analysis (see Chapter 4). In this way context can thus (indirectly) influence the role that users are attributed in the business model, this context requires investigation and is discussed in this thesis.

Among service-dominant firms many use a user-centred approach, taking the user and its needs as a starting point (Vargo & Lusch, 2014). Even though there are many overlapping aspects these terms are not synonyms. A dominant logic represents a broad frame of reference and way of thinking that a firm uses; user-centred design in contrast is an approach that firms can use. The next section will discuss this approach and the involvement of the user in the business model.

2.4 The user-centred approach

User-centred design has become a popular term that originated in the field of human computer interaction (Preece et al., 1994). It is seen as a philosophy for design, in first instance meant for soft- and hardware development. A first step in focussing on the end-user during design was taken and has become more important by the years. User-centred design was all about “*incorporating the user's perspective into the development process in order to achieve a usable system*” (Maguire, 2001). This was done by involving the user in design, receiving feedback to improve the system iteratively and using multi-disciplinary teams to go beyond a merely technology reasoning. This approach can have multiple benefits and can help in the design process; user involvement and participation was also found to be positive for social acceptance of a product or service (Sauter & Watson, 2007; Raven et al., 2009).

User-centred design applied to the business model in a way still resembles this approach. It aims to offer a value proposition well-tailored to the needs of the end-user through interaction with the users (Hienerth et al., 2011). Furthermore, these values go beyond functional and economic benefits in the

product itself as, according to Vargo and Lusch (2014), value is created in use; the user is not a mere recipient of a product or technology (Rohracher, 2005). Value creation is an experienced process which involves the firm as well as the customer. Emotional, social, ethical, and environmental values thus become more important (Grönroos & Voima, 2013). Think of the values Netflix offers compared to purchasing the hard-copy DVD². Interacting with the end-user and involving him or her in the business model helps with finding out these needs, especially when these are intangible and hard to communicate (Cui & Wu, 2015). Providing a more compelling value proposition could help the market for energy efficiency. The creation and use of user-centred business models could thus be a means to bring better aligned services and technology to the market compared to traditional business models. Hienerth et al. (2011, p.347) define a user-centred business model as “*a business model designed to allow, and even trigger, involvement from users in activities at all stages of the supply chain.*” This again emphasizes that these business models ought to involve users in phases beyond design. The use-phase could for instance be important to learn from the way a product or service is used and the effect of energy efficiency measures become apparent (Wever et al., 2008). This led to the question: In what phases do firms interact with the end-user?

Another term that requires definition is co-creation. Like user-centred design, co-creation is an approach a firm can use; in this sense it differs from service-dominant business logic as the latter is a broader strategy and form of thinking. Changing the broader frame of thinking has more impact on the firm than applying an approach such as user-centred design or co-creation (Vargo & Lusch, 2014). In fact, applying these approaches is often a result of being service-dominant as a firm. In contrast, firms that use product dominant logic as a frame of thinking more often take a technology driven approach. The term co-creation is abundantly used, yet sees various definitions: co-creation often stems from the notion that the firm and user engage in joint problem solving; they do this together and value is created in this interaction (Aarikka-Stenroos & Jaakkola, 2012; Grönroos, 2011). Co-creation in this thesis always refers to the firm creating value together with another stakeholder, often the end-user. This stakeholder then takes responsibility for a part of the firm’s process of creating or delivering a value proposition. The act of co-creating in this sense influences components of the business model. Employees of firms play a crucial role for co-creating processes as these are the agents communicating with the end-user (Grönroos & Voima, 2013). Grönroos and Voima furthermore argue that a user can become a co-producer in the production process of a firm and in this sense can be a resource to the firm (Grönroos & Voima, 2013). Hienerth et al. (2011) emphasize co-creation approaches and user-centred approaches have extensive effects on the key-elements of a business model and view active users as a new key-resource as well. Such user-centred business models however require a combination of expertise, knowledge and financial resources (Walters et al., 2012). What the influences on the business model are and what specifically is needed remains unclear.

Besides involving the user as a co-creator in the business model, the user can be involved to increase the innovative capacities of a firm (Oliveira & von Hippel, 2011). Cui and Wu describe three potential ways of involving the end-user in the business model for innovation purposes (Cui & Wu, 2015). Firstly they can be a source of information; this information about the user’s needs and demands is then taken into account by the firm. Secondly, they can be involved as a co-producer of innovations. This means that the user will be actively involved in the innovation process, yet the locus of innovation is at the firm. Finally, the user can be a co-innovator: the innovation is developed by the user and only implemented by the firm (Cui & Wu, 2015). This typology of user involvement for innovation purposes will be a starting point for considering the broader notion of user involvement in

² Accessible anywhere, added features such as recommendations all to improve the experience and convenience for the end-user

the business model and describing co-creation in that sense. For the firm to co-create value with the user interaction is required. Grönroos and Voima state that “*the core of interaction is a physical, virtual, or mental contact, such that the provider creates opportunities to engage with its customers’ experiences and practices and thereby influences their flow and outcomes*” (Grönroos & Voima, 2013, p. 140). These interactions form an essential part when taking a user-centred approach and will be discussed thoroughly in this thesis.

One can conclude that there are different types and moments of interaction and user involvement which can be learned from and that there are still gaps in the theory describing these interactions. Incorporating these lessons and tailoring the value proposition can unlock multiple, latent values and provide a better alignment of the service or product to the end-user. The question however remains how this is done and what it implies for the business model? These questions lead to the final sub-question: “How is user involvement designed in the business model and how does it influence the business model ex post?” Furthermore, previous research tends to have a general marketing approach; the implications that the theories described above have for the market for energy efficiency are often not looked at yet.

The next section will describe the research methods used in this thesis.

3. Research methods

This section will describe the research methods used in this research to answer the main research question and sub-questions. To answer these questions the research design was chosen to be qualitative and explorative. This type of research, where complex social phenomena need to be understood, can benefit most from case studies and in depth interviews (Yin, 2013). Furthermore, the literature review showed the need for a thorough understanding of the context that firms operate within. Both a context analysis and several case studies, based on in depth interviews and a document analysis have thus been performed. First a context analysis was performed; it consisted of a document analysis (internet sources, policy documents and annual reports) as well as three semi-structured interviews with different stakeholders (NGO and government). The generated data was assessed using the Multi-Level Perspective and its three levels of interest: the landscape, regime and niche.

Secondly, nine businesses in the field of energy efficiency have been selected to be studied as cases. To explore the concept of user-centred business model design a diverse sample of cases has been selected. First a longlist of relevant businesses and business models in the Netherlands was made. For each of five categories³ market leading and promising business models were selected; at least two firms were contacted per category, due to practical limitations this resulted in nine case studies. The business models were operated by firms with a great variety in size, ranging from a two-man company to multi-nationals (e.g. Philips). No cases of heating solutions were analysed however as no interviews could be done with the selected firms. The selected firms and corresponding business models were fleshed out in a desktop research using any data freely available (internet sources, annual reports, commercials). Afterwards semi-structured interviews have been held with the firm's CEOs or employees knowledgeable about strategic changes in the business model. The interview dealt with different topics: the business model, user interaction, changes to the business model and a future perspective. Each interviewee was first asked whether the interview could be recorded and made public anonymously. The interview guide can be found in the appendix (Appendix 1); this was the interview guide used for the overall research, task 25. At the end of every interview snowballing was used to uncover whether relevant cases have been missed until a sufficient level of saturation was achieved. An overview of the interviewees can be found in the appendix (Appendix 2); this appendix also highlights who performed the interview.

Data analysis

The interviews were recorded and transcribed, after which they were subject to a coding procedure based on the work of Saldana (2009). Double coding was used to improve validity and reliability; it solved several issues of subjectivity. The codes used were based on theoretical findings in the literature study regarding user interaction and contextual influences on the business model and can be found in the appendix (Appendix 3). Both the coders reached agreement on the definitions of the codes after a trial session in which one interview was thoroughly coded and discussed. After the coding process, each interview was discussed and the most important findings were distilled until full agreement was reached. The codes were iteratively refined and new codes were added. In four sessions the analysis through coding was completed. The coded data and documents were the basis for analysing the cases. The cases were first analysed using the business model canvas (Osterwalder & Pigneur, 2010); the components that allowed user interactions and that were changed after user interactions are discussed. Furthermore, a stakeholder map is made and analysed with a framework developed in task 25. This framework plots stakeholders on a line that depicts the paradigm shift, from product to service-dominant logic.

³ Retrofitting, lighting, heating, smart and total solutions

4. Context analysis

This section describes the relevant context for business models in the market for energy efficiency. As described in the theory section, there is an impact of contextual factors on the development of business models and businesses in general (Provance et al., 2011; Huiben & Verbong, 2013; Strupeit & Palm, 2015); a context analysis can thus be considered useful. Context will be interpreted in twofold, following the MLP: first of all landscape pressures or deep structural trends in the macro environment are discussed. Besides that, this context analysis describes the selective pressures in the regime. Smith & Raven (2012) note the relevant regime context is formed by the 1) established industry structures, 2) policies and political power, 3) market and user practices, 4) dominant technology and infrastructure, 5) the cultural significance of the regime and 6) scientific knowledge. These factors and landscape pressures are described below for the energy efficiency market.

4.1 Broader landscape

In the Netherlands the context around the market for demand side management energy services is based on events in the national and international setting. Recent events in Russia and Ukraine (ECEEE, 2014) have once more shown the importance of energy security whilst even leading countries such as the US and China are making more efforts to be sustainable for various reasons (energy security, health, climate change). Especially the meltdown at Fukushima can be seen as an event that caused pressures, leading to a major change in public opinion towards nuclear energy and starting the Energiewende in Germany; a plan to abandon nuclear energy since this moment (WNA, 2015). The European Union has also focused on a more long term vision by stating the goal to reduce greenhouse gasses by 80-95% by 2050 (European Committee, 2010). One can conclude that slowly but surely these landscape events push the general direction of developed countries towards an environmentally more sustainable energy system.

4.2 Structural elements

4.2.1 Established industry

An observation that was also the starting point for Task 25 and this thesis research was that the market for energy efficiency is not doing well at all (IEA, 2014), sometimes it is even suggested that there is no such thing as a market for energy efficiency (Interview N&M, 2015). This has been observed despite the fact that there is a wide array of energy efficiency measures that are economically feasible, especially in the longer term (IEA, 2014). This also led to the early finding that not only entrepreneurs with green ideals are competing in the market; entrepreneurs that see opportunities for making money are also starting to act.

However, there seems to be little demand for energy efficiency. The supply side differs for different categories of measures that are available (lighting, heating, renovation, smart solutions and one-stop-shop solutions). However, a common trait seems to be that the supply side is not well-organized, nor transparent for the end-user (Interview N&M, 2015; Interview Reimarkt, 2015; Interview LED Design Holland, 2015). This at least seems to be the case for retrofitting and lighting propositions. This might have led to several new firms that tune their business model to this problem by giving a total and integral solution instead of separate measures and try to arrange for a better match between supply and demand.

The incumbent players in the energy regime are not tuned for energy saving. It's in the DNA of energy producers and the utilities to make money on selling energy, for them saving energy thus has less intrinsic value. However, utilities are subject to rules imposed by the ACM (Authority Consumer and Market) which define the tariffs they can charge for energy (ACM, 2015). As these margins are

low, there is fierce competition for customers (Interview Bas Nederland, 2015; Interview Eneco, 2015). The utilities are looking for other viable business models that for instance help to engage customers, retain customers and create value that they can capture, creating chances for smart services (Quby, 2015). At the same time they are obliged to engage in energy saving by the energy efficiency directive. This way the utilities are forced to try and escape the lock-in and create a business model that also functions in a more sustainable market.

Energy Service Companies (ESCOs) and energy performance contracting seem to be rare and underdeveloped in the Netherlands. These kinds of firms that often take complete control of the energy management of a firm in combination with energy performance contracts are more visible in other countries and it is mentioned by the ministry that there is still a large potential to be realized (Interview Economic Affairs, 2015).

Besides the utilities, the distribution system operators (DSOs) are also in a difficult situation; they are expected to prepare the grid for the energy transition towards a sustainable supply, whilst they are not allowed to interfere with the market (ACM, 2015; Netbeheer Nederland, 2015); this also means they should not get involved in energy saving. This search for novelty in a settled market thus creates tensions. In the Netherlands the DSOs are also responsible for the roll out of the smart meter. This is a process that is ongoing and is planned to be finished before 2020. The smart meter could provide useful data for energy saving (KEMA, 2010). However, the DSOs are not allowed to interfere with energy saving directly as this could disrupt the market. This might show that the effect of DSOs will be limited to the roll out, research and grid changes.

Even though the DSOs are encouraged to work towards a transition and the utilities are forced to save energy by legislation – thus being pushed towards a more sustainable energy supply - the government also supports the current market and its status quo. This is partly visible in the support of large enterprises and energy taxes, which for the biggest users are only fractions of the private market (Belastingdienst, 2015). Moreover, the top sector policy, designed to support the sectors at which the Netherlands excels, according to Derk Looibach also works towards this lock-in as it also gives support selectively to more established firms (van der Hoeven, 2014); often the support is not possible for smaller firms as it is for instance based on co-financing of a small part (30%) by the government and thus still requires a large investment by the firm itself.

Besides the players in the energy regime, another regime is relevant for energy efficiency measures; the building and construction regime. Large and traditional players are present here, especially the ones that are in the market for utility buildings. For renovations the market exists of three large players and a lot of small (often family owned) businesses. These players renovate two to three percent of the housing stock each year. The urgency to speed this up is however non-existing for most of these firms. Especially the larger firms also seem to lack any need for research and the tradition for research, making it a harsh environment for innovative business models (Interview Reimarkt, 2015; Interview N&M, 2015).

The banking sector, which is closely intertwined with the housing sector⁴, noticed the movement made by governments and the growing awareness of consumers which could lead to opportunities. They now make it possible to get special loans for energy saving measures that are repaid via the energy savings you make. Possibly their role will become more important in the future (ING, 2013).

⁴ Banks provide mortgages for homes and on the other hand finance loans and several projects. This means that in this sense they could have an interest in house renovations.

The economic context shows that many of the incumbent regime stakeholders are (still) not able to actively participate in the market for Energy Efficiency. Whereas the DSOs will likely contribute somewhat in the form of research, the banking sector and utilities might play bigger roles in the future. Economic context provides opportunities and will do so more in the future when the smart meter roll out is more advanced and even more energy production is decentralised and local. Incumbent actors are still locked-in to the current system and making movements to free themselves from it. Still the market uptake is not satisfactory and efforts are likely not enough to adhere to European aspirations. The next section will describe what the government is doing to influence the market for energy efficiency.

4.2.2 Political context

Also in the Netherlands, eyes are turning towards the problem of climate change and the urgency for taking action. An example is the ‘climate case’ that Urgenda, a Dutch NGO, has filed against the government for not taking adequate action in an attempt to force the government to at least reach the goals they set and make them more ambitious (Urgenda, 2015). Those goals are part of Dutch policy, which is based on European ones such as the Energy Efficiency Directive (EED). Dutch energy policy is closely related to the previously mentioned anti-climate change policy. The Dutch government aims for a share of renewables of 14% by 2020 and a completely sustainable energy supply by 2050 (SER, 2013), while in 2014 it was stable around 4.5% (CBS, 2014). To reach this target the government used multiple policy tools, such as subsidies and fiscal advantages for green investments (RVO, 2015). Besides a greener supply, energy efficiency is mentioned as an important means to reach stated goals (SER, 2013).

Energy Efficiency and energy saving is a subject that is divided between three departments of the Dutch central government: Internal Affairs, Infrastructure and Environment and Economic Affairs. Internal affairs is responsible for the built environment, the department of infrastructure and environment is involved as it is responsible for the environment management law and the last, economic affairs, is the coordinating agent for energy saving in the Netherlands and is responsible for energy saving in industry. These ministries also negotiated in the forming of the energy agreement, which is one of the most relevant policy documents for energy saving in the Netherlands⁵. The energy agreement is made by over 40 parties, representing a large part of Dutch industry as well as the government and several NGO’s (SER, 2013). An often made critique is that this led to a compromise and is thus not as ambitious as would be needed to curb emissions and effectively prevent climate change (van der Goot & Zuil, 2013). In the energy covenants that are made by umbrella organizations firms are represented that make up 80% of the national energy use (Interview Economic Affairs, 2015). For example organizations like VNO NCW, who represents a total of 115000 enterprises, is involved in discussions and often tries to prevent strict and compulsory policy. One can argue that conflicting agendas and priorities thus play parts here. Agencies and regulatory authorities such as RVO (Rijksdienst voor Ondernemend Nederland) are responsible for executing the agreements (RVO, n.d.). RVO is also involved in innovation subsidies; it is involved in both the niche and regime. The ACM, as discussed above, is responsible for monitoring the energy efficiency obligations (Overheid.nl, 2015). Often local municipalities can be responsible for this monitoring task as well.

In the Netherlands the government is divided into the central government, discussed above, and the provincial and local governments. The provinces are responsible for the design of the area and

⁵ Other relevant policy papers speaking of energy efficiency are the law for climate management (Wet Milieubeheer) and the climate agenda (Klimaat agenda) which for instance talk about mandatory investments for energy efficiency if the payback period is below five years (I&M, n.d.).

regional economic policy. Moreover, they supervise the local governments and check their financial plans. These local governments have a more practical role in the carrying out of policy. However, the different levels of government can have different aspirations when it comes down to sustainability, this is also the case for different local governments; some will thus be more active in supporting energy saving than others (Interview Reimarkt, 2015).

Besides this, in practice, the greening of the energy supply is found to be more appealing as it is more visible as a measure towards sustainability. As stated in an interview with the ministry of economic affairs: *'As a firm I'd rather have a windmill built than engage in energy saving, even if that would be more cost effective. It is simply invisible to others that I saved energy'* (Interview Economic Affairs, 2015). According to an entrepreneur this attitude is also found at the government itself, which in his eyes rather funds a clearly visible, yet expensive solar park than energy efficiency measures (Interview Bas Nederland, 2015). It looks like energy efficiency in this way just lacks appeal.

The energy agreement does give Energy Efficiency a central role and differs from other countries by officially taking up the EED in its national policy. However, a lot of measures that have been suggested in 2013 still have not been implemented. The Dutch government is actively participating in the market, for instance with projects that try to offer solutions on a system level. Examples are 'Blok voor Blok' (block by block) and the 'Energiesprong' (Energyjump), which focus on renovating homes to become energy neutral (SER, 2013). So rather than supporting single measures more integral and systemic solutions are supported here. This approach can for instance be seen in Eindhoven's governmental procurement which has seen a switch from 'best price procurement', to 'best value procurement', which again shows that local governments can take different approaches and in this way have an influence on the business models that are supported. Besides the programmes mentioned above, financial and fiscal support measures have been taken.

Financial and fiscal supporting measures

Several measures have been taken to stimulate the demand for energy efficiency: an overview can be found in table 1. These policies try to stimulate the niche market for energy efficiency and consist mainly of stick and carrot approaches for supply and demand.

TABLE 1: AN OVERVIEW OF POLICY MEASURES FOR THE ENERGY EFFICIENCY MARKET.

Policy context	
	<p>National policy “energy agreement”: main energy related policy document that gives special attention to stimulate the niche for energy efficiency as a means to reach European goals. Aims to reduce 1.5% on final energy use annually and save 100 PJ on annual energy use by 2020.</p> <p>Local governments have some freedom in their policy and the tools to use. This means different local governments can provide opportunities for different business models.</p>
<i>Financial</i>	<p>Residential No direct subsidies are available on national level Energy loans & mortgages: special loans available for energy efficiency investments, these have reduced interest rates.</p>
<i>Fiscal</i>	<p>EIA: 41,5% of a sustainable investment can be deduced from fiscal profits (reducing income taxation)</p>

<i>Legislative</i>	Standards (energy label / index), smart meter roll-out
<i>Financial</i>	Commercial WBSO: reduces the costs of R&D for firms TKIs: subsidy scheme for R&D in the Dutch top sectors. STEP & FEH: subsidy schemes for renovations, available for housing corporations.
<i>Fiscal</i>	EIA: see above WA: starting firms can use the ‘random write-off’ to write off investments at random times to achieve fiscal advantages.
<i>Legislative</i>	EED (energy efficiency directive) (European Union, 2012) ⁶ : - Firms with 250+ employees or annual revenues above 50 million euros are obliged to do an energy audit. - The directive makes a 1.5% reduction of energy use mandatory for energy distributors and retailers through energy efficiency measures. - 3% of publicly owned buildings have to be renovated annually.

For instance the government implemented the EIA, an energy investment deduction, which allows you to deduct a part of the investment from your income taxes. The EIA has already seen 1.6 billion euros of related investments in 2014, leading to around 124 million in fiscal advantages (RVO, 2015). A starting firm can also use the random write off for investments, possibly leading to fiscal advantages by artificially raising or lowering its profits. Furthermore, the private market can make use of special loans for energy efficient investments, which have lower rates and are based on a revolving fund, co-funded by the government and banking sector (Rijksoverheid, 2014). Around 200 loans are requested monthly (Ik Investeer Slim, 2015). Subsidies for the private market, like the SDE+ for renewable energy investments, are however not present. For specific parts of the market there are subsidies available. An example is the sports club, which can apply for a subsidy (VNG, 2015). Another part of the demand side lies with housing corporations, they do have the opportunity to renovate their houses and get subsidies (FEH/STEP) for it, based on the number of homes renovated and the energy label difference the renovation produces (source). Once again one could observe that this is a measure focussed on a more systematic approach to energy efficiency measures. These are the main instruments to support the demand side for energy efficiency. On the supply side there are fewer different incentives, the main instrument is that of innovation subsidies for research and development⁷ (e.g. the previously mentioned TKIs and the WBSO) (RVO, 2015).

The political context can be seen as rather ambiguous for companies involved in the energy efficiency market. Political efforts are bound to create some chances in the market and try to increase the efforts taken for energy efficiency measures. However, it will be up to the entrepreneur's skills to anticipate and work with these pressures and adjust their business model accordingly and in time.

⁶ These measures have been included in the Dutch Energy Agreement.

⁷ For energy efficiency TKIs are available for the built environment (TKI enerGO) and industry (TKI ISPT). Furthermore, one can get a budget when applying for STEM funding (Cooperation Topsector Energy and Society)

4.2.3 Market & User practices

The market for energy efficiency has different user groups. On the one hand there are large multinationals in the industry that represent a large amount of the Dutch energy use. These kinds of firms represent 25-30% of the national energy use and are typical regime actors. They are for instance supported by the build-up of energy prices and top sector policy. However, this research focusses on users of a smaller scale; mainly SMEs and residential users. These groups represent 10-15% and 15% of the national energy demand respectively (CLO, 2014). Whereas the large multinational firms are primarily activated by financial motives other aspects have influence on the smaller scale as well.

As noted earlier, energy efficiency is not found to be attractive in itself and the cost of energy is not perceived as high enough to be a critical incentive by SMEs and private users. Besides this, the social practice of using energy is almost invisible, leading to a lack of awareness and interest. This might mean that entrepreneurs have to be more creative and look for values beyond those of energy savings or savings in general (Mourik et al., 2013).

A lack of wealth in the Netherlands does not seem to explain the lack of market uptake of energy efficiency measures. This problem does not seem to be related solely to a lack of money, more so to priority on which to spend it (Interview N&M, 2015). At the moment demand for energy efficiency is still meagre. It is sometimes suggested that the price for energy is still too low to activate people to act upon it and realise the value in energy savings (Interview Plugwise, 2015).

4.2.4 Culture

The Dutch culture has some specific effects on the market for energy efficiency. An example is the formation of an agreement like the energy agreement as discussed above. Lobbying and making compromises is a typical Dutch approach, in which many parties from different backgrounds get involved. This approach dates back to the middle ages and is called the 'polder model'. Another example for the field of energy efficiency is the array of covenants that are made by a large group of parties that make up rules a firm can voluntarily follow. Often representatives of whole industries bargain and discuss with governmental instances to make such deals.

Another typical Dutch approach, also seen in the PV sector, is that of cooperatives. These are groups often formed by locals that try to collectively buy solar panels. Doing so, they have access to more resources and knowledge and might be able to get discounts for bundling their demand. This also creates opportunities in the market as the demand side gets more pro-active and bundled.

The Netherlands know many institutes and organisations that are sometimes government supported that take up a role in the provision of objective information and which try to activate the market and its users. Examples are Natuur & Milieu, Natuur & Milieu federaties, Milieucentraal, Urgenda and the list goes on. These groups participate in the provision of information, arrange bundled purchasing of measures and had a say in the energy agreement. As mentioned earlier, Urgenda even made it to world news recently when they sued the Dutch government for not taking adequate action towards climate change and thus neglecting the health of its future citizens; a case that was won by Urgenda (Urgenda, 2015). This shows they can have a significant impact and help with creating movement in the market; this might be a group of stakeholders that is not so much present in other countries.

Research on the attitude of the Dutch population shows ambiguous results: on the one hand the Eurobarometer found that the Dutch think that the policy goals set by the EU are exactly right (European Commission, 2013), while on the other hand over 50% of the population thinks that the government should take more action. 70% of the people are worried about climate change and they

see the responsibility of acting lying at the EU, national government, businesses and themselves, rather than environmental groups for instance (European Commission, 2014). However, the perceived seriousness of climate change is lower in the Netherlands than the average of the EU. Still, more people have acted, for example by switching energy supplier or purchasing energy efficient appliances (European Commission, 2014).

One of the findings from the interviews with entrepreneurs is a seeming lack of trust in firms and a lack of transparency towards the end-user. Being trustworthy and transparent is mentioned as a key value and starting point for a firm. Especially larger firms are suspected to be very profit oriented and not sincerely interested in the end-users needs. The competitive nature of still immature niche markets does not help this; competitors often tell contradicting stories about for instance the technologies available (Interview N&M, 2015), bringing each other in discredit.

4.2.5 Technology

Generally speaking the niche technologies are sufficiently developed to reach energy efficient outcomes in a cost effective manner. Especially individual measures seem well developed, e.g. insulation materials, HR++ windowpanes, LED lighting and other innovations developed by for instance TKIs. A lot of these innovations are produced but still are not visible in the market. A field that does require R&D is that of smart services and smart products, which are related to the smart meter. The integration of measures also sees more development and R&D, also subsidized by the government, and is a problem that is mentioned in conversations with multiple entrepreneurs; often for instance knowledge is lacking on the effect of stacking different individual measures rather than offering a more integral solution. It should be an objective of entrepreneurs to become aware of their offer and how it fits in the bigger picture of an integral solution or to link their offer to parties that share a view that focusses on a single solution.

4.2.6 Scientific Knowledge

As concluded from the literature review the focus in research is broadening from mainly technological innovation towards social innovations such as business model innovation. Amongst others Vargo and Lusch have been advocating a shift from product oriented business logic towards more service-dominant business models (Vargo & Lusch, 2004). However, as mentioned above, technological innovation still occurs on every level as LED technologies are incrementally improved and radically new applications for smart solutions are developed. Because the topic of energy efficiency consists of many facets and behaviours are an important aspect more than technological knowledge is required.

4.3 Conclusion

The market for energy efficiency is complex. It deals with different subsets of the market, different types of firms and different governments, horizontally and vertically; the subject is part of EZ, BNZ, I&M at the highest level and can be approached differently at the more local levels. Furthermore, it deals with different types of niches, markets and a very broad traditional system as these include the producers but also users of energy: thus everyone. A clear and one-sided influence of this context is hard to distinguish. However, the Dutch context seems to be promising, at least in the long term. The sense of urgency among the public is growing, legal and financial measures are taken by the national and international authorities and technologies that are financially feasible are available. Yet the market and some pricing mechanisms⁸ in it still present barriers.

⁸ E.g. the build-up of the energy tariff.

TABLE 2: CONTEXT ANALYSIS BASED ON THE MULTI-LEVEL PERSPECTIVE

Context analysis	
Industry structures	<p><i>Key players energy regime</i> Energy retailers: fierce competition, low margins on energy: leads to the search for new business models, often more service oriented. DSOs: Experience contradicting forces: asked to prepare for a sustainable energy system yet not allowed to compete with the market in any way. ACM: Authority for Consumer and Market, sets rules for competition (e.g. margins on energy sales) that apply to DSOs and Energy Retailers. ESCOs: relatively undeveloped in the Netherlands</p> <p><i>Energy users (CLO, 2014)</i> Large firms/industry: 25-30% of total energy use SMEs: 10-15% Transport: 15% Residential:15%</p> <p><i>Miscellaneous</i> Build-up of the energy price: the energy bill is build-up of grid maintenance, retailing costs and energy taxes. A higher use is linked to lower taxes (residential 0,1196, largest industry 0,0005 euro per kwh)</p>
Policy context	See table 1. "Policy Context"
Market and User practices	<p>Energy Efficiency itself is not appealing Energy costs not perceived as painful or high; does not create urgency The use of energy is an invisible practice Lack of trust and transparency in businesses: these are key-values that firms should communicate</p>
Technology and Infrastructure	<p>Most energy efficiency measures are well developed R&D still plays a role, especially for smart services Roll-out of the smart meter has been a trigger for multiple firms</p> <p>Integrating measures and creating value in a systematic solution still a key issue</p>
Culture	<p>Collaborative nature in the Netherlands: 'polderen' Energy cooperation's are common practice NGOs are abundant and active (e.g. the climate case by Urgenda)</p>
Scientific knowledge	Research has broadened from a focus on technological innovation towards social innovations.

5. Results: case study analysis

This section will discuss the case studies in more detail. The analysis will be done in relation to the categories mentioned earlier: retrofitting-, lighting-, heating-, smart- and total solutions; however no heating solutions were analysed. Due to an overlap in activities (most firms offering total solutions also offer retrofitting solutions) retrofitting and total solutions are combined and will be discussed together. First, the categories will be described and the main contextual features mentioned. After this, each case will be analysed following a similar structure: on basis of the held interviews the business model and position in the market of the firm will be discussed first, followed by a description of the user interactions. This section will discuss the main elements of research on this topic: when interaction took place, how it was facilitated in the business model, what type of interaction was used, what was learned from it and how this affected the business model ex-post. Finally, contextual influences and tensions with the business model will be discussed. These will show how contextual influences can define the design space of user-centred business models and furthermore, discusses the tension between stakeholders that follow product dominant business logic (PDL) and those who follow service-dominant logic (SDL), which is more related to user-centred business models. These stakeholders will be plotted on a line ranging from PDL to SDL, a method developed by national experts involved in Task 25 (Mourik, 2015). After these individual case descriptions a more integral analysis will be done.

5.1 Retrofitting and total solutions

The Dutch market for retrofitting and specifically insulation is old. However, there is still a huge potential to be reached. The Dutch housing stock, seven million houses, consists of homes that have energy label D or lower for over 50% (Kadaster, 2013). The housing stock consists for 55% out of privately owned houses and 45% is rented. Of this rented segment 75-80% is owned by a corporation. These homes are generally less energy efficient than privately owned homes. This means that a great deal could be improved in bulk by these corporations. The technology to achieve energy neutral homes is already available (Interview Platform31, 2015); in essence the most important aspect in the market thus lies in marketing and social innovations to overcome barriers for investment.

The supply side of the market consists of three large firms and a whole range of smaller family owned businesses. Together these firms serve two to three percent of the housing market annually. The offers that are available in the market seem to be very diffuse and lack transparency. Often information that is given contradicts and this leads to many users to remain inactive, even after deciding they would like to invest in retrofitting measures (Interview N&M, 2015). A Dutch environmental NGO noted that these difficulties often discourage users and cause them to abort the process of insulating their home even after making the decision that it could be a valuable investment. The process that the users have to go through is perceived as a hassle. Generally the user's expectations are based around the traditional and common way the market works: from first contact to measuring, receiving an offer and finally installing. This process can take weeks to months. Novel business models that go for an integral or quicker approach have to deal with these expectations and norms as well (Interview Reimarkt, 2015).

The government has established several programmes that aim to stimulate the market for retrofitting⁹. Some of these are offering single solutions, such as cavity wall insulation, on a local level; a municipality or town. A question that can be asked is whether it created and supplied isolated islands of demand instead of creating a wider demand for renovation. Whether the approach that was taken

⁹ De Stroomversnelling, Blok voor Blok approach and more local initiatives.

actually stimulates the formation of a healthy market was questioned by Natuur & Milieu (Interview Natuur & Milieu, 2015)

The government did support the market by making energy labels for homes mandatory in accordance with the European Energy Performance of Buildings Directive. This measure makes the outcome of a renovation project more visible and also allows setting goals that go beyond single measures. The energy label and energy performance index (EPI) also make way for the possibility to subsidise outcomes of energy efficiency measures rather than a single measure. Examples are the STEP and FEH subsidies (see context analysis). These are available for housing corporations when they improve the EPI of a for instance 10 houses by one point. For the private market the energy investment deduction for taxes is a commonly used instrument. Another common option is the so called ‘sustainability loan’ that is possible for energy saving projects. As mentioned before, there are some innovation-subsidies that try to improve the supply side rather than demand (Interview Economic Affairs, 2015); these however tend to be more product than service oriented.

There are several NGOs and institutes¹⁰ active within the housing market and renovation market. As they found that there is a discrepancy between the perceived effort and gains of energy efficiency they generally take up the role of informer and try to activate potential users.

A lot of effort is made to try and activate this rather passive and opaque market. Firms are left with the challenge to make an understandable and economically feasible offer. The following sections will describe business models operating in this context.

5.1.1 Nederland Isoleert¹¹

This case study builds on work by national experts involved in task 25 (Format analyses Task 25 Nederland Isoleert, 2015). Nederland Isoleert is an insulation retailer that focuses solely on installing cavity wall and crawl space insulation; it provides a single solution. In 2012 one of the entrepreneurs saw a societal need that was not being fulfilled and commercial opportunities in the market. Cavity wall insulation has been done for 35 years already and still 1.8 million homes are not insulated (Interview Nederland Isoleert, 2015). As mentioned above the current market only insulates 2-3% of those homes annually. Nederland Isoleert has the objective to speed this up and saturate the market in 10 years. This led to a business plan and a short pilot project after which the firm quickly grew up to 65 employees in 2015. The firm can thus be seen as quite successful. Nederland Isoleert identified some key-barriers in the market: the market is not transparent, too complex and the main players are not putting in enough effort to overcome these problems. In response their business model focuses on doing one thing really well and being better than competitors. The main distinctive features are a pre-defined price for insulation measures and measuring the walls externally, via ‘Google streetview-like’ software. Furthermore, Nederland Isoleert operates a transparent and easy proposition towards the end-user, in which clear communication is a key factor. Providing one type of insulation helps with making their business transparent. “*Otherwise I will have to explain why in one case I use glass wool and in other cases I use pearls*”. Besides that, Nederland Isoleert uses a call-centre to at least have any communication issues solved. Overall the business model can be considered commercially and product driven.

¹⁰ E.g. Consumentenbond, Vereniging Eigen Huis, Natuur & Milieu, Natuur & Milieu federaties, Milieu Centraal.

¹¹ This case study builds on work by national experts involved in task 25 (Format analyses Task 25 Reimarkt, 2015). Renske Bouwknegt performed the interview.

The market is entered either directly through cold-acquisition (door-to-door) or on a project base with a partner (e.g. Natuur & Milieu and Essent). These larger campaigns often help them serve a bundled customer segment and also to improve their business model. For example the firm communicated standard prices for insulation as this was a demand made by Natuur & Milieu, which proved to be a success factor.



FIGURE 2: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END-USER IS REACHED.

User interaction

This section will describe the timing, organisation and results of user-interaction in more detail. The cursive lines highlight these aspects of user interaction. An overview of the types (to receive information, send information, co-produce and co-innovate) of interaction and how this influenced the business model is given in table 3; a distinction is made between direct (D) and indirect (I) interactions. The same format will be used in all consecutive cases.

Nederland Isoleert operates a business model that is quite static. User interaction that occurs is, with some exceptions, not intentionally organized to learn from the user. As will be described below user interaction only resulted in few and incremental changes to the business model. The types of user interaction, how they are designed and what changes to the business model are made will be described per phase in a summarizing table below.

In the *design phase* the firm did a pilot project to see what works and what triggers are salient to the end-user and will make them continue the process of installing insulation. This was a moment in which they did interact with end-users to gain information, however not much was changed to their proposition; they found their story and product could often convince the user: “*When we did the pilot we just wanted to get a feel for the triggers for people to make an appointment and then proceed to purchase insulation. We went house by house, asked if we could make an appointment to come and sell. You just went there and it turned out we could (make the appointment), it’s that easy!*” (Interview Nederland Isoleert, 2015). The business model is set to facilitate this convincing of the end-user and they want to find more ways to do this effectively.

Interaction with the end-user is done in multiple ways, but in most cases Nederland Isoleert interacts in the *marketing phase* to inform the end-user; only in some cases to learn from the user. At a point they were interested which channel was best to reach the end-user. For some time they tried different options: door-to-door marketing, call-centres and online advertisement. They found that any channel worked except for online advertisement, as the online environment often works based on comparisons

with other insulation retailers; this makes it harder to stand out. User interaction helped them decide which channels to use and thus incrementally improved the business model.

Moreover, Nederland Isoleert uses data about the end-user to be able to measure the homes and where to place insulation. This can be considered as gaining information by indirect interaction with the end-user. This information and being able to do measurements without intervening in the user's life turned out to be an important resource in their business model, making their business much more efficient and feasible: *“You can't go and drive through all of the Netherlands for every request”* (Interview Nederland Isoleert, 2015). This was one of their defining features that made them win a tender by a Dutch NGO that started up a campaign and eventually was a breakthrough moment for the firm.

More intense relations and interaction with the end-user does not appeal to Nederland Isoleert. *“Those bottom-up ideas are great of course, but it requires the user to take initiative; doesn't that make you rely on an enthusiastic unemployed neighbour of 65 who will think: April, the weather is bad, let's go to Benidorm for a month”* (Interview Nederland Isoleert, 2015). So instead of co-creating Nederland Isoleert tries to take initiative themselves and be as reliable as possible.

TABLE 3: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST. D = DIRECT INTERACTION, I = INDIRECT INTERACTION

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: pilot project	Receive information (D) Send information (D)	Value proposition: confirmed approach /
<i>Marketing / sales phase</i>	Channel: cold acquisition Resource: public data	Send information (D) Receive information (I)	Channel: most effective channels found Operational use
<i>Use phase</i>	Channel: call centre	Receive information (D)	Activity: incremental changes to approach

Nederland Isoleert thus mainly interacts with the user in the marketing or sales phase. Often they rather send than receive information. However, some lessons are learnt and the business model is incrementally changed; they learned to respond quickly, to not damage any of the user's properties and which channels are most effective.

Contextual influences

This section will describe how contextual factors and tensions between stakeholders and their dominant business model logic influence the design space of a (user-centred) business model. Firms and other stakeholders operate reasoning from a logic that ranges from product to service-dominant logic. The figure below will highlight this position of stakeholders, as mentioned by the entrepreneur in the interview. Hence, not all figures will describe the same actors. The vertical position, above or

below the line, does not represent differences. The same format, which finds its theoretical basis in Task 25, will be used in consecutive cases.

Nederland Isoleert finds that contextual factors, such as partners, competitors, governments and other stakeholders in the ecosystem can have a big impact on how you operate your business. All these stakeholders find themselves at a point in the transition from product dominant logic to the more service-dominant logic. Sometimes in relation to this transition a culture or vision is not shared, which can be troublesome. Nederland Isoleert encountered this problem when trying to find new employees. Installers that previously worked for competitors did not match well with the different culture within the firm; they were used to the way the traditional firms run their business and how they approach the market and user. The inability to work for the firm with different business model logic caused tensions. To overcome this problem they started training their own employees.

Besides that, Nederland Isoleert argues that governments interfere in the market, especially with projects such as Energiesprong and the ‘block by block’ approach. Energiesprong brought across an undesired message: *do not go for insulation as a single measure*, thus actively competing for users and impeding the business of Nederland Isoleert because of their more integral approach. On the other hand local governments are very diverse in their visions and actions. The province of Overijssel for instance mentioned that integrated and holistic approaches are needed if you want to apply for a subsidy. In addition, a housing corporation demanded that besides insulation measures a complete renovation was performed, thus more integral solutions again; this requires specific competences from firms. *“They wanted us to replace the bathroom as well! That’s crazy! We just have to drill a couple of holes in the outer wall; the resident does not even have to be home!”* (Interview Nederland Isoleert, 2015). The focus on a single technology is thus not shared by these stakeholders. These stakeholders prefer a more service and outcome focussed solutions; they lean towards the service-dominant logic.

On the other hand, Natuur & Milieu turned out to be a fitting partner, with whom their business model did match. As Nederland Isoleert had different ambitions and had a less traditional approach to the market they won the tender by Natuur & Milieu: *“price transparency was very important... and Nederland Isoleert wanted to use an online portal to digitally measure the house, the traditional companies still had to physically go there. That’s something you have to pay for.”* (Interview N&M, 2015). This partnership might also have changed the market slightly; soon the traditional suppliers copied the more transparent approach. *“Several weeks after we came with a standard offer of 750 euros another big supplier did the same; they literally put it on their vans”* (Interview N&M, 2015).

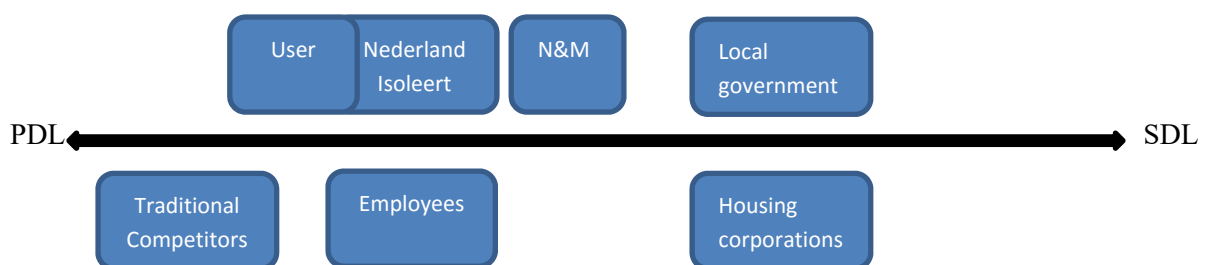


FIGURE 3: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Contextual factors also have more direct implications on the business model. In this case an example can be found in the social renting sector. Within this sector the monthly rent cannot exceed a certain legal limit; there is a maximum rent for social housing. This means that housing corporations in the social rental sector are sometimes unable to invest in their homes as this could mean that the monthly

rent would have to rise. This legislation also limits the customer segment a firm such as Nederland Isoleert can target and can thus directly prevent specific, possibly user-centred, business models.

Sometimes subsidies can also be experienced as a barrier. If the future of subsidies is uncertain people might choose not to take action. Nederland Isoleert mentions that some of their customers choose to postpone the moment of insulating because they expect that new or better subsidy schemes will come in the near future. The entrepreneur envisions its ideal governments to only use subsidy schemes they are clearly communicated and long-lasting. Moreover, the government should focus on awareness campaigns that showed a need for sustainability and benefits of energy efficiency.

5.1.2 Reimarkt¹²

Reimarkt is an intermediary that delivers renovations that make the housing stock more sustainable. The firm is active in Enschede and Bergen op Zoom, where it delivers its service to the private market and to housing corporations. Reimarkt offers a retail concept; based on 20 types of homes that make up 80% of the housing stock they provide standardised total solutions for renovations allowing you to ‘shop’ for your retrofitting package that aims to change the home towards an energy neutral home. These solutions combine different energy efficiency measures into a clear package deal, a clearly different value proposition than Nederland Isoleert, described above. Reimarkt’s business model tries to make the process, or customer journey, significantly easier as the user is taken by the hand through several steps. The approach removes several market barriers that Reimarkt found. Their initial finding, similar to Nederland Isoleert, was that the market for retrofitting lacked transparency and was too complex for the end-user. The approach to solve this is different however; Reimarkt argues more holistic and clear approaches are needed. The values that are communicated go beyond energy and monetary savings; instead the firm tries to sell pleasant living as a value, a more holistic and abstract value.

Reimarkt, as an intermediary, places itself between supplier and users, and often bundles demand through partnering with housing corporations (see fig. 1).

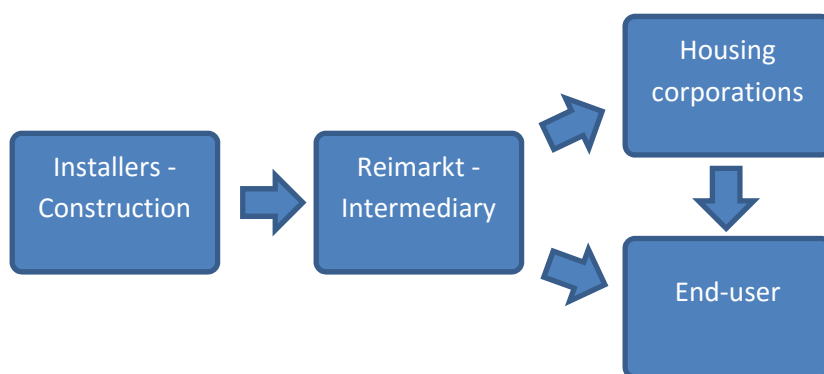


FIGURE 4: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END-USER IS REACHED.

This position gives Reimarkt the responsibility and need to deliver value to the end-user, possibly to corporations and to their suppliers. They have to make sure their products goes to the customer in a clear and transparent way. In essence they deal with multiple customers or users to provide value to.

User interaction

¹² This case study builds on work by national experts involved in task 25 (Format analyses Task 25 Reimarkt, 2015). Renske Bouwknegt performed the interview.

As a response to the frustrations that are visible in the market, Reimarkt tries to be service oriented and user centred in their proposition. An implication is that users have to be interacted with to find out market needs and change the value offered accordingly. In many cases assumptions about the end-user and its desired value were tested and either confirmed or not. “*We have been active in the market for over half a year and get a lot of user responses which we try to incorporate in our offer. We noticed people are mainly interested in what they can actually do with that bit of energy saving*” (Interview Reimarkt, 2015). One of the users for instance mentioned he used the savings to pay for his sports club.

The business model, and specifically the value proposition, is continuously being tweaked to the lessons learned from users. This was for instance done in the *use phase*, yet through their iterative setting (the well-known ‘lean start-up’ philosophy) the *design and use phase* seem *intertwined* to a large extent. “*...we want to be able to test the customer’s reactions to the product. That allows us to achieve a very steep learning curve*” (Interview Reimarkt, 2015). One of the lessons learned early on was that the value proposition can be made more convincing by making the results of energy efficiency measures and integral solutions feasible in terms of living needs and wishes instead of money.

Besides the interaction with the user in the design and use phase, there is interaction in what you could call a *marketing phase*. On the one hand this is done through marketing campaigns in which they talk to the end-user about what they expect and want from a retrofit. On the other hand some end-users are more deeply involved; they are asked to showcase their retrofitted home for other potential users and thus act as a co-producer of the service. This was done after user interaction where they found out a showcase model of a retrofitted home done by the housing corporation was not trustworthy enough. In contrast, a user with whom they can identify themselves is seen as trustworthy: “*we are currently switching to showcasing occupied buildings, the person living there is much better at selling it than we are*” (Interview Reimarkt, 2015).

Beside these forms of direct interaction with the end-user, information is also gained by more indirect interaction. Reimarkt uses data sources to learn about the customer segment in a specific area. For instance, they can make a lay-over of house typologies and user data to find out which places have high energy bills and high income in combination with a type of house; this shows them the most feasible areas.

TABLE 4: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: testing customer reactions (lean start-up)	Receive information (D)	VP: offer more abstract values / outcomes
<i>Marketing / sales phase</i>	Activity: testing customer reactions Activity: showcase homes Resource: public data Partner: user showcases own home	Receive information (D) Send information (D) Receive information (D) Send information (D) Receive information (I) Co-producing	VP: perfecting offer Partner: user as co-producer Operational use Operational use (trustworthy)

Use phase	Activity: testing customer reactions Partner: user showcases own home	Receive information (D) Co-producing	VP: make the abstract values tangible Operational use
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Reimarkt’s business model is set to interact with and learn from the user in different ways and at different moments. Compared to the previous case there is much more intent to actually learn from the user. In the design, marketing and use phase the user is involved in the business model. In the design and use phase the main objective is to test the customer’s reaction and improve the business model through feedback.

In the marketing phase the user is involved as a key-partner, the user becomes a co-producer which showcases his house and (unknowingly) takes upon itself the role of salesman. This was a radical change in the business model based on a lesson learned from user-interaction, but also a way to enable more user interaction. The changes can be considered radical (involving the user as co-producer) as well as some continuous incremental changes (iterative business model improvement).

Contextual influences

Also Reimarkt and its business model can be plotted on a line, differentiating its setting from a more traditional product dominant logic to the more novel service-dominant logic. The dominant logic within Reimarkt is found to be based on services. This framing does not seem to match with all the important stakeholders in the ecosystem in which Reimarkt operates (fig. 4). These matches and mismatches will be discussed below.

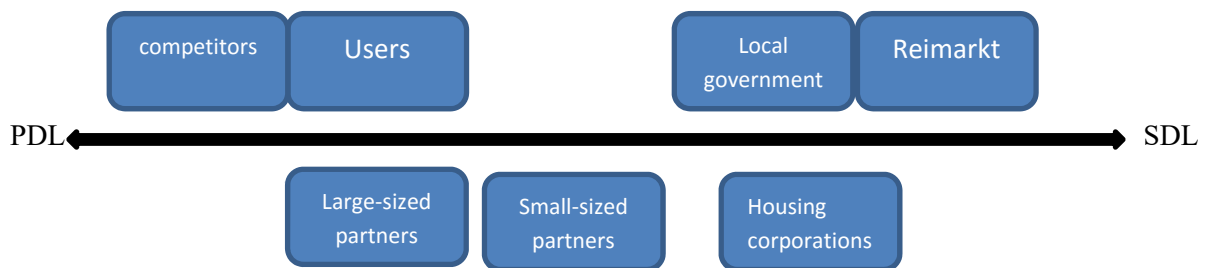


FIGURE 5: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Reimarkt sees mismatches due to the novelty of their business model and value proposition. Their offering is an integral solution, whilst traditional players often offer single measures. This causes mistrust and confusion at the end-user’s side; they are not accustomed to the value and integral solution Reimarkt provides. One customer’s reaction illustrates this: “*Huh, a readymade product for my home? That just can’t be right! You will come to measure and all?*” (Interview Reimarkt, 2015). In contrast to this, housing corporations do see the value and are more familiar with integrated solutions and are more aligned in terms of service-dominant logic. These thus make a good client and channel towards the end-user with whom they have a mismatch.

In addition to the end-users, Reimarkt also found their partners could not get along in their envisioned business model. The large construction companies were too traditionally focussed to operate on Reimarkt’s retail concept; the service-dominant logic requires a more flexible business model. Due to the lack of flexibility these firms showed Reimarkt decided to switch to smaller, family owned, businesses. These businesses could adopt the more innovative approach, but were still no perfect

match for the model Reimarkt would like to operate. The construction companies seem to lack a research tradition, making it harder to work with them in an innovative setting.

However, the fact that Reimarkt won a tender in the market that was set by the local government means that in this case the local government and its idea of value matches with Reimarkt. As the tender preferred a more service oriented solution the local government is considered to lean towards SDL. However, this again shows the diversity between governments horizontally and vertically¹³, making its influence in different areas ambiguous.

Viewing the ecosystem in which Reimarkt operates shows that there is a mismatch with the end-user and partners in terms of the value and service that is offered. This could be troublesome as the firm does not seem to be incredibly successful. Reimarkt operates a business model that is less common than Nederland Isoleert and seems to have more mismatches. Possibly using the corporations as a channel towards the end-user could partially solve this problem.

Aside from these mismatches in the transition from product to service-dominant logic, there are also more concrete influences of context on the business model in relation to the end-user. Legislation can for instance set boundaries to the customer segment that can be targeted. Just like Nederland Isoleert also in the case of Reimarkt it cuts of a valuable part of the market to some extent, social rental housing. *“Especially in the rental market there are a lot of legal barriers; offering sustainability products that lead to a raise of the rent where certain limits cannot be exceeded (e.g. in social rental) because that home will fall out of a segment is sometimes impossible, even though objectively there is an advantage for the renter”*. The raise of the rent might cost the tenant his ‘housing benefit’ or exceed the limit for social rental houses. *“These are situations of which I think: It’s ridiculous that we put up these rules together that make these things impossible”* (Interview Reimarkt, 2015).

5.1.3 Buurkracht

Buurkracht¹⁴ is an organization that tries to motivate and activate people to engage in energy saving measures. The organization, which is part of one of the Dutch DSOs Enexis, is a non-profit initiative that helps neighbourhoods become more energy efficient. Being part of the DSO means there is a significant amount of money available to start-up the initiative, one of the success factors of Buurkracht. Besides that, RVO and the EU provided subsidies to do in depth research.

In practice Buurkracht tries to use the end-user as a starting point to set up a guided process of co-creation. They start up a neighbourhood team, consisting of voluntary and enthusiastic members of the neighbourhood. This team is responsible for taking action and tries to get the enthusiasm to spread. In 2016 the 5000th user became active on the online platform after roughly three years (Buurkracht, 2016). The organization is expecting more success in the future.

Buurkracht mainly helps to start up these teams and then informs them and provides the tools and knowledge to have a successful project or as they call it: “guiding the customer journey”. The teams will provide a channel towards other users and organize meetings and assess the necessary measures. For instance they do energy scans, determine priorities for measures and then try to collectively buy the measures. The conversion rate (i.e. the percentage that actually takes measures) is between 5 and 10 percent.

¹³ There seem to be great differences between the national, provincial and local governments in their approaches as well as between local governments.

¹⁴ Free translated to ‘neighbourhood force’

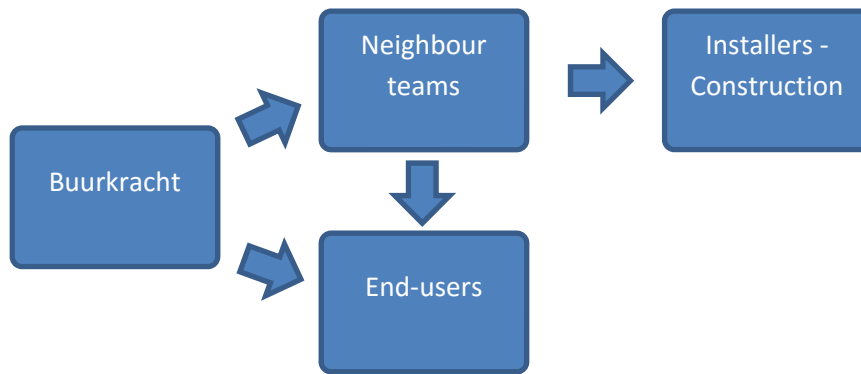


FIGURE 6: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END-USER IS REACHED.

In the business model operated by Buurkracht social cohesion is an important resource and way to reach to people. Social cohesion can be seen as a resource in the business model, but also as a goal in itself. Being so close to the end-user leads to several moments and methods of interaction, these will be discussed below.

User interaction

The business model of Buurkracht is tuned to working with and helping the end-user. To do this effectively Buurkracht feels it really needs to be independent and trustworthy. Hence, a revenue model does not exist in terms of money, only as a goal for CO2 reduction. Furthermore, there are no contracts made with suppliers of measures as this could harm their neutral position. As a DSO the legal options for making profit and selecting suppliers are limited as market distortion by public parties is forbidden; these choices have thus not solely been made to improve trustworthiness. Being so close to the end-user and working at the neighbourhood level also leads to the use of more bottom-up channels: example given, social cohesion (peer-to-peer), local newspapers and magazines, sport clubs, pizza nights, and meetings in the town hall.

As mentioned peer-to-peer interaction is a favoured way of reaching the end-user. This is often done through the neighbourhood teams, who reach out to their peers. Seducing people to start these teams and consecutively start a project has become one of the main activities for Buurkracht. One can thus see that on almost every aspect of the business model specific choices have been made that resulted in a more user-centred business model. Whether these choices were made to avoid market distortion or to provide a more compelling value proposition is debateable.

A first thing that is noticed is that Buurkracht has two different user groups, which require different values delivered. The user as member of the neighbourhood team needs information, skills and an online platform whilst the end-user that the team is serving do not need these things; they value comfort, energy savings and a more financial stable situation amongst others. Different things are also learned from the different end-users. Interacting with the teams teaches what they need and what makes a team successful, whilst interacting with the end-user shows more about the things they value.

The neighbourhood team is an example of co-creation in the business model; the user is a co-producer of value, which also facilitates more interaction through social cohesion as they have an existing network or relation already. One of the lessons learned from this co-creation process was that people like to find out things themselves, rather than being told everything and assuming it is true. This is called the “self-invented syndrome”. Buurkracht noticed this effect and decided to always let the team try out and experience things, even when the likely outcome is known; they only prevent major mistakes; a slight adaptation in the business model as to how this activity is done.

Having the user act as a co-producer of the value offered also led to changes in the value offered to the end-user. In the city of Breda the team noticed safety was an important issue and one of the members noted: *“The way I see it is that sustainability and safety are closely related. For instance the windows, you can look at them in two ways: will they keep the cold out and heat in, but also: will they keep burglars out? These are two aspects you can address at the same time”* (Buurkracht, 2015). Setting safety as a priority led to the incorporation of a “city marine”¹⁵ in the process, who could communicate the value of insulated glazing (double or triple pane) in terms of safety as well.

Interaction between the end-user and the teams is often face-to-face and occurs from *design until use*. Together with Buurkracht the teams for instance organise meetings in a town hall or in the case of Breda; door-to-door. These activities are an important means for Buurkracht to facilitate interaction. Lessons learned from interaction with the end-user are broad. *“There are ten thousand and one reasons to work on your home and in many cases there is a link to energy”*. Learning about this diversity was important for Buurkracht. Different groups of users also showed to have very different interests; these differences exist between levels of education, but also between generations: *“You see that different age groups are in different phases. We would live in a certain home for a couple years and move on. Halfway through your thirties however you will have a home where you live the coming ten to twenty years. These are phases that you really need to be aware of”* (Interview Buurkracht, 2015).

Buurkracht is also partnering with knowledge institutes, such as universities, to refine the lessons learned from the interactions with the user. It aims to find deeper drivers for behaviour and energy saving in a more research setting. This again facilitates an interaction with the end-user; this time for design purposes rather than in the use-phase where face-to-face interaction is used in a private setting.

Indirectly the end-user is interacted with via an online platform. Surveys are for instance sent to users of the platform and usability tests for the website are done. Sometimes this leads to a pizza night where people will show up to help improve the platform. However, the platform also provides data, for example about the reasons why people take action. Buurkracht is thus again actively searching for ways to interact with the end-user and refine their business model and customer journey accordingly. Often this seems to follow a more general loop: interaction is facilitated, lessons are learnt from interaction and the business model adjusted accordingly.

TABLE 5: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: create the neighbourhood team	Co-producing	Partner: give space for self-invented syndrome
	Partner: knowledge institute	Co-innovating Receive information (D)	VP: added safety VP: establish customer journey

¹⁵ The city marine helps with the execution of safety policy in the neighbourhoods. These ‘marines’ try to support initiatives that increase the safety and liveability of the area **Ongeldige bron opgegeven..**

Marketing / sales phase	Channel: team Activity: neighbourhood meetings	Co-producing Receive information (D)	Customer segment / relation/channel: Diversity in user groups, different approaches
Use phase	Channel: team Resource: online platform	Receive information (D) Co-producing Receive information (I)	Activity: which teams are most effective Resource: improvement to platform

Buurkracht is an initiative that puts all focus on the end-user and being a trustworthy and transparent party. In all phases this is visible as the end-user takes up the role of co-producer as the neighbourhood team. In the design phase this team is also actively thinking of tailored solutions and can be considered a co-innovator. Most learning happens through direct interaction; often in the form of neighbourhood meet-ups or bi-lateral conversations. Also in the marketing phase the team is used to convince other neighbours and work with their feedback. In the use-phase indirect interaction and data become more important.

As mentioned above setting up the neighbourhood team is a key-activity for Buurkracht that also facilitates further interaction. These teams essentially become a partner and are a channel towards the end-user. Because of the lessons learned through user interactions Buurkracht in some cases radically changed its business model. The value proposition was for instance broadened to include safety; a significant change to the normal situation.

Contextual influences

There are certain contextual influences that determine the boundaries of the business model operated by Buurkracht. One of those has to do with demographics: their customer segment initially is based on people that like to act together in groups, which for the Netherlands is about a third of the population according to Buurkracht. Especially the elderly like these types of interactions, meaning the build-up of the population in a country or area can be a determinant for the viability of the business model. Furthermore, in this case the customer segment is limited to the area where Enexis, the DSO, is operating.

Aside from this, legislation has a big influence on Buurkracht. As part of a DSO they are subject to very specific legislation as in the Netherlands DSOs are publicly funded actors. The role description of a DSO is to make the grid function properly, not so much to engage in energy saving projects. This means a lot of the things Buurkracht can or can't do are determined; they for instance should not interfere with the market and create unfair competition. To avoid some of these legislative stresses Buurkracht for instance had to choose very specifically within which part of Enexis it should fall. They chose the non-monopolist part (Enexis Holding NV), which was not regulated and thus gave more space to manoeuvre.

Besides these influences, the ecosystem of stakeholders can also have a match or mismatch with the service-dominant approach Buurkracht takes. The initiative can be found at the far end of the line between product dominant logic and service-dominant logic. The whole business model of Buurkracht is tuned for providing the adequate service to the end-users and enticing them to become co-producers

and sometimes co-innovators. In some aspects this approach sees mismatches with other stakeholders in their network.

As mentioned above the activities Buurkracht in the name of Enexis engages in are at the legal boundary of what a DSO is allowed to do. However, the fact that Enexis is owned by provinces and local governments shows that these instances see value in the more service-dominant and user-centred approach. These local and provincial governments thus match with the way of thinking within Buurkracht and are open to its approach. Besides this, there is support available for innovative niche projects such as Buurkracht. Instances such as RVO but also the European Union support these developments and can thus be found on the right side of the line (fig. 6) in this case.

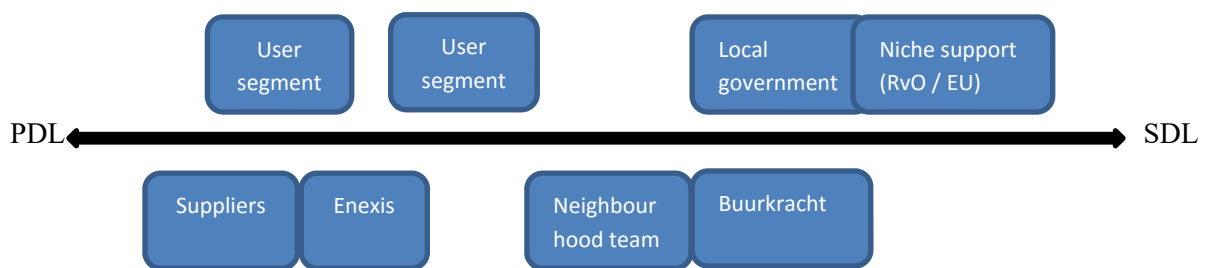


FIGURE 7: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

On the other hand however, the entrepreneur mentioned that there were differences in culture between Enexis and Buurkracht. Within Enexis the stereotype employee differs from the more start-up atmosphere within Buurkracht: *“There you need other types of people than within Enexis. There the focus is on 30-40 year old, bald, good at conserving and managing, especially managing and reducing risks. That attitude is at odds with the entrepreneurial character of Buurkracht.”* This meant that a lot of people with the right skills and competences were not available internally and thus had to be found elsewhere.

Furthermore, Buurkracht tries to engage different groups of users. The primary focus is finding people that are enthusiastic and willing to join the neighbourhood team, whilst also trying to convince the whole neighbourhood, a more diversely minded group. Whereas often elderly enjoy these user-centred approaches there are also groups that would rather just find solutions themselves. The latter sees a mismatch with the business model and have to be targeted differently: *“Our research showed that approximately 30% likes to do these things together, that 30% is the group we serve. Then there is a large group of individualist... ..They see something happening in the neighbourhood but rather do something (arranging energy efficiency measures) themselves”* (Interview Buurkracht, 2015). As Buurkracht sees it, they still get to activate the people that do not match their value proposition as these people act after successful renovations.

Finally a mismatch can be seen in choosing partners. As partnering with a dedicated supplier of measures wears down on transparency and trustworthiness of the project Buurkracht had to choose not to partner with suppliers. They did manage to get some bargains, but always have to leave the choice open for the neighbourhood team. From a product dominant perspective partnering with supplier to achieve scaling advantages seems logical; from a more service-dominant logic this however undermines an intrinsic part of the business model which is built around social cohesion, trust and transparency.

5.1.4 Bas Nederland

Bas Nederland is a firm that tries to get firms to join them on the path to. This path to zero means that the firm becomes independent from fossil fuels by saving energy and generating renewable energy. Bas Nederland is an energy supplier, however the firm wants to split up the company and build a “Chinese wall” between the energy supplying part and the part that provides the path to zero (Interview Bas Nederland, 2015). The latter part acts as an intermediary between firms that demand energy efficiency and those who offer it. Bas Nederland assesses the needs and options and takes control of the process all the way to implementation. Typically the client pays a fixed sum periodically. Saving energy frees up a part of this fee to invest in energy saving measures. This should lead to a situation where the client is independent from fossil fuels.

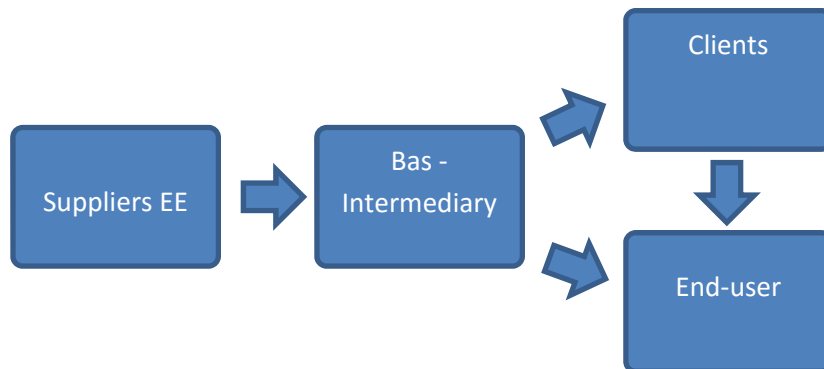


FIGURE 8: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END-USER IS REACHED.

Generally the customers are energy related firms, SMEs and firms with a lot of users themselves (e.g. healthcare sector). According to its CEO, the firm has the capacity to serve 10 times as many customers as soon as their offering is completely finished and fine-tuned.

User Interaction

Bas Nederland has two main ways to interact with their users. Firstly, through bi-lateral and face-to-face interactions with the paying client; these are often in a project setting where wishes and needs are assessed and the project is talked through. Secondly users have the opportunity to communicate in an indirect setting via an online platform and in the future via the app that is being developed.

The face-to-face meetings often lead to lessons and consecutive changes in the business model. In first instance, during the *design phase*, the initial reactions of relatives were tested (e.g. family in law of the entrepreneur). This already showed that people are generally satisfied and in this sense loyal towards their energy supplier and that the costs were still too high for the private market; even relatives decided not to join the path to zero because of these issues. These interactions led to some lessons for which a low amount of effort was needed; the low hanging fruit. This for instance led to a focus on software development (the app can lower costs for auditing significantly) and might have been a reason to decide to split the two sides of the firm as this could remove the barrier that users are loyal to their energy supplier.

Another example is the case of Zienn, an organization that helps and houses homeless people. The conversations with this party led to a broader customer segment; not only were the buildings owned

by Zienn included in the path to zero, also those owned by employees of the organization. This was an initiative taken by Zienn who thus acted as a co-innovator (Interview Zienn, 2015)¹⁶.

Besides this, Bas Nederland noticed from interactions quite early on that the value they offered with their novel business model was not always recognized by firms. Those firms were hesitant to join the path to zero. This observation led to a focus on missionary work: “*We were too optimistic; we thought they [users] would see the sense in it much sooner. We have to talk more, convince. [At that time] we gave over 100 speeches and workshops*” (Interview Bas Nederland, 2015). Sending and communicating became a new key-activity.

Through experience with a client Bas Nederland found out that offering energy efficiency to an organization that has multiple end-users itself means you have to deliver two value propositions: one to the paying client, but also value to their end-user. It for instance is not desirable to have an energy efficient but closed air circulation system in a building that is inhabited by drug addicts. These have very different priorities and needs than other user groups. Bas Nederland thus has to be aware of these differences and change the services and measures it offers accordingly.

During the *use phase* Bas Nederland also interacts with the users via their online platform and in the near future via the app. As mentioned the development of the app started after learning that the auditing system (which costs 250 euros) was too expensive for the private market. The app will be significantly cheaper (10-20 euros) as it allows the user to perform the energy audit themselves. If this is implemented the end-user will thus have an important role in the process as a co-producer.

TABLE 6: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Channel / CR: bi-lateral interaction with client	Co-innovating Receive information (D)	CS: added employees of firms
	Resource: relatives as test group	Receive information (D)	CS: postpone private market VP: separate energy supply and EE supply
<i>Marketing / sales phase</i>	Activity: speeches and workshops	Receive information (D) Send information (D)	Activity: speeches and workshops became much more important
<i>Use phase</i>	Channel / CR: bi-lateral interaction with client	Receive information (D)	VP: tailor the solution to specific user group CR: user will become a co-producer Instrumental
	Activity: software design (App)	Receive information (I)	
	Resource: online platform	Receive information (I)	

¹⁶ This interview was performed by Fiona Tutti.

The main communication with the client and end-user takes place through direct interaction (one-on-one) in the *design, marketing and use phase*. Besides this, indirect communication via the platform will become more important as app development is progressing. This should allow the user to become a co-producer as it takes up the task of performing the energy audit. Besides that, in some cases the client acts as a co-innovator and suggests changes in the business model directly.

After these interactions several parts of the business model changed. The firm is for instance trying to separate the energy and energy efficiency supply, significantly altering the value proposition to avoid missing users that are loyal to their energy supplier. The value proposition was also changed more incrementally on basis of user feedback. Changes to the business model after interaction can thus be considered radical (focussing on app development, separating the energy supply) as well as incremental.

Contextual influences

Bas Nederland notices that in terms of vision and way of thinking, which is service oriented, they are out of sync with other stakeholders in the ecosystem. This means that in some cases the value they offer is not recognized or supported, for instance by potential customers. However, Bas Nederland tries to act on this. As mentioned above over 100 speeches and workshops were held to try and fix this mismatch.

Besides that, Bas Nederland also had to act and try to stretch the legislative possibilities for becoming an energy supplier. Because of this effort the procedure that the ACM has and the requirements for it have changed. So also the government or legislation can have a mismatch. This is also visible in specific legislation that does not allow to sell pre-paid energy, something Bas Nederland would like to add to their value-proposition but can't.

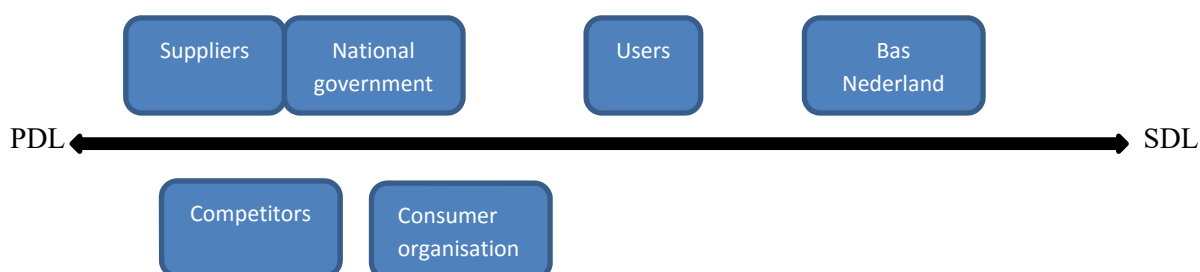


FIGURE 9: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Furthermore, consumer organisations, which often represent and serve the interests of firms or private users, still see a mismatch with Bas Nederland. *“The totality we offer is still a bridge too far for them and I understand that. Once we launce our app and have served our first couple thousand customers we will start to be useful in their eyes”* (Interview Bas Nederland, 2015).

These mismatches can be a barrier for Bas Nederland. Their strategy is to stretch the possibilities and try to get the other stakeholders better aligned with them; their own proposition however changes little in the direction of important stakeholders.

5.1.5 Woonconnect

Compared to the firms we have seen before Woonconnect offers a technology that takes a very different approach to renovations; it calls itself a pure provider of technology. Looking at the firm

closer however shows that the value of the technology is created by services around it. The development of the technology already started in 2001 by ‘de Twee Snoeken’, a firm with a background in architecture. Woonconnect offers an online configurator technology. This tool lets people configure homes online, both for new buildings as for renovation. The paying customer is often an instance with multiple end-users, such as housing corporations. These use the configurator technology to provide extra value to their users. Woonconnect thus has to be able to provide different values to these different user groups. The paying client gains value by an improved experience and satisfaction of their users, but also become much more efficient on the whole process; architectural drawings, energy performance indicators are for instance generated automatically.

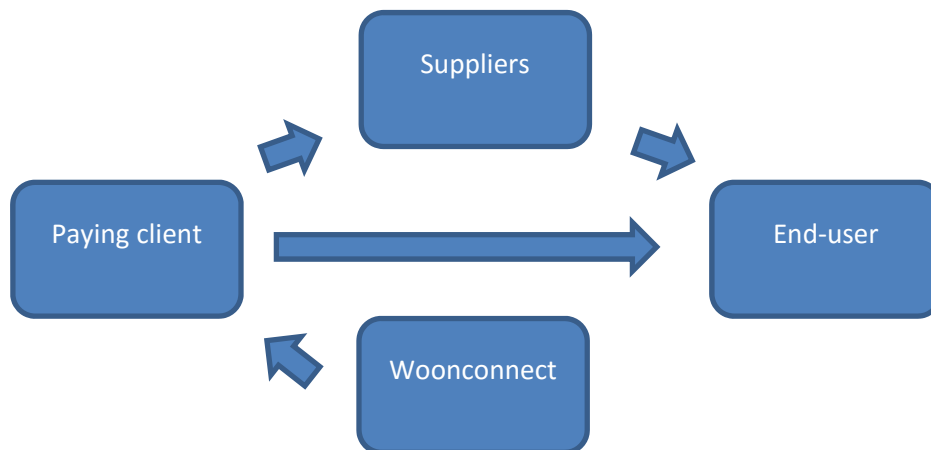


FIGURE 10: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END-USER IS REACHED.

In practice Woonconnect gets involved by a paying client (e.g. a housing corporation) that wants to either build a new building or renovate. Via the tool the clients of a housing corporation (the end-user) can configure their home online. These configurations can be very diverse, ranging from a new door, an extension of the home, even an extra floor or insulation measures. This means that energy efficiency is just one of the many possible results. Extra insight is given in the energy performance of the building and possible costs avoided by taking specific measures. Aside from that, data about the measures that are demanded makes the process for suppliers more efficient as well. For these services and creating this infrastructure the client pays 250 euros per building. Woonconnect is not generating any profits yet; it still needs to scale up to become profitable.

User Interaction

The Woonconnect platform offers a means for its paying clients to interact with their end-users. The configurator tool has many options and can itself be changed to the liking of the client. In this sense the client decides what options are available to the end-user; this can range from a couple standard solutions to a house that can be fully designed by the end-user. The paying client is involved as a co-producer of the value proposition. In addition to the influence of the client, the end-user is also important in the *use and design phase*; he or she is involved as a co-producer in the business model as it has to actively configure its desired house and thus taking an important part in the process. The end-user has a lot of freedom for experimentation in this phase and can immediately see what a choice would mean for his design; the service and user together create value in use as defined by Vargo and Lusch (2004). Doing the configuration themselves makes the service more transparent to the end-user and seem trustworthy.

User interaction is partly facilitated by the online platform. On this platform users can show their needs, but can also be asked to give specific information. Finding out the user needs is often the

starting point for Woonconnect. Via the platform the interaction is very indirect and on the initiative of the end-user. In some cases this is also done more directly. An example can be found in the city of Arnhem, where Woonconnect went door to door in an apartment building. “*We asked the residents what the pains in their living experience are. The energy bill wasn’t even in the top 10*” (Interview Woonconnect, 2015). This taught Woonconnect to change the value proposition slightly and try to find and solve the pains that are important and make the ideal combination with energy efficiency measures.

Another way of getting this kind of information is through surveys. This approach can be done directly (e.g. door-to-door visit) and indirectly via the platform. Often Woonconnect engages in direct interaction with the user in this way. These surveys not only give information about the behaviour and needs of these users but also about the way to approach them and how to perform the surveys. In a sense they thus engage in different types of learning; first and second order. An example of first order learning through the surveys is through asking about the behaviour of a user, which turned to be important in some cases: “*for different individuals a measure can have a different meaning as they tend to behave differently as well: you can offer someone that never showers at home a heat pump, but if he showers at the gym that just has no point*” (Interview Woonconnect, 2015). Besides this, second order learning is done. The way people are asked for feedback has changed through user-interaction. It turned out that the user wants to determine themselves how and what to answer; some want to be very specific and short while others want to give more detail and information.

However, the end-user is not the only one to take into account; Woonconnect also has to deliver its value proposition to the paying client. These paying clients determine the value proposition towards the end-user for a great extent. The client can determine which data is stored, what the available options for the end-user are and what the degree of freedom of choice is for the end-user. Some clients for instance are not interested in the social component that Woonconnect offers; in some cases the needs of individual users are thus not taken into account as much as Woonconnect would recommend to.

Woonconnect thus interacts with the end-user in the *design as well as use phase* through their online platform and more directly by going door-to-door and submitting surveys. This information is provided by the user autonomously; it gives valuable information and co-produces value. In the *marketing phase* interaction is directed towards the paying client rather than the end-user. Throughout the process from design to use the paying client is interacted with on a project base.

TABLE 7: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: pilot project	Receive information (D)	VP: focus on win-win (EE and ...)
	Activity / channel: surveys via online platform	Receive information (I)	Activity: changed how surveys are done
<i>Marketing / sales phase</i>	Activity: expert workshops	Receive information (D) Send information (D)	

Use phase	Channel / CR: bi-lateral interaction with client	Receive information (D) Co-producing	VP: tailor the solution to client and end-user
	Resource: tech / online platform (end-user)	Receive information (I) Co-producing	VP: incremental change Instrumental

Woonconnect intentionally organizes interaction to learn and improve the offer. This is done by organizing activities such as pilot projects and surveys, using different channels to reach the user and client and with their most important resources: the technology, database and its online platform.

The interaction has resulted in add-ons to the proposition and changes in the way learning takes place. On the one hand first order learning resulted into changes in the value proposition, but also second order learning about how to approach an activity that facilitates interaction with the end-user. The changes made in the business model afterwards interaction are mainly incremental, yet the business model is open to change the value proposition as much as desired by the paying client.

Contextual influences

Woonconnect believes its technology can improve some processes in the world of construction and beyond fundamentally. This possibly radical novelty can be looked upon as dangerous or scary by incumbent players. In this sense the novel approach can be a barrier for itself. This section will highlight the matches and mismatches between Woonconnect and stakeholders in its ecosystem in relation to differences in product or service-dominant logic.

One of the problems encountered by Woonconnect is that firms are somehow reluctant to start working with the technology and its options as they are reluctant to change their own firm's processes very radically. Furthermore, some of the features (e.g. automatic architectural drawings and EPC measurements) can make a part of an employees' job description obsolete.

The clients and users in the construction sector are not used to the freedom of choice that Woonconnect offers: *"they think that having five choices is quite decent already"* (Interview Woonconnect, 2015). In that sense competitors that offer some degree of choice are still more in sync with the expectations of the end-user; Woonconnect creates value that is not yet demanded.

Woonconnect on the other hand is in sync with some local governments and some housing corporations. These are in some cases contractors and help the firm with projects from which they can learn and improve the concept. Especially the co-creative nature, where the end-user gets a voice in the process sometimes appeals to some local governments.

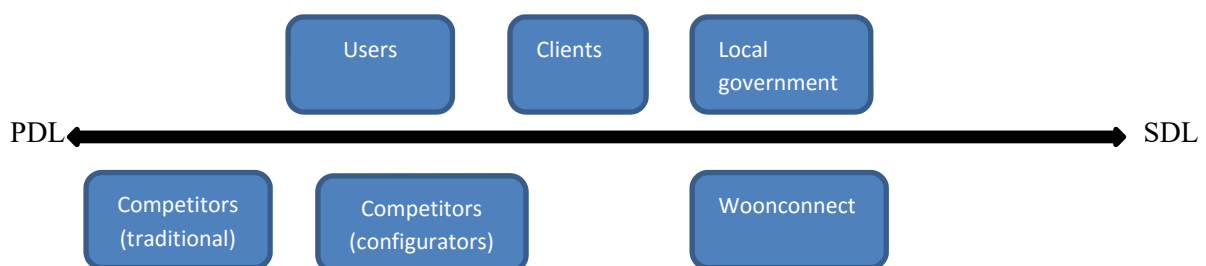


FIGURE 11: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Woonconnect also noticed that their holistic approach to process automation can be a barrier to some firms. Many firms already made investments in some aspects of the process. When a firm for instance invests in a system that delivers EPC values based on digital architectural drawings a part of the functionality Woonconnect offers is made redundant. Due to the sunk costs firms might decide not to go for the holistic and integral solution Woonconnect offers.

5.2 Lighting solutions

In contrast to the market for renovations the market for lighting solutions is seeing many sustainable developments and growth. Especially LED lighting is a promising technology that is quickly spreading. As of 2015 almost half of the private market uses LED lighting and the same trend is visible in public buildings and industry (de Groot, 2015). The market is predicted to grow 30% annually as technology improves and becomes cheaper every year (McKinsey & Company, 2012).

Lighting is mainly supplied by a couple large firms such as Philips and Osram and a lot of small retailers and LED specialists. The large retailers focus more on governments, public buildings and large businesses while the smaller retailers focus on smaller clients, for instance SMEs. Especially the smaller retailers are very diverse and some offer inferior products for a low price, which is something the government and consumer should be aware of.

Besides the energy agreement's aspirations for energy saving in the Netherlands, which are mentioned earlier, there are also specific goals for public lighting: by 2020 an energy efficiency goal of 20% energy savings should be realised in public lighting in relation to the 2013 energy use and 40% of the lighting should include a smart energy management system (SER, 2013). So especially the latter goal could push smart lighting solutions.

Moreover, the market for energy efficient lighting has seen a boost since the government banned the sales of incandescent lighting in the period between 2009 and 2012 (Milieucentraal, n.d.). This decision was made based on EU energy efficiency requirements of lighting, which incandescent lighting and some halogen lamps do not meet. Investment in energy efficient lighting is furthermore supported by the EIA and sustainability loans.

The market for sustainable and energy efficient lighting is thus growing steadily and seeing many developments. One of the main problems is that several suppliers sell lighting of bad quality for a good price which creates harsh competition and makes the market less sustainable (Interview Philips, 2015; Interview LED Design Holland, 2015).

5.2.1 LED Design Holland

LED Design Holland is a LED specialist. It offers complete lighting solutions mainly to other firms or organizations. Their process starts with cold acquisition, door-to-door, after which they try to convince firms of the benefits of LED lighting. If successful the project plan is made and cost and benefits for the project are communicated. Based on the wishes of the client help is offered for subsidy requests, financing and service contracts. Common clients for the firm are other SMEs. Generally the customer relation ends after the technology has been installed. In terms of success the firm is able to provide a living for its owners, two young entrepreneurs, which is as much as they had hoped for.



FIGURE 12: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END USER IS REACHED.

User Interaction

The end-user is interacted with during *marketing phase* and the initial *design phase* of a project. They are an installer; as soon as the product is delivered it should function for 15 years and the customer relation will often be minimal. As mentioned, the main channel to get to sales is cold acquisition. In this stage the flow of information mainly flows from LED Design Holland to the end-user; the focus is on sending rather than receiving information. In later conversations also the user communicates its needs as together they set out the project details. User interaction is thus mainly used in the marketing phase to communicate values, both from firm to user and vice versa. Finding out the basic market needs is seen as an obvious and relatively easy thing to do: *“it’s important to listen to your customer and learn from them if necessary; ...it’s often not rocket science.”* (Interview LED Design Holland, 2015).

LED Design Holland learned several things from speaking and interaction with their customers. Often it led to incremental improvements in the business model. For instance they found that the end-user values insight in the savings that are realised. To make this insightful they tweaked their offer and now show a demo model. Furthermore, they learned not to communicate in their specialist jargon; often the end-user is not familiar with these terms and will thus not be able to make a good judgement based on them: *“people often lack the technical foundations to see ‘lumen output’ and know what it is”* (Interview LED Design Holland, 2015). Finally they found that there was a demand for different financial constructions than a simple initial investment. To facilitate this they partnered with a financial party that made long term payments possible. These are all add-ons to the initial business model. The latter however meant several changes: a partnership was made, the cost and revenue structure changed and a service added to the value proposition; this change could thus be called radical.

Another change in their value proposition was made; the firm offers help to simplify the process of getting subsidies and fiscal advantages. The firm learned in their projects that firms often find it difficult to oversee the different financial and fiscal possibilities available for LED lighting. These often difficult policy tools required LED Design Holland to give advice and help their end-user in the process; an additional service offered. This also impacted the customer relationship to some extent: *“We help and advise our customers partly in their subsidy requests, which is possible for LED lighting. After installing we will thus sometimes be in contact with the customer for some weeks”* (Interview LED Design Holland, 2015).

TABLE 8: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Resource: friends and relatives	Receive information (D)	VP / CR: Avoid jargon

Marketing / sales phase	Channel: cold acquisition Channel / CR: bi-lateral interaction with client	Receive information (D) Send information (D) Receive information (D)	VP: provide tangible insights in savings Activity: show a demo-model Partner: for long-term payments
Use phase	CR: available for contact	Receive information (D) /	

In short user-interaction is used to mainly incrementally improve the business model and is primarily done in the marketing phase. The interaction always takes place in a direct form; one on one conversations with end-users and is often done to give information to the end-user and sometimes to learn from them as well. This process is seen as a logical thing. As mentioned these interactions resulted in incremental add-ons or changes to the value proposition.

Contextual Influences

LED Design Holland is a company that sometimes tweaks the business model when needed. In relation to stakeholders in their ecosystem they seem to fit well with their product dominant approach; they are in line with available subsidies, expected value and offer from the user and the supplying partners. These are all still product driven.

One obstacle in the context is the competition in the market. There are several competitors that take advantage of the novelty of the product and low level of knowledge at the end-user side; they offer relatively bad products for a low price (Interview Philips, 2015). *“When you have these ‘LED Cowboys’ around you that talk nonsense, you have to make much more effort to convince someone that your tube that is twice as expensive is of better quality”* (Interview LED Design Holland, 2015). LED Design Holland is more ideologically driven and wants to offer the best solution. Competition thus pushes them to search for better ways to convince users of their value as they intend to deliver the best product available.

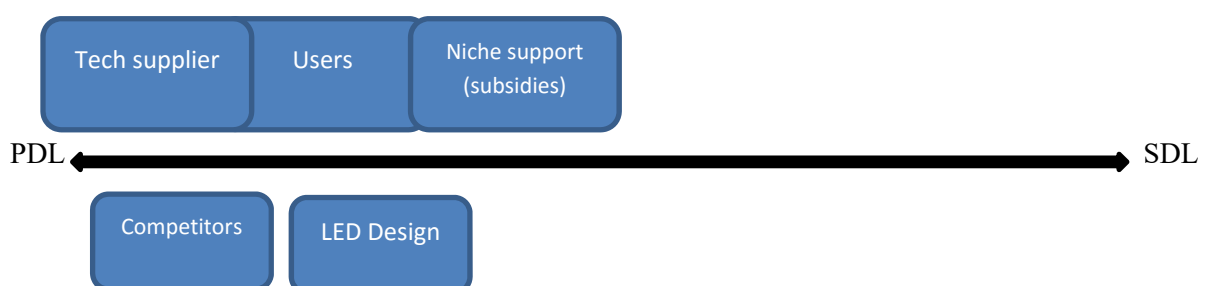


FIGURE 13: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Besides the stakeholders’ position in the transition towards SDL, there are several contextual factors strongly influence the business model operated by LED Design Holland and the way they have to communicate or deal with the end-user. An example of a legislative influence is the build-up of the energy tariffs in the Netherlands. Users at the residential level pay a different, higher, price per kilowatt hour than users at the industrial level. This also implies that energy saving measures have different pay back times for these different user groups. LED Design Holland accounts for this in their

offers and thus has to slightly change its cost and revenue structure towards different users. Furthermore, this means that they have a better business case for smaller users.

5.2.2 Philips Lighting¹⁷

Philips is a large multi-national that today produces a broad range of products. From origin Philips is a light bulb producer which now focusses on LED lighting. Recently Philips made a change in their business model: they changed from being a producer of light bulbs to being a service provider. With ‘light as a service’ the user pays in terms of output: lux. As a result of the change towards a service Philips remains the owner of the product and will focus on services and activities that enable a circular economy (retrieval of products, recycling, refurbishment etc.). The circular economy is a next step towards sustainability and allows Philips to capture more value in the supply chain.

Philips targets very diverse groups of customers. However, light as a service is mainly available for large firms and organizations. An important group is reached through the Ellen Macarthur foundation, which explicitly aims to achieve a circular economy. Philips is part of its network, which is used as an early customer base.

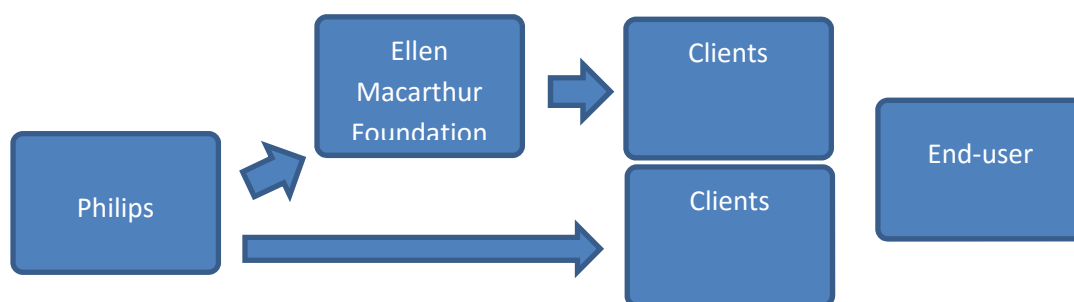


FIGURE 14: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END USER IS REACHED.

User interaction

Philips tries to very consciously learn from the end-user in the *design phase* in the form of research and pilot projects. Research as well as devoting financial and human resources are called a necessity to be able to move to a different portfolio as a company.

To get closer to practice Philips also engaged in pilot projects in the *design phase*. An example is the office building of Deloitte, a Dutch accountant. To realize this project Philips partnered with Deloitte and OVG, a real estate firm. More than 30.000 sensors and ‘intelligent’ LEDs¹⁸ have been installed to make the building more efficient and at the same time give the occupants the ability to personalize the lighting with their smartphone. Philips aims to learn about the social and technological possibilities of personalized lighting more through these projects. In this case Deloitte can be seen as a co-innovator, closely involved in the research process. Besides lessons through direct interaction with the users of the building, the connected lighting system can also provide data; the user is thus also interacted with indirectly.

In the *marketing phase* Philips mainly uses bi-lateral interactions to persuade firms to become a customer of their lighting solutions. As mentioned they initially target firms involved with the Ellen MacArthur foundation whom they ask: “Do you have circular lighting yet? They will tell you no, then

¹⁷ The interview was held by Renske Bouwknecht and Joost Tolkamp

¹⁸ Philips introduced connected lighting: the LED receives its power through the Ethernet cable and can thus also transfer information: it becomes intelligent.

you have a new appointment. So you start with clients that are willing and they will spread the word and proudly tell about their building. That's the way we roll this out" (Interview Philips, 2015).

Changing from product to service changed the customer relationship significantly in the *use phase*. In the traditional setting the customer relationship to a large extent ended at the purchasing decision whilst now service contracts and more regular contact are necessary. However, in the *use phase* user interaction is still limited; if all works well no additional interaction is needed except for the pilot project.

TABLE 9: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
Design phase	Activity: pilot project Key-partner: pilot partner/user	Receive information (D) Co-innovation	VP: discover the options for smart/connected lighting
	Activity: customer research	Receive information (I)	/
Marketing / sales phase	Channel: Ellen MacArthur foundation	Receive information (D) Send information (D)	CS: focus on dedicated clients
Use phase	Resource: data from smart lighting	Receive information (I)	VP: options for lighting
	Channel/CR: long term relation and contracts	Receive information (D)	/

Philips thus mainly interacts for learning purposes in the design phase. These interactions show the possibilities for intelligent lighting solutions. These solutions also generate data that can be used for learning purposes. In the later marketing phase bi-lateral direct interaction is common; this is done to send information in first instance rather than to learn from the user. Working together on a project base however does provide opportunities for learning. Lastly in the use-phase there is quite minimal interaction; Philips has a closer customer relation than it traditionally had, but if the systems function direct interaction is still limited.

These interactions led to changes in the business model, for instance in the customer segment which focusses on dedicated clients. However, the most important changes in the business model that Philips operates are triggered by the switch from a product to service supplier. However, this switch was not solely made on the basis of insights provided by user interactions, but by insights that the firm had from an architect (Ellen MacArthur Foundation, 2011) and developments in circular economy (Interview Philips, 2015).

Contextual influences

There is still a large user base that is not ready for light as a service yet. The shift from lighting as a product to light as a service can be seen as a transition and these generally take around 40 years (Interview Philips, 2015); this means it will take time before the large majority is on board. The needs of the majority thus do not match yet with the values offered by Philips. On the other hand, the firms

reached through the Ellen MacArthur foundation do fit the value proposition. Focussing on these firms provides Philips possibilities to spread their service amongst early adopters. Being a front runner in energy efficient lighting and finding users that value this is suggested to have been one of the success factors for Philips (Interview Philips, 2015).

Aside from this part of the user base, some existing structures with firms or governments can be a barrier to the adoption of light as a service. *“A customer, for example a government, could have their own service organisation that for instance maintains street lighting. That can be done very traditionally: an employee just drives around in the evening and sees a broken light. He notes this and the next morning there is a report on the desk of maintenance service”* (Interview Philips, 2015). This process can go on and on and could be done much more efficiently using intelligent lighting. Sometimes employees within these traditional organizations might however fear losing their jobs; these can then undermine the decision making process. This poses a challenge for Philips who has to find out how to deliver value to all stakeholders.

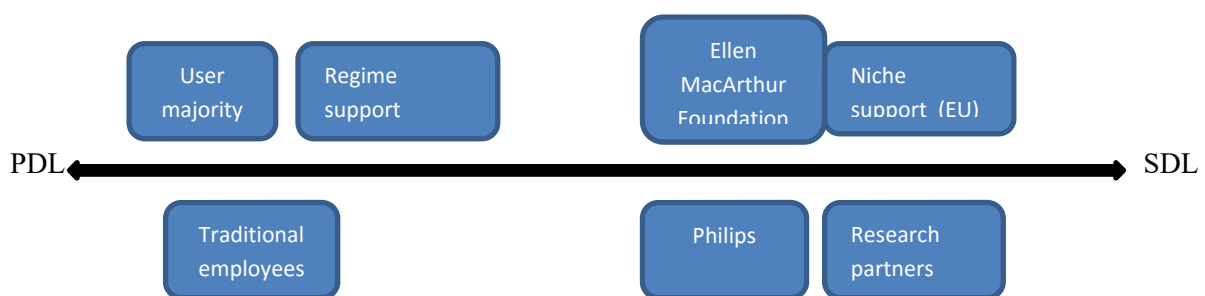


FIGURE 15: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Philips is positive about the pro-active stance of the government, which tries to remove legal barriers that still exist. An example of a barrier is found in waste legislation; some hazardous materials legally cannot be re-entered in the supply loop. *“The term ‘waste is food’, which cradle-to-cradle advocates, is thus not completely true”* (Interview Philips, 2015). The government is aware of these problems and tries to speak with stakeholders to resolve this. According to Philips the European Union is also looking at the circular economy and will publish a white paper that possibly leads to new legislation. In the transition the role of the government is very important.

5.3 Smart solutions

The market for smart solutions is still new compared to retrofitting and lighting. Smart solutions include smart thermostats and home energy management systems. These generally use real-time data to inform and engage the user.

The market still sees many new firms and products. Also international companies, such as Google with Nest, are entering the market (Geschickter & Sumic, 2014). Important stakeholders in the Netherlands are the electric utilities. Because of fierce competition on energy prices and the EED these stakeholders want to add smart thermostats or energy management systems to their offer (Interview Eneco, 2015). This way they can offer more value to the customer and retain them. The utilities often partner with soft- and hardware development companies that offer the products.

Development of these smart solutions has been triggered by several events. For the utilities this has been the privatisation of the energy market and the formation of the Energy Efficiency Directive which forces firms to decrease energy use by 1.5 percent annually (European Union, 2012). Also the introduction of the smart meter has created and will create opportunities which entrepreneurs

anticipate (Interview Greeniant, 2015). Furthermore, the upsurge of smart phones and appliances and open data has led to developments towards for instance a smarter home.

The market is seeing a lot of developments and possibilities and is still much more focussed on R&D than the more traditional energy saving solutions. This also means there are still more risks and uncertainties. For instance, it is not completely clear whether insight in energy use results in lower use and how this can be improved (Ayres et al., 2013). As behaviours become more important with these kinds of solutions multiple areas of research become important; this makes the market and its contribution to energy efficiency more complex.

5.3.1 Greeniant¹⁹

Greeniant is a company that provides smart services based on smart meter data. This data allows for services provided in three areas: information about energy use, information about appliances (e.g. for maintenance, hours operated) and behaviour. The data and smart meter are the main resources, along with the knowledge of what to do with them, the distinctive feature of the firm. Greeniant can disaggregate smart meter data and identify the energy use of single products.

Greeniant offers solutions to clients with a large number of users such as corporations, energy suppliers or insurance companies. The model could be characterised as business to business to consumer (B2B2C). They typically are in close contact with both these groups and provide different value propositions to them. The revenue model is a service fee subscription model: Greeniant asks a service fee, based on the number of users. There is a minimum number and the fee is generally a couple euros per user. Furthermore, having more users means scale advantages, thus lower prices. How successful Greeniant is remained unclear until they filed for bankruptcy in December 2015 (FaillissementsDossier, 2015). This shows that their relatively user-centred approach does not guarantee success.

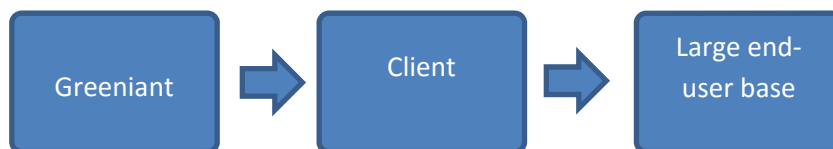


FIGURE 16: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END USER IS REACHED.

User Interaction

Greeniant calls itself a design led company. In its model the design of the service is based on the wishes and needs of the end-user; the customer takes a central position in the proposition. However, Greeniant has not always been service oriented. Their starting point was a technology that could deliver insight in energy use and could benchmark your appliances and suggest improvements.

In the early start-up years Greeniant frequently interacted with users, for example in cooperation with Eneco they went to people and asked them directly how and why they used appliances. These interactions taught Greeniant a harsh lesson: “*We told those people our technology can show what doing laundry costs per wash and it is very confronting to hear: I don’t want to know*” (Interview Greeniant, 2015). The lesson learned was that the application of the technology they had in mind was not the right one and that they have to ask the user what application their technology should be used for. This meant a business model change from a technology driven offer to a user-centred offer.

¹⁹ The interview was held by Renske Bouwknecht and Joost Tolcamp

In this *design phase* Greeniant also interacted with people that were close to the company. The first testers within Eneco for instance were familiar with the CEO of Greeniant and also direct relatives gave feedback. This was done through direct interaction. These sources confirmed that identifying the energy use of application in itself was not interesting. In combination with the research done with Eneco, this led to a significant change in the value proposition.

In essence also Greeniant has two users to satisfy with the value proposition, a paying client and the end-user. Interacting with the end-user gave them valuable insights as to which problem to solve for them. For one client (a farmer association) Greeniant had to provide a service to farmers that would result in a 2% energy reduction. During a presentation and meeting in the marketing phase Greeniant could directly interact with the farmers the firm found out that insight in the energy use of their appliances did not raise any interest; what did raise interest was showing the cumulative use of a specific appliance. In this case the farmers all used vacuum tubes that lasted for a specific time (e.g. 150 hours of use); alerting the farmer that he had to change the tubes was a service that was needed and much appreciated whilst it saved energy as well. This showed Greeniant that they have to offer different value to their client than to the end-user and that the value that you provide to the end-user does not necessarily have to have anything to do with energy or energy efficiency.

A lot of the information Greeniant gets and learns from is gathered during the *use phase* in the form of data which the CEO sees as ‘the new oil’. Data gathering and processing is the key to the value proposition Greeniant offers and this indirect form of interaction often leads to incremental changes within the firm. Often this indirect interaction takes place through an online environment or an application; this makes the interaction very quick and easy. It is for instance being used to test the effects of changing to an English version as Greeniant is looking to expand to other countries. Using the platform to interact can deliver quantitative as well as qualitative information and lessons learned are first and second order lessons: on the one hand finding out the values needed for the end-user and with which techniques for analysis can we find this out best.

An example of a second order lesson is the difference between the social practices involving washing versus the appliances used for it that Greeniant became aware of. Greeniant found out that you should target behaviours and practices rather than appliances as these are something that is recognized by the end-user.

TABLE 10: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: user research Partner: research partner	Receive information (D) Receive information (I)	VP: focus from technology push to user centred Activity: solve problems of user and client
	Resource: relatives / friends	Receive information (D)	VP: focus on other things than insight

Marketing / sales phase	Channel / CR: bi-lateral interaction with client Activity: end-user meetings	Receive information (D) Receive information (D)	VP: focus on alerting the end-user
Use phase	Resource: usage data CR: user as data provider	Receive information (I) Co-producing	Resource: incrementally improved VP: shows effect of adding features

Greeniant is a firm that consciously aims to learn from its users and lessons learned have caused several shifts in the business model. This started in the design phase where they learned from relatives and friends as well as a large research project together with Eneco. Furthermore, data has a pivotal role in the firm, also in relation to learning from the end-user. In the later marketing phase users of Greeniant’s technology are spoken with, for instance in group meetings. These are organized to give and receive information. Finally in the use-phase indirect interaction, through the generated data, is important; as this is a central element in the business model the user could be called a co-producer.

The interactions resulted in a radical change to the value proposition. This changed from a technology driven way of delivering insight to a focus on user research and offering value on the level of social practices instead of appliances. Furthermore, the value is delivered as insight but one step further, by alerting the end-user. Also more incremental changes to the software, a key-resource that is offered, are triggered by user interactions.

Contextual influences

In the ecosystem of stakeholders there can be matches and mismatches in relation to the user-centeredness and service-dominant logic Greeniant applies. A mismatch for instance became apparent when Greeniant found an investor. Quickly they found out having an investor can greatly determine your agenda as investors are often financially driven. “*You become less flexible and less of a pioneer*” (Interview Greeniant, 2015). Besides that, the investor was not open to more user research and his product dominant logic impeded the user-centred business model.

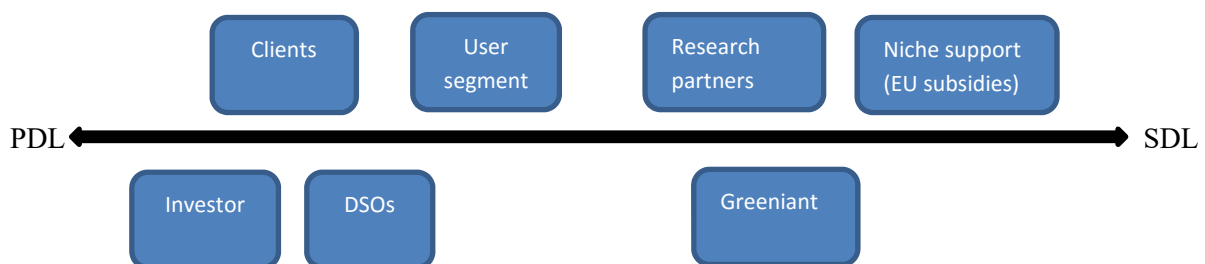


FIGURE 17: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Greeniant noticed that the mismatch as seen with the investor is a much broader problem. Similar mismatches are seen at various stakeholders, such as the local and national government, utilities, DSOs and other clients; they have not realised yet that there are more values to offer. Often there is still a focus of delivering energy efficiency as a value to the end-user instead of solving their actual needs and pains.

There is also a more general context that influences the business model. As Greeniant does not serve only a specific market type a lot of different market contexts can play a role. In the example of dairy farmers the agro covenant that says these firms should aim for a 2% annual reduction of energy was an important starting point (RVO, 2014). However, in all cases there is one important resource for Greeniant: data supplied through the smart meter. The firm is heavily dependent on the use of smart meters. *“If the government were to decide we can only read out smart meter data digitally two times a year we would not be able to do anything anymore”* (Interview Greeniant, 2015). The roll-out of the smart meter is also an important point of consideration when looking for other countries to expand to.

5.3.2 Eneco’s Toon²⁰

Eneco is a Dutch energy supplier that was founded in 1995. The firm had around 7000 employees 2014 and is active in Belgium and the UK as well, serving a total of 2.2 million customers (Eneco, 2014). After the liberalisation of the Dutch energy market Eneco noticed the growing competition. Combined with the insight of Jeroen de Haas, the CEO of Eneco, that sustainability would be a lasting trend and issue a new path was chosen. Since 2007 within the firm all eyes turned to sustainability and becoming a *“beloved company”* (Interview Eneco, 2015).

One of the ways to reach this is Toon, which is one of Eneco’s products used to enable energy saving at the end-user. Over 160.000 are in use as of September 2015; the introduction of the smart thermostat can thus be considered quite successful. Toon is a smart thermostat that also provides insight in energy use and related information such as weather forecast. Doing so, it has become an interactive interface in the home.

From Eneco’s perspective the device is also used for customer retention and to acquire new customers. Initially they offered Toon when engaging in a long term contract. The smart thermostat can be seen as one of the steps towards a utility that provides value through services. For instance, Toon provides the user with insight and control over their energy bill. As of the start of 2015 Toon also became available for customers that do not have an energy contract with Eneco.

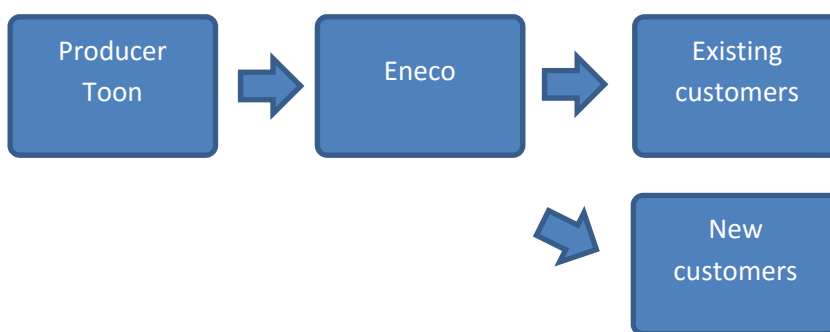


FIGURE 18: NETWORK OVERVIEW OF THE CHANNELS THROUGH WHICH THE END USER IS REACHED.

User Interaction

The introduction of Toon, as it is an interactive interface, provided a means to interact with the end-user. In first instance it was used to indirectly interact with the user as data on the usage of Toon was reviewed quite early on. This led to the realisation that this could deliver more value than a smart thermostat. It can potentially become an interface for a smart home and all sorts of applications that come with it; *“the brain for your smart home”* (Eneco, 2014).

²⁰ The interview was held by Joost Tolcamp and Ruth Mourik.

This also led to the realisation that to find out what the demands and needs of customers are you have to actually go and talk to them. This was a next step, a new activity for Eneco. The user and its needs are thus becoming more important to Eneco since the radical shift the company made and introduced Toon. *“I wouldn’t be honest if I say this has always been important of course. Looking with a focus on the last ten years, from a monopoly position the end-user wasn’t important”* (Interview Eneco, 2015). In the *marketing phase* talking to the end-user showed Eneco that there was a lack of understanding and trust on the end-user side. The users did not understand why a firm that makes money by selling energy would want to help you save energy. This lesson showed Eneco it has to work on becoming trustworthy and communicating transparently what’s in it for them.

Talking to the user and receiving feedback is done in the *use phase*. On several occasions user groups, consisting of end-users and employees, are asked about their experience via a questionnaire. This is a method of learning from practical use of the smart thermostat that originally started among employees but that now broadened to a large group that also consists of end-users. It is mainly used to incrementally improve Toon and test whether add-ons are effective and appreciated. Furthermore, test groups are used to confirm whether energy savings are achieved.

The development of the technology for Toon started out with a partner, Quby. However, developments keep going faster and faster. This was a reason to look at integrating start-up communities and end-users in the *design process*. For example during the Dutch Design Week. The event in Eindhoven was an opportunity to interact with end-users and have them come up with new ideas. These users range from students to heavy users and influencers. Eneco organized a brainstorm and Hackathon where the groups could try to developed the user interface for Toon from different perspectives. In this way the end-user is thus used as a co-innovator. *“You can try to innovate by yourself, which takes a lot of exercise, money and time. If you have open innovation, you get much more ideas in less time, with less money”* (Interview Eneco, 2015).

Another strategic choice of end-user interaction concerns media and other influencers. Eneco actively engages in conversations with these kinds of critics and follows influential bloggers and vloggers in order to be able to be a participant in the conversation: *“They will be talking about you anyway, you can’t stop it. So then assure you get involved in this conversation”* (Interview Eneco, 2015). In this case Eneco tries to send and receive information.

TABLE 11: AN OVERVIEW OF FACILITATION OF USER INTERACTION IN THE BUSINESS MODEL AND THE IMPACT OF USER INTERACTION EX-POST.

	Business model facilitation	Type of user interaction	Business model changes after interaction
<i>Design phase</i>	Activity: hackathons, design competition	Receive information (D) Co-innovating	VP/Resource: improved, new design Costs: cheaper innovations
	Resource: data from early adopters	Receive information (I)	VP: many values in Toon beyond insight

Marketing / sales phase	Channel: social media / talking to influencers	Receive information (D) Send information (D)	Activity: direct interaction needed to find out user's needs Activity: focus on creating trust
Use phase	Activity / CR: create test groups, do surveys	Receive information (D) Receive information (I)	VP / Resources: incremental improvements to the technology and offer

In every phase Eneco tries to actively interact with the end-user and uncover its needs. In the design phase the user acts as a co-innovator; design competitions and hackathons are held to involve the user with design problems. Furthermore, reactions are tested directly and indirectly. In the marketing and use phase Eneco actively speaks with social influencers (i.e. bloggers/vloggers).

The interaction mainly led to changes and add-ons to the value proposition. Furthermore, Eneco found out that finding out and delivering values requires direct contact with the end-user, which was not needed from their earlier monopoly position. Having the user as a co-innovator also changed the costs structure and R&D activities that are done in house.

Contextual influences

For Eneco pressures from the context have been very important for the development of the business model. The direction Eneco took, towards a more service oriented logic in which the end-user has become much more important, was a result of the changing market after the liberalisation of the energy market. Market liberalisation resulted in fierce competition for customers on the basis of energy prices. To avoid competing on this commodity Eneco turned its eyes towards sustainability and services. To do this effectively the needs and demands of the end-user need to be known. Whereas from a monopoly position the end-user was not important Eneco now became much more service oriented.

Aside from the liberalisation, the CEO of Eneco at the time had a leading role in convincing the firm that sustainability would be a long lasting trend. This trend and the emergence of the smart phone and smart meter allowed them to move away slightly from the product dominant business logic.

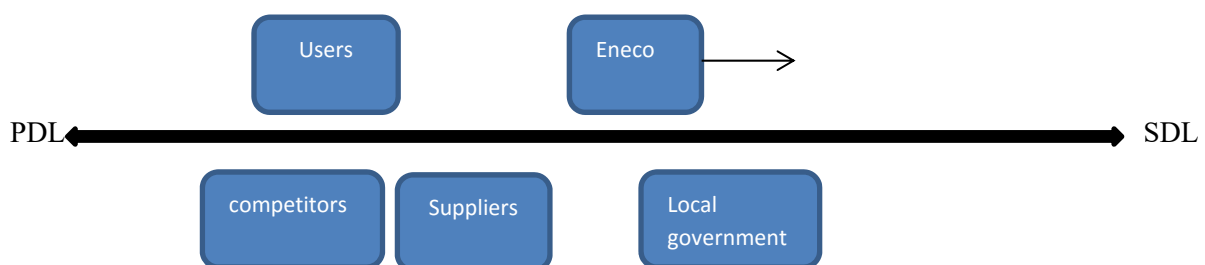


FIGURE 19: OVERVIEW OF RELEVANT STAKEHOLDERS AND THEIR POSITION OF BUSINESS MODEL LOGIC (RANGING FROM PRODUCT TO SERVICE-DOMINANT LOGIC)

Eneco found that this dominant business logic has deep roots, within the ecosystem, but also within the firm. A lot of the employees were still used to the product oriented setting and lacked the necessary skills to be service oriented. It took Eneco several years to successfully perform this

transition within the company itself as all layers of the company, from manager to floor worker, had to adapt to the new strategy.

In addition to the employees, also the end-user is still not familiar with the new business model. As mentioned above, the fact that the business model and the motives for it are not well known at the end-user level can also be a source of distrust: “*Why is an energy company telling me to save energy? That doesn't make sense!*” (Interview Eneco, 2015). So convincing people they will achieve the reduction is a challenge. Doing a pilot project helped Eneco to gain some credibility at this level, besides that, Eneco is becoming more transparent about their interests.

Furthermore, Eneco has to be more aware of the partners it chooses now it is changing its dominant business logic. Sometimes it turns out that they do not match in terms of organizational culture. For Eneco this means that if they are not on the same terms within three meetings those mismatches are still too big. “*It could work out tomorrow or next year, but we need to work on the matching of our organizational culture*” (Interview Eneco, 2015).

6. Results: macro analysis

This section will describe the implications of the findings presented in the case analyses on the research questions. First the impact of user interaction and involvement in the business model is discussed. This is done on the basis of the results of chapter five (See Appendix 4 & 5). Secondly the influence of contextual factors is described. This will be done with the research questions in mind.

6.1 User interaction

This section discusses how users and firms interact and how this influences the business model. It will highlight important aspects of interaction and distinguish between user centred (and service-dominant) and technology driven (or product dominant) ways of thinking. The aspects are the phase and type of interaction, the typical process a firm follows when interacting and the changes to the business model when interacting with the end-user.

6.1.1 Phases of interaction

The first sub-question related to the phases in which firms interact with the end-user. Interaction with the end-user can in essence be facilitated in the business model at any stage from design to use and even beyond. However, traditionally there has been a lot of focus on user-centred design. This term, with its origins in human computer interaction (Abrams et al., 2004), automatically puts emphasis on involving the end-user in the design phase. Furthermore, it focusses on improving a technology or product and tailoring it to the end user. This thesis however takes a broader perspective, that of the business model.

As the literature review showed several studies suggest that involving the user in the business model and interacting with him or her should also be done in the use phase of a product or service (Wever et al., 2008). Especially so in the case of energy efficiency measures as the effect of energy efficiency measures becomes apparent through use. In the cases discussed above that were more service-dominant this was the case: the use phase was an important moment of feedback. In the use phase monitoring and evaluation of the product or service can be done and both unsuccessful and successful cases can help to improve the business model. The cases furthermore show that firms can aim to interact during a marketing phase, a third phase for interaction. Especially firms that are product or technology oriented mainly interact with the user in the marketing phase; in the cases discussed above LED Design Holland and Nederland Isoleert mainly interacted through their door-to-door acquisition or marketing campaigns. The user is thus interacted with because of the need to sell a product; using this moment of interaction to learn as well can be seen as capturing the low hanging fruit. It is a low effort moment for interaction from which incremental and radical changes can emerge.

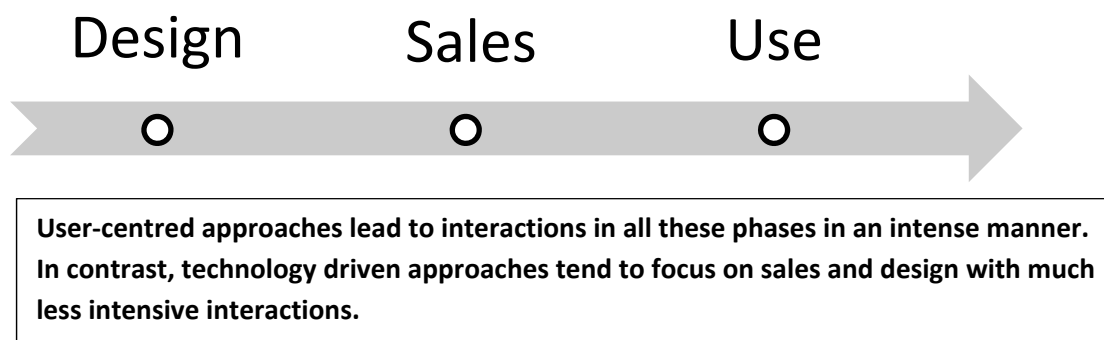


FIGURE 20: PHASES OF INTERACTION: USER-CENTRED APPROACH USES ALL PHASES, TECHNOLOGY DRIVEN APPROACHES FOCUS ON INTERACTION DURING SALES

The following section will describe the process that firms undergo when interacting with an end-user. This process can exist in any of the phases and its basic shape is the same for any interaction; how every step is taken is however dependent on the firm.

6.1.2 Interaction process

Firms with a different vision and business model logic tend to differ in the ways they interact with the end user. However the process of learning from the user looks roughly the same for all firms that engage in user interactions. An example is Buurkracht who intended to involve the user as a co-producer and innovator. To facilitate this, the organization starts up a neighbourhood team, consisting of dedicated users. In the interaction with the users and with other users they reach through them, lessons are learned and the business model is changed accordingly; think of the example where safety measures were installed as well as energy efficiency measures.

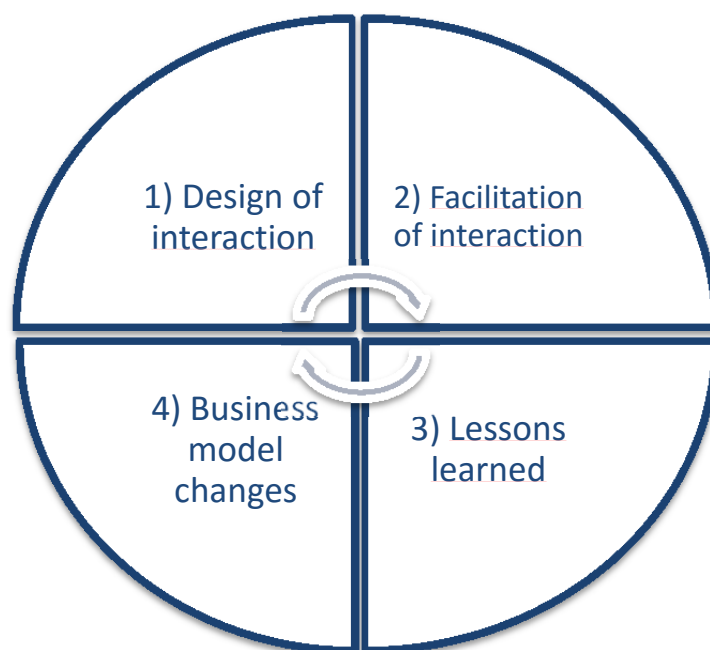


FIGURE 21: THE USER INTERACTION PROCESS.

This process thus has four stages (fig. 20): (1) designing user interaction, (2) facilitating interaction, (3) learning and (4) adjusting the business model accordingly.

Whereas these steps are the same for all firms there are significant differences between firms as to how they are taken. The differences between firms taking a technology driven (TD) and user-centred (UC) approach will be discussed below and are highlighted in figure 23. A black-and-white distinction between these approaches is shown; in practice the differences between the two approaches are more nuanced. The differences that can be distinguished will be further explained below.

6.1.3 Step 1: Design of user interaction

A first step when choosing to interact with the user is to design the interaction and think of the types of interaction to use. The second sub-question asked what types of interaction and involvement can be distinguished in the business model; there are differences between user centred and technology driven approaches. Product dominant firms using a technology driven approach for instance focus on sending

information rather than learning and more often use indirect interactions as a means to improve the offer. On the other hand the user is more involved in user-centred business models; the focus is on co-creating value with the end user. Direct interactions such as bi-lateral conversations are a preferred way of interacting with the user and are abundantly present in the cases (e.g. Buurkracht, Reimarkt, Bas Nederland, Woonconnect, Greeniant). For service-dominant firms who take a user-centred approach interaction is thus a more important activity; more time and money are spent to do this. This section will describe the different types of interaction that can be distinguished.

Cui & Wu (2015) define three categories of interaction that add value to the business model in the sense that they provide customer knowledge and improve the innovative capabilities of the firm: they speak of involving the user as a source of information, as a co-producer and as a co-innovator. In their work Cui & Wu speak of co-producers ‘of innovations’ (Cui & Wu, 2015); in this thesis the perspective of the business model is chosen. The user can be involved and interacted with in a broader sense than for the purpose of generating product or service innovations. He or she can be involved as a co-producer of the business model. A co-producer in this sense is involved in the process of delivering a product or service. Examples described earlier are users that exhibit their renovated homes (Reimarkt), design their own home on an online platform (Woonconnect) or organize neighbourhood meetings (Buurkracht).

From the case study analysis a categorization of types of user interaction in the business model can be made (table 12). These types of user interaction range from a minimalistic to intense customer relation. Users are interacted with directly (e.g. face to face). This can be done to send information, to receive information, to co-produce the business model, to co-innovate the business model or to co-innovate the actual product. Three of these interactions can also be made indirectly: indirect interaction to send and receive information and to co-produce the business model. These types of interaction will be described more thoroughly.

TABLE 12: TYPES OF USER INTERACTION

Type of interaction	Sending information	Receiving information	Co-producing the business model	Co-innovating the business model / product
Direct or indirect	Direct and indirect	Direct and indirect	Direct and indirect	Direct

Sending information is an important activity that can be considered a user interaction; especially product dominant firms with a technology driven approach mainly engage in user interaction to send instead of receive. The user is thus a recipient of information. This activity ranges from door-to-door sales in which potential users are communicated with directly to very indirect forms of interaction such as commercials. These activities are mainly done to either sell a product or communicate the value it could bring and is closer related to technology oriented firms than service oriented firms.

Receiving information from the end user on the other hand is more often done when taking a user-centred approach. This type of interaction often has the purpose of learning from the end-user. Directly talking to the end-user to uncover its needs and the ‘job to be done’ can lead to valuable lessons for the firm as shown by Greeniant; these interactions led to a complete switch in business logic. On the other hand information can also be provided indirectly, for instance through online platforms, forums or other channels. Indirect interaction to receive information is often a more

instrumental element of the business model that is needed to tune the offer to a specific user. This was for example done by Nederland Isoleert, which uses public data to be able to make an offer digitally, without having to go to the end user to get this information.

Co-producing the business model can be understood as an interaction that is needed for the business model to be *functional*. In these cases the user gets a specific role in the process of delivering the value proposition. For example, the user can be asked to configure its own product and settings or in another case to showcase a bought service or product and thus act as a salesman and channel towards other users. In these cases the user is an element of the business model and adds value to the good or service; value is co-created in use. This can also be done indirectly: Woonconnect for instance lets the user configure its desired home on an online platform. A co-producer can thus be understood as a user who is actively involved and creates value for the firm, him or herself and/or other users.

When the business model is *co-innovated* the user has direct impact on the *development* of the business model. The user actively suggests changes to the business model or the service provided. This process was only seen through direct interaction in the analysed cases; examples are the neighbourhood team at Buurkracht and the hackathons organized by Eneco. Novelty is thus produced by the user rather than the firm itself. Not only the business model can be co-innovated with the user, also for product innovations the user can be involved. This is the topic Cui & Wu (2015) focus on in their research; within the concept of co-innovation of the product their definitions of co-producers of innovations and co-innovators are found.

The different types of interaction generally lead to different outcomes. First there is a distinctive pattern visible in the cases discussed: in most cases direct interaction was the trigger for more radical changes in the business model. Whereas direct interaction led to radical changes in the business model in seven cases, indirect interaction mainly led to incremental changes. An exception is Philips, who uses the data from pilot projects to do research about the application of smart lighting. Possibly the difference between the results of direct and indirect interaction is the often pre-defined format in which indirect interaction takes place; it leaves much less room for out of the box thinking than direct and open conversations. Co-innovation is only found through direct interaction in the analysed cases. One can however imagine that a business model is co-innovated via indirect channels for interaction as well.

6.1.4 Step 2: Facilitation of interaction

After designing interaction and deciding which type of interaction to use the interaction has to be facilitated; this relates to the third sub-question of this thesis. For technology driven, or product dominant firms, facilitation of interaction is mainly done in the marketing phase. In this phase there needs to be interaction to sell the product; the intention to learn is a lower priority and the firm is more focussed on improving the market uptake of their product. For more user-centred firms learning from the end user is done with intent. Facilitating interaction is a more prominent activity of the firm and is often done in all phases. The purpose of interacting thus reaches beyond selling the product, it is to a large extent done to learn and improve. Facilitating interaction itself can be done in many ways as well; this section will describe how user interaction can be facilitated by a firm: how can each component contribute to a business model that is set for useful user interactions?

To create moments of interaction the *customer relation* changed significantly in six cases. This relation becomes less automated and in some cases the business model is even co-produced and co-innovated. In these cases the user has to be more involved than before and the relation often extends into the use phase or at least beyond the moment in which the decision to purchase is made.

Interacting with the user with the intention to learn furthermore means that the flow of information is no longer directed only towards the end user; it has to become reciprocal.

Furthermore, the *channels* through which the firm reaches the end-user tend to be different when aiming to learn from interactions. Especially with this intention it is preferred to directly interact; the channels should thus be more personal and bottom-up oriented. Buurkracht and Reimarkt for example specifically involve the user in their business model as channel to their peers. Also Bas Nederland and Woonconnect preferably use personal channels to communicate with their users. Product or technology oriented firms like Nederland Isoleert on the other hand tend to use channels mainly for sending such as call-centres or door-to-door acquisition. Involving the user as a co-producer and thus an active participant in the business model can also be done through indirect interactions. These require specific *resources* as well, for instance software and an online environment or application through which this interaction takes place.

For service oriented firms taking a user-centred approach problem solving, rather than selling a product, is a *key-activity*; this is done together with the user. Part of this problem solving is interacting with the user and finding out the pains he or she experiences; these are activities with a high priority. Greeniant is an example of a firm that solves a problem rather than sells a product. The firm makes an inventory of the way their technology can be used to solve a problem for a specific group of users. This can be done through organizing pilot projects, research projects, gathering feedback or organizing meetings and other opportunities for direct communication.

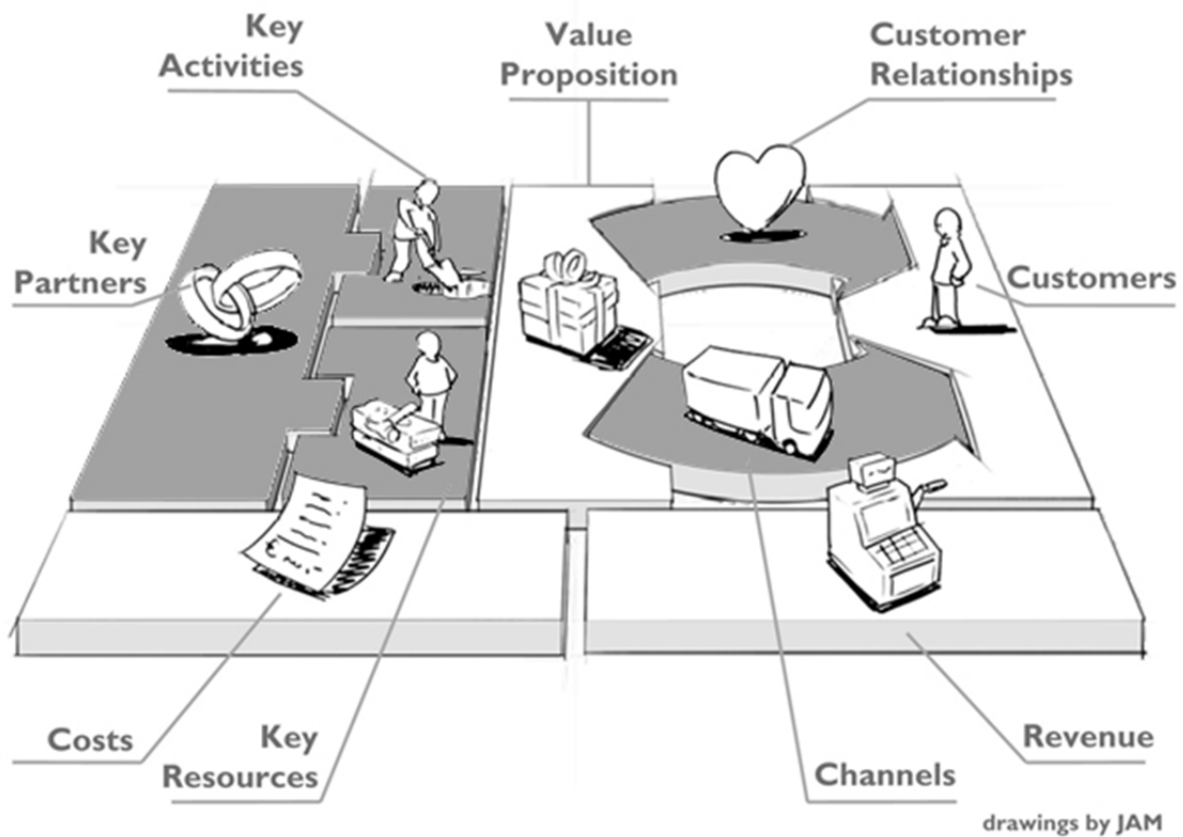


FIGURE 22: THE BUSINESS MODEL CANVAS, COMPONENTS THAT FACILITATE USER-INTERACTION ARE HIGHLIGHTED IN GREY

Furthermore, for firms like Woonconnect and Buurkracht that use an online environment or applications to indirectly interact with the end user the development of software can be a key-activity. The figure above (fig. 22) shows the business model components that likely have a different setting when interacting with the end-user. Table 13 (Appendix 4) furthermore shows the business model components that were used to facilitate user-interactions.

In four cases the firms made new *key-partnerships* to help with the activities mentioned above. For instance partnerships were made with knowledge institutes for research purposes by Greeniant and Buurkracht and with other firms to start pilot projects. In extrema the user can be thought of as a key-partner when involving him or her as a co-producer or innovator in the business model.

To be able to interact and learn effectively several *resources* are needed. For example human resources and financial resources, which are fundamental for a lot of research. The main resources that firms used for indirect interaction in the analysed cases were these online environments or places where public data is generated. In fact, creating and maintaining these platforms was an important activity for six out of nine firms. Furthermore, a social network of friends and relatives can be seen as a valuable resource for interactions in the start-up period of a firm. These types of resources were mentioned by the majority of firms.

When aiming to learn from the user and operate a user-centred business model several building blocks will thus need to change from the perspective of a ‘business as usual’ setting. The customer relation becomes more intense, channels more personal, key activities are focussed on the user and solving his problems and partners and resources are needed to do this. This shows that a large part of the operational aspects of a firm change to facilitate a user-centred business model with user interaction.

6.1.5 Step 3: Lessons learned

Both firms using a user-centred and technology driven approach can learn from interacting with the end user. Step three in the interaction process (fig. 21) is learning these lessons and refining the hypotheses that are the basis for offering value. This step was not a focal point in this research and will thus only be reflected on briefly. User-centred approaches, compared to technology driven approaches, lead to second order lessons more often; these are lessons about underlying assumptions rather than something you would directly ask. Greeniant and Woonconnect both learned these kinds of lessons when directly talking to end-users; the latter found out how to do surveys rather than what value to offer. Interestingly, Buurkracht also showed learning and adaptation of the way that user interaction was designed. Furthermore, technology driven approaches seem to be limited in the lessons learned; as learning is most often done during the marketing phase the lessons learned are limited to getting to know why people decide to purchase or not to purchase. Firms taking a user-centred approach thus learn in a much broader spectrum, these findings could be refined in further research.

6.1.6 Step 4: Business model changes

As shown above business model facilitation leads to interactions, lessons and finally to changes in the business model to incorporate the learned lessons in the offer, which is the final step in the interaction process that firms go through (see fig. 23); the third sub-question deals with influences to facilitate interaction as well as changes that are generated because of it. This section will discuss the changes that result from user interaction. An overview of the business model components that were changed in the cases described above can be found in the appendix.

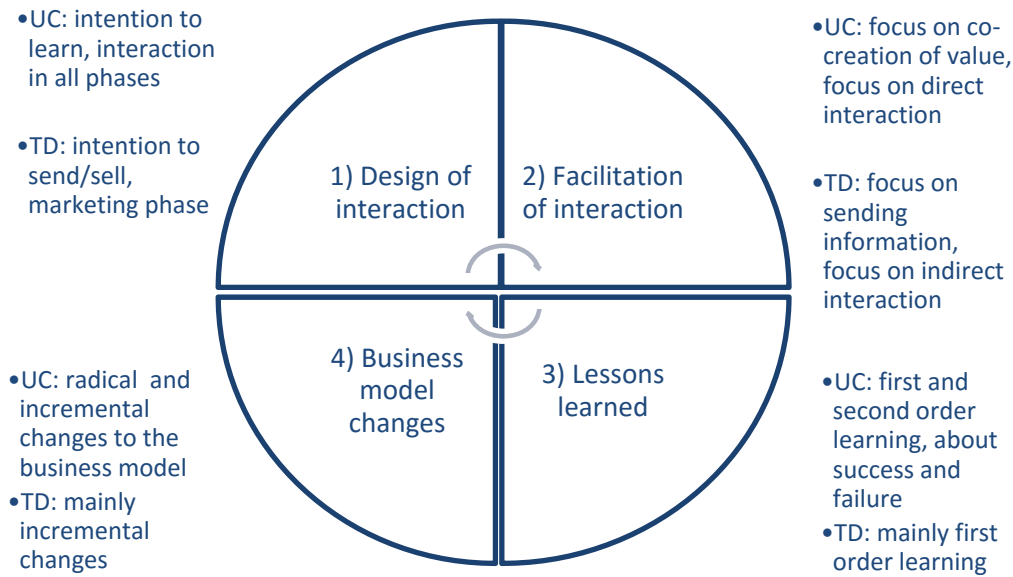


FIGURE 23: THE USER INTERACTION PROCESS. DIFFERENCES BETWEEN A USER-CENTRED (UC) AND TECHNOLOGY DRIVEN (TD) BUSINESS MODEL ARE HIGHLIGHTED

As there are more and different lessons learned from the end user there are more and different changes to the business model after interaction as well. These differences are mainly found in the frequency and nature of the changes: firms taking a user-centred approach more often change their business model due to lessons learned from user interaction and these changes are sometimes radical changes to the business model²¹. These radical changes often involve more than one of the building blocks of the business model and often change the daily routine within the firm. Example given, Greeniant switched from offering insight in an appliance's energy use to alerting the user when to repair or check their appliances; instead of offering what the product can do they offered what the user wants. This approach changed their key-activities, value proposition and partnerships to engage in user research were made. However, both firms taking user-centred and technology driven approaches make incremental changes to their business model. These changes involve a single building block and do not lead away from business as usual.

Table 14 (Appendix 5) shows that in essence any business model component can change after learning from user interactions. If the lessons learned from the interaction show that a part of the business model should be adjusted, the entrepreneur can choose to change this. However, especially incremental changes to value proposition and the value communicated to the user are ubiquitous. Often the user shows that a specific aspect of the value proposition does not match with his or her needs and this is adjusted, think of cases such as Greeniant and Reimarkt. All the other building blocks are related to the value proposition in a way, for instance how to enable the value proposition and how to deliver it. The value is often created by specific key-activities and resources; these components of the business model are often improved through user interactions as well.

Furthermore, firms might decide to change different components of the business model to support the credibility and trustworthiness of the firm. Dedicated and pre-defined suppliers can for instance be avoided to emphasize neutrality and frame the firm as a trustworthy party. Besides that Buurkracht had the possibility to discard a revenue model as this would also negatively affect their impartiality.

²¹ The user-centred cases on average show five business model changes in relation to three for technology driven firms; on average every user-centred case experienced a radical change where others did not.

Indirectly costs and revenues can also be influenced; as other business model components are changed these will change consecutively; LED Design Holland for instance introduced a partner with whom they facilitated long term payments. Not only the partnership changed; the revenue model and cost structure changed with it. Furthermore, when an activity becomes more time or resource consuming this will have an effect on the costs and revenues of the firm. Service orientation tends to result in a cost structure that is not based on minimizing costs and making margins, but rather on adding value and trying to make people wanting to pay for that value. Money and time are spent to interact and learn.

In essence any component can thus change, however especially the value proposition and the components enabling the value proposition (key-partners, key-activities, resources) often see improvements. Besides that interacting with the user also gives the entrepreneur experience in doing this; the way this changes the customer relation and channels can thus be reviewed and improved as well.

6.2 Contextual influences

Besides user interactions the business model can also be influenced by contextual factors; the subject of the final sub-question. This section will discuss how context influences the degree of freedom the entrepreneur has to operate and design the business model and specifically how this can impede or support user-centred business models.

6.2.1 Stakeholder mismatches

A paradigm shift from product to service-dominant logic is going on (Vargo & Lusch, 2014). Being aware of this transition and positioning yourself and your firm in this transition is important. The analysed cases show that different firms and stakeholders are at different places in this transition; some are front runners and operate user-centred business models while others still think and argue with a technologically driven logic and use more technology driven approaches. There is no clear boundary between these two dominant logics; it is a range in which a firm can position itself. Often the firms that operate with service dominant logic use user-centred approaches; mismatches in dominant logic between the stakeholders in an eco-system can thus influence user-centred firms.

It is important for service-dominant firms to have a fit with other relevant stakeholders in the ecosystem: users, partners, financiers and governments and the legislation and support mechanisms they put in place all find themselves somewhere on the line between product dominant and service-dominant logic. Sharing values and expectations with these stakeholders makes a (user-centred) business model more feasible and makes it possible to provide a compelling value proposition towards the user.

As mentioned above, mismatches can occur with different stakeholders in the ecosystem. Several firms that operate a (relatively) user-centred business for instance saw *mismatches with the end-user*. Woonconnect for instance mentioned that the end-user was not expecting the degree of choice and freedom that Woonconnect offers; they do not experience added value in it yet. Also Philips and Bas Nederland mentioned that their level of servitization is not recognized as valuable yet, however, this will come as the transition progresses. The end-user, or at least the majority, is thus not on the service-dominant side of the spectrum yet. Philips is aware of this transition and chose to target front runners to solve this mismatch.

Besides the end-user, Reimarkt experienced a *mismatch with a key-partner*. This partner was a large construction company with an outspoken product driven business logic. The partnership with the more innovative and user-centred approach of Reimarkt was no match. This led to change of partner

as working with the partner that had a complete mismatch was not feasible. Smaller, family owned, businesses were more flexible and willing to work with Reimarkt, who however mentioned that this partnership was not perfect either.

Furthermore, Greeniant found that a *financier* that doesn't share your mind set can limit the freedom and space for a business model. The investor gets a say in the firm's strategy and determined that user-research should be a lower priority. This stakeholder thus created tensions relating to the position of the firm in the transition towards service-dominant logic.

Finally *policy tools* such as subsidies can specifically benefit a specific type of firm; either user-centred or technology driven. Many policies seem to be product oriented and aim to improve the uptake of a specific measure through financial benefits. These more specifically benefit technology driven approaches. The reverse is possible as well: Nederland Isoleert for instance lost a tender because more service driven and integral solutions were asked for.

The firm's capability to orchestrate the eco-system and prevent mismatches to become barriers for success could thus be important. Bas Nederland for instance did not sit idly when told they were not allowed to become an energy supplier; the entrepreneur tried to stretch the legal possibilities and managed to convince the ACM to change their perspective. Furthermore, Reimarkt, as mentioned above, switched partners to overcome the mismatches.

6.2.2 Four strategies²²

To overcome, prevent or work with mismatches between the firm and stakeholders in the ecosystem firms can choose several strategies. The cases in this thesis highlight four distinct approaches; however, more will be possible. The four strategies can be termed as *the matcher*, *stealth changer*, *aware market changer* and *unaware market changer*. These will be discussed in more detail below.

The matcher

Nederland Isoleert can be taken as an example of a matcher; the firm tries to offer a value that is expected by the user and other stakeholders in the network and benefit from the momentum that is already present in the market. In their case this means that they took a product dominant approach, as this is still the common way to deliver insulation measures. This way Nederland Isoleert avoids mismatches which can be troublesome in the other strategies.

The stealth changer

In first instance stealth changers apply the same strategy as a matcher, sticking close to what is expected, until a market share is taken and a loyal customer segment is established. Then slowly the firm changes the value proposition and products or services offered within the existing segment. An example in the Dutch energy sector is Eneco, which tries to move beyond supplying energy to its dedicated customer segment and starts offering all kinds of products and services. One of these is Toon, the smart thermostat.

Aware market changer

An example of an aware market changer is Philips. The firm is aware of the ongoing transition; the majority of businesses is not ready for light as a service or the circular economy thinking it is based on. Philips thus targets a dedicated customer segment as a launching customer and tries to build

²² The four strategies and their names have been the result of a brainstorm sessions in Task 25.

success stories with the clients that they do match with. Even though there is a mismatch with the majority of potential users they pick a segment that is aligned. Doing so they work along with the paradigm shift and intentionally try to make it happen.

Unaware market changer

Just like Philips some firms have the ideals of changing the market. Reimarkt for instance would like to change the housing and renovations market with their one-stop-shop business model. Unlike Philips the awareness of an ongoing transition and the stresses this creates between stakeholders is absent. Even though Reimarkt experiences these stresses and tries to act to avoid them an overall strategy from this perspective lacks; Reimarkt overstretches the space between them and other firms with different mind sets. Unlike the other strategies these firms tend to be unaware of the mismatches in their business model.

The different strategies will have an effect on the successfulness of the firm. The firms which are less successful tend to have more mismatches in their business model than successful ones. The unsuccessful firms thus tend to lack a decent strategy to prevent mismatches and might be less aware or completely unaware of them. No clear difference in terms of success is visible when comparing user-centred and technology driven firms. A firm like Buurkracht cannot be considered more successful than Nederland Isoleert for example. Developing a business model that is aligned with other stakeholders in the ecosystem, and specifically with the end-user, might thus be of more importance.

6.2.2 Other contextual influences

The sections above discussed the influences and stresses for service oriented business models created by other stakeholders and their position within the paradigm shift. However, there are also other contextual factors that limit the degree of freedom for designing the business model which have less to do with a user-centred mind-set that does not match, but still influence user-centred business models.

Eneco for instance was pushed into a direction by a combination of contextual factors for energy suppliers. Specifically the privatizing the energy market removed the firm from its monopoly position, which in turn resulted in competition in the market. Due to this fierce competition only low margins could be made on the sales of energy; Eneco was pushed towards providing services to earn money from. As mentioned above: *“from a monopoly position the end user was not important”* (Interview Eneco, 2015); however, this all changed.

Another example of contextual influences that influenced the business model is pre-paid energy. Selling pre-paid energy is not allowed, unlike other markets where pre-paid services are becoming a mainstream phenomenon such as telephony. Selling pre-paid energy would mean another step towards servitization for Bas Nederland, however this is prevented by legislation.

Furthermore, the legal maximum of housing rent in the social housing sector can influence and limit the business models that try to serve this segment. Reimarkt for instance benefits from partnering with housing corporations to better reach their customer segment; when these housing corporations have trouble investing in social housing because of legislation the business model operated by Reimarkt is also influenced.

These kinds of contextual influences can thus influence a business model: it can be pushed in a certain direction or the degree of freedom for designing the business model can be limited. This leaves the option open for policy makers which can thus stimulate or limit different types of business models.

7. Conclusion & discussion

This thesis set out to gain a thorough understanding of user-centred business models by performing nine case studies in the market for energy efficiency. It tries to answer the following question: *what are user centred business models and how can these business models facilitate a better market uptake for energy efficiency measures*. User interactions seemed important for learning and iteratively improving the business model. How this interaction is organized and what this implies for the business model however remained the question. This section will relate the findings discussed in earlier chapters to the main questions of the thesis. First the sub-questions will be answered, secondly the main research question.

SQ1: "In what phases do firms interact with the end-user?"

The cases have shown that three phases for interaction can be identified: design, sales and use. User-centred business models go beyond interaction in the design phase; firms using a user-centred approach, who often reason with service-dominant logic, interact in all phases, whilst technology driven firms mainly focus on the sales phase.

This adds to literature that often focusses on one phase, design (Rohracher, 2005; Hienert et al., 2011), use (Wever et al., 2008; Vargo & Lusch, 2004) or marketing and shows that the process of learning from the user takes place in a broader time frame. This furthermore gives a first insight into the phases that different types of firms prefer for user interaction.

SQ2: "What types of interaction and involvement can be distinguished in the business model?"

A distinction can be made between four types of interaction which can be conducted directly or indirectly. Firstly, the user can be interacted with to communicate values and sell the product; the firm sends information. Secondly interaction can be set up to learn from the user. Furthermore, the user can be involved as a co-producer in the business model, becoming an integral part of the business model and carrying out one of the components functions. Finally the user can be a co-innovator, either innovating the business model, product or service. Co-innovation however was only seen through direct interaction in the cases, the other types could also be done indirectly. User-centred business models more often involved the end-user actively in the business model; more and higher quality interactions take place. It is important to note that not only indirect interaction should be aimed for when trying to learn from the end-user. Even though indirect interaction resulted in lessons and consecutive changes direct interaction results in more business model changes and makes the interaction reciprocal.

These findings build on and refine the categorization for user-involvement for innovation purposes by Cui & Wu (2015) and shows how this involvement can be done in business models. It also makes a distinction in their notion that user involvement can be a source of information: just like receiving information from the user sending information to the user was an important activity for many firms. Furthermore, the notion of a co-producer of innovations as suggested by Cui & Wu has been broadened to fit the role of a user as co-producer in the business model. As a co-producer of the business model the user is an integral component of the business model, rather than an asset that contributes ideas for innovation through direct interactions. Furthermore, user involvement as a co-

producer of the business model can be indirect as well as direct whereas direct interaction at the firm's location is suggested by Cui & Wu when involving the user for innovation purposes.

Firms taking a user-centred approach in their business model more often involved the end-user as a co-producer or co-innovator. Besides that these interactions were generally direct and done with an intention to learn from the user and improve the business model. These interactions finally resulted in more radical changes to the business model. This finding is in line with Grönroos & Voima (2013) who argued that direct interactions are important for valuable co-creation, incremental or radical. Whether radical changes are always valuable changes can however be questioned as aiming for radical changes is a high risk strategy. In this sense a user-centred approach, which more often leads to radical changes, can be considered as a higher risk and is thus not always beneficial for the success of a firm or entrepreneur.

SQ3a: “How is user interaction designed in the business model...?”

The third sub-question should be looked at in twofold; firstly it regarded the way user involvement can be designed in the business model. Within the business model several components can be set to facilitate user interaction; in this sense a more user-centred business model differs from the current business as usual. The customer relation is less automated and involves the user, channels tend to be more personal and bottom up, problem solving is a key-activity rather than selling a product, partners should be found that fit in and enable user research and finally the firm needs resources that enable interaction or access to data. Aside from these components that can facilitate interaction in a user-centred business model, some parts can also be changed to make the business model more aligned as a user-centred business model. Often these changes involve the creation of trust and impartiality which are important resources for a firm. On the other hand, Philips chose a dedicated customer segment; a segment more aligned with their business model.

These results show that interacting with the user and involving him in the business model is preferably facilitated broadly. At least it shows that user-interaction and its influence on the business model is more than a key-resource (Grönroos & Voima, 2013). The results further define a notion put forward by Hienerth et al. (2011) who stated that facilitating user-interaction has a heavy influence on the business model. Finally it opens up the black box of what is needed for operating a user-centred business model focussed on user interactions; it goes well beyond a mix of resources, knowledge, finances as suggested by Walters et al. (2012) as the whole business model can be altered to facilitate interactions.

SQ3b: ...and how does it (user interaction) influence the business model ex-post?”

The second part of the question regards how user-interaction influences the business model ex post. After interaction firms learn from the end-user and the business model often sees changes, be it radical or incremental. In essence any component of the business model can change if the entrepreneur decides to put lessons learned into practice. Especially the value proposition and the components enabling the value proposition (key-partners, key-activities, resources) often see improvements. Besides that, interacting with the user also gives the entrepreneur experience in doing this; the way this changes the customer relation and channels, or the way that is interacted, can thus be reviewed and improved as well. Finally the costs and revenues tend to see changes as these are greatly determined by the other components of the business model.

SQ4: How does context influence the development and implementation of user-centred business models?”

This thesis identifies two different types of context influence: mismatches relating to the dominant logic in the stakeholder network of a firm and influences that affect the firm and its business model itself.

First mismatches with users and other stakeholders in the ecosystem of a firm can occur for user-centred business models as these tend to be front runners in the ongoing transition towards service-dominant logic. Other stakeholders that still operate on the basis of product dominant logic can thus cause tensions and stresses in the stakeholder network because of a mismatch in business logic.

Being aware that there are stresses and mismatches between the business model and stakeholders in the ecosystem is an important starting point towards operating an effective strategy to cope with these mismatches. Firms can take different strategies and these seem to have different results in terms of success; firms with strategies that focus on minimizing mismatches and aligning the business model with end-users and other stakeholders seem to be more successful than firms without these strategies. The measure taken for success in this thesis was not uniform for the cases and not completely objective. How successful the different strategies are and how to support different types of business models and strategies could thus be a topic for further research and is the focus of continuing work of IEA DSM Task 25.

Besides these mismatches at the level of business logic, there are other context influences that can limit or extend design space of the business model. Especially legislation and policy tend to have a directing effect on firms; this also influences whether a firm has the option to operate a user-centred business model. These findings are in line with the findings of Huijben & Verbong and Provance et al. who state that in general business models are influenced by context such as policy (Huijben & Verbong., 2013; Provance et al., 2011).

RQ: What are user-centred business models and how can these business models facilitate a better market uptake of energy efficiency measures?

Looking back at the main research question we can conclude that a user-centred approach to business modelling specifically aims for user involvement in a broad range of activities at all stages of the development with the intent to learn from the user and to co-create value. The cases show that interaction and co-creating value are crucial elements; these findings are in line with suggestions and definitions made by Hienerth et al. (2011).

Four types of user involvement can be designed in the business model: the user acts as a recipient of information, source of information, co-producer of the business model or as co-innovator. These interactions are generally facilitated by bottom up and personal channels, a less automated customer relation which involves the user, having problem solving is a key-activity rather than selling a product, fitting partners who enable user research and finally the resources that enable interaction or access to data. As mentioned above, these interactions can lead to various changes in the business model.

How these user-centred business models can facilitate a better market uptake of energy efficiency measures is hard to conclude. As mentioned in the context analysis the market for energy efficiency consists of many sub-sectors and can be considered very complex. One can state that user-centred business models can engage users and learn from them. In the analysed cases the technology driven approaches did not seem less successful. In fact, these approaches seem to work just fine for most energy efficiency services; to what extent the development of user-centred business models increases the market uptake cannot be said conclusively. For instance, it seems that not all firms and markets

benefit equally from adopting a user-centred approach. This is partly determined by the product or service that is delivered. One can imagine that selling a relatively simple product like cavity wall insulation or energy efficient lighting requires a different, more product oriented approach, compared to selling a smart service like a smart thermostat as the user only has to be persuaded to make a purchasing decision. In contrast, the user has to actively work with smart services and his or her attitudes and behaviour are for instance more important in the use-phase. It is likely that these kinds of services could benefit from a more user-centred approach. Besides that, as mentioned earlier, user-centred approaches that aim for radical changes can be considered as high-risk approaches; from the perspective of innovations in an evolutionary environment these can be considered positive. In contrast, from the perspective of a firm that tries to be successful, the high risk of failure might result in a more risk averse strategy. More research is needed to determine which firms and markets could benefit most from applying such an approach and whether a user-centred approach is useful in the first place. To define this, a measure for success and more longitudinal quantitative research is needed.

Finally, user-centred business models benefit from alignment within the business model and alignment with stakeholders in the eco-system. Internal and external mismatches should be prevented to enhance chances of success. As mentioned earlier this will be a topic of further research in the ongoing Task 25 by the IEA.

7.1 Limitations & recommendations for further research

As it seems direct interactions with the user are often at the basis of radical changes to the business model. It is unclear however which aspects of these interactions create this valuable information and provide this trigger. Further research could focus on direct interactions with end-users to find out which type of direct interactions result in more valuable lessons (first and second order) and provide triggers for change.

Several other topics were out of the scope of this research and require further research. Due to practical constraints, this thesis could not provide a comprehensive review of business models providing solutions for heating. Further research could thus include this specific area of energy efficiency solutions to give a complete overview of the market.

More quantitative research could also aim to review the effect of energy efficiency measures when put in the market with a user-centred business model. Engaging with users and gathering feedback in the use phase might give insight whether user-centred business models can partly prevent the rebound effect.

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9. Appendices

1: interview guides for entrepreneurs and context stakeholders

Guide voor ondernemers

Ter voorbereiding: canvas invullen voor business van de respondent

Korte introductie: korte uitleg interview, opname starten

Doel van het onderzoek en de centrale vraag in het onderzoek

Naam, functie en achtergrond

Rol in het bedrijf en sinds wanneer actief in het bedrijf

Huidige situatie:

A: check op businessmodel canvas

- Beschrijf de kern van het businessmodel: hoe creëer, lever en behoud jij waarde?
- Value proposition (wat is de kern van jouw aanbod. Wat heb je als aanvullende services en waarom?)
- Klant segment: welk probleem los je op. Job to be done?
- Past ... in de dagelijkse routine van de gebruiker of moet er nieuw / ander gedrag vertoond worden? Is er ingespeeld op bestaande gewoontes, attitudes, waardes of gedrag of juist op verandering daarvan?
- Rol van eindgebruiker in jouw BM: actief/passief? Hoe? Leg uit? In welke fase van ontwikkeling? Verschilde de rol van de eindgebruiker in deze fases?
- Verdienmodel
- Belangrijkste activiteiten
- Belangrijkste middelen (kennis, financieel, etc.)

B: Stakeholder Map invullen aan de hand van stakeholder Canvas

C: Initiële model

- Wat was het initiële idee?
- Hoe zag BM er toen uit (anders t.o.v. huidige BM)

D: Aanleiding tot verandering (Cultureel, institutioneel, technologisch, klant, politiek)

Wat waren belangrijkste veranderingen vanaf start tot nu en hoe hebben die het BM beïnvloed? (helpen met...)

- Subsidies
- Wet – en regelgeving
- Verandering in beleid
- Nieuwe technologie
- Nieuw klantinzicht
- Awareness van consument/eindgebruiker

- Nieuwe campagnes
- Nieuwe toetreders of innovaties in de markt
- Nieuwe kennis?
- Anders...

Inzoomen op relatie met de klant

Is de rol van/visie op de klant veranderd?

Is je eerste hypothetische representatie van de klant correct gebleken?

Hoe ben je achter needs van de klant gekomen en wat heb je daarna gedaan?

Wat waren de aanpassingen in het model (VP / waarde voor de klant/ interactie met de klant?) (wanneer?)

Wie uit het netwerk speelden daarbij een rol? Wat was die rol?

Wat is de belangrijkste les die je hiervan hebt geleerd?

E. Toekomst

- Ben je waar je wilt zijn?
- Indien ja: hoe zorg je voor t behoud (teruggrijpen naar stakeholder map) wie heb je daarbij nodig?
- Indien nee: hoe borg je de komende veranderingen? Hoe zorg je voor continuïteit?
- Hoe zorg je ervoor dat je ook in de toekomst in staat bent te anticiperen op veranderingen?
- Welke belangrijke belemmeringen ervaar je? (Als xxx wordt opgelost, verhoogt dat mijn kans op succes/groeien mijn mogelijkheden?
 - verwijzen naar genoemde categorieën
 - Specifiek voor de eindgebruiker?
 - Wat zie je als mogelijke oplossing

F. Afsluiting

Zijn er nog zaken die we niet hebben besproken die u graag zou willen delen?

Welke andere partijen moeten we zeker niet missen in ons onderzoek? (snowballen)

Rollen op de stakeholder map

- Economische Zaken / centrale overheid
- Provinciale overheid
- Lokale overheid
- Netbeheerder
- Energie leveranciers
- Investeerdere
- Kennisinstellingen
- Milieuorganisaties
- Technologiebedrijven
- Concurrenten
- Toeleveranciers
- Consumentenorganisaties
- Subsidiërende instanties
- Banken
- Eindgebruiker
- Media

- Q. Energieproducenten
- R. Anders:
- S. Anders:

Guide Stakeholders /experts

Introductie

A: stakeholder canvas:

- Wat zijn belangrijke key spelers in het systeem EE
- Wat is hun rol/functie
- Hoe werken ze samen en wat winnen ze erbij (value)
- Welke stakeholders hebben wat te verliezen aan waarde? Wat en waarom?
- Indien relevant: welke internationale relaties zijn er?

B: Waar staat EE in termen van volwassenheid? Leg uit? (op S curve)

- Verschil B2B B2C leg uit
- Is er verschil tussen de verschillende categorieën?
- Rol van de key-players bij de plek in de curve (remmende of stimulerende, en invulling van rol).
- In het bijzonder voor jouw organisatie
- Wie heb je nodig? Waarom?

Visie op de huidige rol van

- Netbeheerders
- Utilities
- Startups
- Overheden

C: De eindgebruiker

- Hoe zie je de rol van de eindgebruiker (SME/Consument) (passief of actief? Verantwoordelijkheden? Bewust/onbewust? In welke fase van ontwikkeling?)
- Positie op de S curve?
- Wat zijn remmende en stimulerende factoren. Waarom?
- Hoe kan hier met beleid op ingespeeld worden?

D: Toekomst

- Wat zijn in jouw ogen succesvolle EE proposities? Nationaal/internationaal?
- Vanuit jouw perspectief wat is de toekomstvisie, waar moet het heen, wie hebben daar dan een rol in en hoe ziet die rol er uit?
- t.a.v. de eindgebruiker
- T.a.v. de provider

t.a.v. de interactie of samenwerking tussen provider en eindgebruiker?

2: overview of interviewees

Firm / organization	Interviewer
Businesses	
Bas Nederland	Joost Tolkamp
Zienn (case of Bas Nederland)	Fiona Tutti
Buurkracht	Joost Tolkamp
Eneco	Joost Tolkamp, Ruth Mourik
Greeniant	Joost Tolkamp, Renske Bouwknecht
LED Design Holland	Joost Tolkamp
Nederland Isoleert	Renske Bouwknecht
Philips	Joost Tolkamp, Renske Bouwknecht
Reimarkt	Joost Tolkamp, Renske Bouwknecht
Woonconnect	Joost Tolkamp
Plugwise	Joost Tolkamp
Context stakeholders	
Natuur & Milieu	Joost Tolkamp, Renske Bouwknecht
Ministry of economic affairs	Renske Bouwknecht
Platform 31	Renske Bouwknecht

FIGURE 24: OVERVIEW OF INTERVIEWEES

3: interview codes: the final coding scheme used to code the interviews. The codes were iteratively improved and completed during the coding process

	Category	Outcome
<i>User interaction</i>	TI-X (timing of interaction)	X = D (design phase) X = M/S (marketing phase) X = U (use phase)
	BMF-X (business model facilitation of interaction)	X = any business model component
	UI-X (type of user interaction)	X = I (as direct information source) X = II (as indirect information source) X = C (as co-producer/innovator)
	BMI-X (business model changes after interaction)	X = any business model component
	UR-X (user representations)	X = I (hypothesis about user) X = E (validated lessons about user)
<i>Context</i>	C-X (contextual influences)	X = P (paradigm mismatch) X = L (legislation or policy influence)
<i>Business model</i>	X (any business model component)	
<i>Open code</i>	OC (open code)	

FIGURE 25: CODES USED FOR CODING THE TRANSCRIBED INTERVIEWS

4: overview of the business model components that facilitate interaction

TABLE 13: BUSINESS MODEL FACILITATION OF INTERACTION PER CASE. DESCRIBES THE BUSINESS MODEL COMPONENTS THAT FACILITATE INTERACTION PER PHASE: DESIGN, MARKETING AND USE (VP: VALUE PROPOSITION, CH: CHANNELS, CR: CUSTOMER RELATION, CS: CUSTOMER SEGMENT, KP: KEY-PARTNERS, KA: KEY-ACTIVITIES, KR: KEY-RESOURCES, C: COST STRUCTURE, RM: REVENUE MODEL).

Case	Phase (D/M/U)	BM component	Business model facilitation
Nederland Isoleert	D	KA	Pilot project
	M	CH	Cold-acquisition
	M	KR	Public-data
	U	CH	Call-centre
Reimarkt	D / M / U	KA	Testing user reactions
	M	KA	Showcase homes
	M	KR	Public data
	M / U	KP	User as co-producer; showcases home
Buurkracht	D	KA	Create neighbourhood team
	D	KP	Partner with knowledge institute
	M / U	CH	Team as channel
	M / U	KA	Neighbourhood meetings
Bas Nederland	U	KR	Online platform
	D / U	CH / CR	Bi-lateral interaction with the client/user
	D	KR	Relatives as test-group
	M	KA	Speeches and workshops
Woonconnect	U	KA	Software design
	U	KR	Online platform
	D	KA	Pilot project
	D	KA / CH / KR	Surveys via the online platform
LED Design Holland	M	KA	Expert workshops
	U	CH / CR	Bi-lateral interaction with the client/user
	U	KR	Technology and platform
	D	KR	Friends / relatives as test-group
Philips	M	CH	Cold-acquisition
	M	CH / CR	Bi-lateral interaction with the client/user
	U	CR	Available for contact
	D	KA	Pilot project
Greeniant	D	KP	Pilot partner
	D	KA	Customer research
	M	CH	Ellen MacArthur Foundation
	U	KR	Data from connected lighting
	U	CH / CR	Long-term relation and contracts
	D	KA	User-research
Eneco	D	KP	Research partner
	D	KR	Relatives as test-group
	M	CH / CR	Bi-lateral interaction with the client/user
	M	KA	End-user meetings
	U	KR	Data of use
	U	CR	User as data-provider
Eneco	D	KA	Hackathons and design competitions
	D	KR	Data from early adopters
	M	CH	Social media / influencers
	U	KA / CR	Create test groups / do surveys

5: overview of the business model components that changed after interaction

TABLE 14: BUSINESS MODEL CHANGES AFTER INTERACTION PER CASE. DESCRIBES THE BUSINESS MODEL COMPONENTS THAT WERE CHANGED IN WHICH PHASE: DESIGN, MARKETING AND USE (VP: VALUE PROPOSITION, CH: CHANNELS, CR: CUSTOMER RELATION, CS: CUSTOMER SEGMENT, KP: KEY-PARTNERS, KA: KEY-ACTIVITIES, KR: KEY-RESOURCES, C: COST STRUCTURE, RM: REVENUE MODEL).

Case	Phase (D/M/U)	BM component	Business model change
Nederland Isoleert	M	CH	Most effective channel chosen (inc)
	U	KA	Change to procedure, care for property (inc)
Reimarkt	D	VP	More abstract offer
	M / U	VP	Perfect the offer (inc)
	M / U	KP	User as co-producer, salesman (rad)
	U	VP	Make abstract offer more tangible
Buurkracht	D / U	KA / KP / CR	Give space to co-innovator for 'self invented syndrome'
	D	VP	Add safety to the offer (rad)
	D	VP	Established the customer journey, starting point (rad)
	M	CR / CH	Different user groups are approached differently
	U	KA	Learn about teams and which are most effective (inc)
	U	KR	Improved the online platform (inc)
	Bas Nederland	D	CS
	D	CS	Postpone private market
	D	VP	Separate energy and energy efficiency supply (rad)
	M	KA	Give speeches and workshops to spread value (rad)
	U	VP	Tailor solution to specific group
	U	KA / CR	Focus on software development (rad) / User a co-producer
Woonconnect	D	VP	Focus on win-win (EE and other values)
	D	KA	Changed the approach to surveys
	U	VP	Tailor the value proposition to client and user
	U	VP	Many incremental changes (inc)
LED Design Holland	D	VP	Avoid jargon (inc)
	M	VP	Provide tangible insights in savings
	M	KA	Show a demo-model
	M	KP / C / RM	Partner for long-term payments
Philips	D	VP	Discover and act on options for smart lighting
	M	CS	Focus on dedicated clients
	U	CR	Long term relations became more important
Greeniant	D	VP	Switch from technology driven to user centred approach (rad)
	D	KA	Focus on solving problems of user and client
	D	VP	Focus on more values than insight
	M	VP	Alert the user
	U	KR	Incremental improvements (inc)
	U	VP	Find effect of added features and improve them (inc)
	Eneco	D	VP / KR
	D	C	Lower costs through co-innovation
	D	VP	Many values in Toon beyond insight to be added
	M	KA	Direct interaction and problem solving important (rad)
	M	KA	Create trust
	U	VP / KR	Incremental improvements on basis of data (inc)