



iea dsm
energy efficiency

Task 25 D2 report Netherlands

**Dutch context analysis and Business Models case studies
for a more Effective uptake of DSM energy services for
SMEs and communities**

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Introducing Task 25

In November 2014 Task 25 started under the umbrella of the International Energy Agency Demand Side Management Technology Initiative. A Task focused on business models underpinning Energy Efficiency services. This introduction provides the basics about the task and its core views and goals.

Why this Task is important and necessary

Task 25 is trying to understand what can be done to stimulate the market uptake of Energy Efficiency. The premises behind this question is that the current system (the established system) is technocratic and push oriented and that a more user centered approach will be more effective. In order to find out what works when, where and why we have to understand the system at the level of the proposition and the business model, at the level of the entrepreneur and his skills and at the level of all the actors in the system. Also, we have to understand interaction and exchange of various types of value.

We fully acknowledge that the current climate and energy policies reflect the interests of established stakeholders and potentially allow for low-hanging fruit type of changes and inhibit more radical type of changes. In this Task we work towards an understanding of this tension between the established regime and new business models and propositions that aim to transform the system. We have found that there is no canon yet in relevant literature on how and at which level such processes of shifts should come about, or how to make them come about. And we are convinced that these questions are essential as part of a “theory of policy” for a true green transformation.

The energy efficiency market still is being defined in terms of -for example- technological, subsidiary or legal possibilities. These descriptions not only influence the way business models are being created, but also the way they are being studied (as for example, technical or contractual constructions) and being reviewed by, for example, policy makers. We think this is an exponent of what is called ‘the tech-push perspective. In this perspective, the basis of economic activity is the making and distribution of goods (output). The main goal of a firm is then is to maximise profit margins through efficient production and distribution.

Consequently, in this perspective, the user has a passive (consuming) role and service is an ad-on, with the main purpose to increase the output of goods.

The task thus has a very explicit strategic framing and we do explicitly work with and towards a framework that reflects these strategic questions, with the sociotechnical transitions methodology and value flow model complementing the more individual proposition and business model focused methodology of the business model canvas analysis. For a more thorough discussion of these frameworks and models please take a look at our work plan to be found on our task website.

We decided to focus exclusively on Energy Efficiency services (by this, we exclude production like solar, biomass etc.). Based on typologies found in all countries we decided to focus on Energy Efficiency propositions offering:

1. Retrofitting (product or service included)
2. Smart (home) management systems (product or service included)
3. Renewable waste energy (product or service included)
4. Lighting (product or service included)
5. Total solutions

Subtask 2: Identify proven and potential business models for energy services

The Task is divided in 4 subtasks. Subtask 1 is about management. Subtask 3 is about training relevant stakeholders based on findings in Subtask 2. Subtask 4 is the dissemination task. Subtask 2 is the focus of this report.

There are many energy service business models “out there” and often they are closely linked to existing market structures and policies. In other words, business models are often country and context specific. The subtask is focused on performing an inventory of different existing business models, both in the participating countries and also including global examples of successful business models. In the different participating countries we analyse what business models exist, and what frameworks (market and policy) accompany them.

Subtask objectives

1. Identifying country specific suppliers, clients, and their stakeholder networks and trying to establish national advisory expert networks to continue working with throughout the task.
2. Narrowing down the focus of both services, target groups and typology of business models in close cooperation with national experts and other relevant stakeholders.
3. Clarifying how the different parameters of success of business models and services will relate to each other in the analysis – economic profitability, scale of impact and real savings, business creation, growth rate, synergies with other values, adoption rate etc.
4. Developing a task specific typology or categorisation of business models and services for EE.
5. Developing an overview of existing energy service business models in the participating countries and their frameworks/ecosystems and how they meet and incorporate client needs.
 - a. Longlist overview of existing services and business models
 - b. Shortlist overview of services to be focused on in more detail.
6. Reviewing global existing business models and their frameworks/ecosystems with a clear focus on quantifying and qualifying effectiveness.
7. In-depth comparative analysis of around 4 similar business models in different countries and around 12 per country. Determining patterns, drivers and pitfalls.
8. Identifying key factors that make services (and their vendors) succeed in the participating countries through an in-depth analysis of country specific markets and policies for energy services and their influences on business models.
9. Organising country workshops with service providers and clients.

Subtask 2 and The Netherlands

Together with the national experts, we first drew up a longlist of interesting Energy Efficiency propositions in the participating countries. The selected propositions are interesting because they are more or less successful, effective and often fit the existing system well for some reason but still manage to create real uptake of energy efficiency (fit propositions), or they are interesting because they are ‘unconventional, innovative’ and focus on the high hanging fruit and real transformations of the system, we call these the stretch propositions. Based on initial information collected in this longlist and based on the categorization of 5

types of energy efficiency propositions we made a selection of propositions that would be further analysed to understand their business model, and the interaction with the context and existing system. The selection will allow for comparison of similar propositions, with sometimes different outcomes, and operating in different political, institutional, technological, socio-cultural contexts. In a parallel movement we started fleshing out the business model canvas for each of the propositions on the shortlist. The canvas however is a snapshot, while the underlying business is a very dynamic and complex entity which operates in a system, which is also very complex, with its own dynamics. Therefore, we investigated the entrepreneur’s journey for each of the propositions as well, which is a description of the business and how it has evolved over time. Also, we identify how the system influenced this development. In order to collect our data we interviewed all these entrepreneurs both on their business, their skills and their perspective on the system they operate in. Once these individual case studies were performed and a national context analysis was conducted we entered the next stage of the task: the comparative analysis. For an extensive overview of the methodologies used see Annex 1.

Reader’s guide

This country report is the Dutch Subtask 2 final deliverable for Task 25. The report first provides a short description of the analysis framework for the Dutch context and cases. Then the analysis of the Dutch context is discussed and finally the different business models and services selected for the deeper analysis are described. For the comparative analysis of cases, including the Dutch cases we refer to Deliverable 4 of Task 25.

Three levels of analysis: business model, entrepreneurial capabilities and context

This task focuses on three issues that are of key importance in the successful delivery of energy efficiency services. Sustainable business models can benefit from taking a user-centred approach. This is directly related to the fact that service value is being co-created with the end user. No user means no service. Business models and energy services focusing on the customer perspective and their unique buying reasons for energy efficiency are therefore the next step in creating a mass market for energy efficiency. These new types of business models and energy services are arguably much more effective than the so far rather technocratic and technology push approach

A second element of importance to delivering effective energy efficiency services is the ability and skills of entrepreneurs and providers of services to focus on this customer perspective and tailor their services. This is becoming increasingly important in creating future competitive market strategies. This certainly applies to the changing customer market for energy companies and utilities and other suppliers, which are in dire need for new business models and effective energy services. These skills include customising and co-creation, contextualising, orchestrating, stretching and scaling,

A third element of relevance to understanding how to deliver more effective energy efficiency is context. A business model design is strongly influenced by context, e.g. existing legislation and available subsidies, other bottlenecks and constraints, and various players within the current energy production and consumption system. The creation of the business model and value proposition, the context in which the business model and service is deployed and finally the capabilities of the entrepreneur/enterprise in navigating the context and user related issues are at the core of our analysis of the country specific cases.

Introducing the transition from only product to also service and user needs orientation in the EE market

A different perspective than the technology push perspective is what could be defined as a service logic. [Vargo and Lusch, 2004] In this perspective, the service is the fundamental basis of exchange. This implicates that not goods, but knowledge and skills are the fundamental source of competitive advantage and therefore are the main drivers of value. One of the characteristics of services is that their value is experienced in use. The main goal of a firm is therefore to facilitate outcomes the user wishes for and values. From this perspective, the user has a dominant role in the creation of value as well as in the creation of the business model.

In reaction to the lack of uptake of energy efficiency products many businesses and utilities are (intuitively) changing their business and turning towards a more service oriented model. We are witnessing a transition from a focus on delivering the physical goods needed to achieve energy efficiency to a focus on offering solutions including both goods and services. A recent study on North-American and European utilities (Bigliani, R. et al., 2015) for example demonstrates that utilities are facing many challenges and

Transition!



in addition also face new competition for (the wallets of) their customers from nonutility players (including ICT companies, consumer electronics and energy equipment manufacturers, telecom). These new players offer richer customer experience with new services and new business models and force utilities to start discussing new business models (IRENA 2014). In Europe new business models tops the strategy agenda of European utility executives (Bigliani, R. et al. 2015). North-America is following, as a survey amongst stakeholders demonstrate, where new business models were seen as the most important challenge by 2% of respondents in 2014 to 34% of the respondents in 2015 (Bigliani, R. et al. 2015). And of these business models, the service model, including PV charging, HVAC services, rooftop solar, Bundles home services, community energy, data management) is most appealing to utilities that are forward-looking, with even plans to decouple the service from the sale of a commodity supply contract (Bigliani, R. et al. 2015).

Examples of emerging energy efficiency services include integrated or one-stop shop or bundled offerings around retrofitting, smart (grid) services, lighting-as-a-service, heating-as-a-service, smart energy management as a service and the more common ESCo's and EPC contracts.

The Cambridge Service Alliance, a leading research-industry cooperation states that in many sectors we are indeed facing a transition from a system consisting of products, outputs, elements suppliers and transactions to a system consisting of solutions, outcomes, relationships, network partners and ecosystems, packaged as services.

Necessary Entrepreneurial capabilities

By now we know that a (new) service is composed of several different elements, closely linked to the dimensions of the business canvas (Janssen, 2015) (Janssen & Hertog 2016 forthcoming). For these elements to work well together, the service provider needs several dynamic capabilities that have to do with the ability of the company to realize new solutions and respond to changes in the environment where they operate (Janssen et al, 2015). Four sets of capabilities turn out to be particularly significant.

1. Sensing user needs and (technological) options: this capability is about engaging in a meaningful interaction with users and other stakeholders to extract relevant information for fitting the service to the expressed needs. This interaction can be about co-learning, by sharing knowledge from both sides, or about contextualizing, by making efforts to match service offerings with actual needs.
2. Conceptualizing: engaging in service provision often means that the companies experience frequent interactions with users and stakeholders. Yet, the same companies might not always be able to take a step back and uncover general patterns in the rich variety of context-dependent needs. Service providers able to conceptualize have strong induction capabilities and they are engaged in innovation on a regular basis.
3. Co-producing and orchestrating: services often require the alignment of several different actors as they bridge for instance several physical inputs providers to create the end experience. Companies able to co-produce have developed capabilities for working together seamlessly with different partners, have strategies on how to create consistency and smooth procedures for interaction, particularly in the case of diverging incentives.
4. Scaling and stretching: a final key capability relates to the marketing skills of service providers and their ability to package their offerings in a way that large user groups will recognize the value of those offerings. This capability is about finding and promoting a general formula for value creation.

Context

The national regulatory and political frameworks in many countries are not favourable towards service oriented business models and can hinder the development of an energy service market. The current frameworks in many countries in Europe are very much product focused/technology-push business model oriented, hindering service oriented business model (i.e. financing schemes favour the delivery and innovation on products instead of services).

If we want to create markets for energy efficiency services we need to consider current energy markets infrastructures, regulation and support mechanisms in place (both for old and new technologies) since these directly influence the business model opportunities in a country (Huijben and Verbong, 2013). In addition, business models are part of or embedded in a socio-technical system or ecosystem (Johnson and Suskewicz, 2009), and these systems are fast changing and complex environments. Because of these continuous changes and complexity, learning and experimentation are of main importance for business model development (McGrath, 2010; Chesbrough, 2010).

A business model design is thus strongly influenced by context, e.g. existing legislation and available subsidies, other bottlenecks and constraints, and various players within the current energy production and consumption system and consequently some type of business models are encouraged, others are hindered (Bidmon and Knab, 2014; Provance, Donnelly, and Cara Yanniss, 2011; Geels and Schot 2010; Huijben and Verbong 2013 Mormann 2014). Business models thus reflect and reproduce the social and political organisation of state and market action, ideas about energy (as a resource or as service), interpretations of public and private space and responsibility and ideas about the role of consumers and providers in constituting demand (Shove, ecee 2015). These institutions not only influence the way business models are being created, but also the way they are being studied, monitored and evaluated (by, for example, policy makers).

In this Task we explicitly focus on this shift from product orientation to also service orientation in the Energy Efficiency field. For a much more detailed description of this paradigm shift, the role of entrepreneurial skills and the role of context see our Deliverable 4 report.

The Netherlands – context analysis

This analysis uses a multi-level perspective to describe the relevant context for business models in the market that sell energy efficient products or services or both. As there is an impact of contextual factors on the development of business models and businesses in general (Provance, Donnelly, & Carayannis, 2011) (Huijben & Verbong, 2013) a context analysis can be considered useful. Context can be interpreted in two ways: first of all it can include policy landscape pressures, deep structural trends in the macro environment that determine contextual opportunities. Context also includes barriers for socio-technical transitions (Geels, 2002) which can be seen as relevant context for the market. Besides that, in the process of a transition firms bring products or technologies to the market via their business model (Boons & Ludeke-Freund, 2013). Dominant business models are present in the regime, while radically innovative business models develop their niches to form and grow (Bidmon & Knab, 2014). As in the wider market transition, these firms operate within a larger context, and their business models face selective pressures present in the regime. This context analysis will describe the broader landscape, the environment in which a firm and the business model are positioned and policy that specifically tries to empower the energy efficiency niche. Smith & Raven (2012) note the relevant 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 will be described below for the energy efficiency market.

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.

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 Natuur & Milieu, 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 retrofitting¹.

¹ De Stroomversnelling, Blok voor Blok approach and more local initiatives.

Some of these are offering specific solutions, such as cavity wall insulation, on a local level, example given a municipality or town.

A remark that can be made is that it created and supplied isolated islands of demand instead of creating a wider demand for renovation. Whether the approach that was taken actually stimulates the formation of a healthy market can thus be asked.

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 EE 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 institutes² active within the housing market and renovation market. As they found that there is a discrepancy between the perceived effort and the gains 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.

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).

² E.g. Consumentenbond, Vereniging Eigen Huis, Natuur & Milieu, Natuur & Milieu federaties, Milieu Centraal.

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 that 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. Furthermore 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).

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. Important stakeholders in the Netherlands are 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. 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. Also the introduction of the smart meter has created and will create opportunities which entrepreneurs anticipate. 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. It for instance is not completely clear whether insight in energy use results in lower use and how this can be improved. As behaviours become more important with these kinds of solutions other areas of research become more important as well; this makes the market and its contribution to energy efficiency more complex.

Structural elements

Established industry

An observation that was also the starting point for this 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.

Whereas there seems to be little demand for energy efficiency, the supply side to a large extent differs for different categories of measures, which are currently mainly present in the niche level (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, 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 currently 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, 2015; Interview Eneco, 2015). The utilities are at the moment looking for other viable business models that for instance help to retain customers and create value that they can capture, creating chances for smart services (Quby, 2014). 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 EZ, 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 will not be ready before 2020. The smart meter could provide useful data for energy saving. Research however showed that a faster roll out of the smart meter causes distrust from its users; according to their findings 20% would not give access to their data if the roll out were to be more abrupt. The lengthy process will thus likely be a given. Beside that 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 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). Furthermore the top sector policy, designed to support the sectors at which the Netherlands excels, according to Derk Loorbach 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.

Beside the players in the energy regime another regime is relevant for energy efficiency measures; the 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 family owned businesses. These 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 sector³, 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). 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.

³ 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 next section will describe what the government is currently doing to influence the market for energy efficiency.

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 it is currently 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 Netherlands⁴. 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 (Nu.nl, 2013). In the energy covenants that are made by umbrella organizations firms are represented that make up 80% of the national energy use (Interview EZ, 2015).

⁴ 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.).

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. Instances 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 regional economic policy. Furthermore, 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).

Beside 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 EZ, 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, 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. 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. Beside 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 EE market.

Policy context	National policy
Financial	<p>“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>
Fiscal	<p>Residential</p> <p>No direct subsidies are available on national level</p> <p>Energy loans & mortgages: special loans available for energy efficiency investments, these have reduced interest rates.</p>
Legislative	<p>EIA: 41,5% of a sustainable investment can be deducted from fiscal profits (reducing income taxation)</p> <p>Standards (energy label / index), smart meter roll-out</p>
Financial	<p>Commercial</p> <p>WBSO: reduces the costs of R&D for firms</p> <p>TKIs: subsidy scheme for R&D in the Dutch top sectors.</p> <p>STEP & FEH: subsidy schemes for renovations, available for housing corporations.</p>
Fiscal	<p>EIA: see above</p> <p>WA: starting firms can use the ‘random write-off’ to write off investments at random times to achieve fiscal advantages.</p>
Legislative	<p>EED (energy efficiency directive) (European Union, 2012):⁵</p> <ul style="list-style-type: none"> - 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.

⁵ 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.

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 development⁶ (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.

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, the users this research focusses on are firms 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, Rotmann, & et al., 2013). A lack of wealth in the Netherlands does not seem to explain the lack of market uptake of EE 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 EE 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).

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 for instance. 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.

⁶ 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)

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 is 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: "the ones making an offer of course wanted to tell that the technology of all other parties was completely worthless: Did they tell you to use that? I would never do that; it will only give you troubles" (Interview N&M, 2015).

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++ glass, 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. An exception is the research on smart services and smart products that are related to the smart meter. These still require a lot of attention in the field of R&D. 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.

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 improved as well as new applications for smart solutions.

Conclusion

The market for energy efficiency is complex. It deals with 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 can thus not be seen. However, opportunities through niche support as well as barriers are present.

Context analysis

Industry structures

Key players energy regime

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

Energy users (CLO, 2014)

Large firms/industry: 25-30% of total energy use
 SMEs: 10-15%
 Transport: 15%
 Residential: 15%

Miscellaneous

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)

Policy context

See table 1. "Policy Context"

Market and User practices

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

Technology and Infrastructure

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
 Integrating measures and creating value in a systematic solution still a key issue

Culture

Collaborative nature in the Netherlands: 'polderen'
 Energy cooperation's are common practice
 NGOs are abundant and active (e.g. the climate case by Urgenda)

Scientific knowledge

Research has broadened from a focus on technological innovation towards social innovations.

The Dutch case studies

The initial longlist for the Netherlands contained 63 potentially interesting businesses/ energy efficiency services. There was a very broad sample of solutions offered in the market, many focussing on smart solutions with the prospect of the smart meter. In the longlist only several cases were identified that provided renewable waste energy solutions. Furthermore, many cases on the longlist operated with a standard, product oriented business model. This is also visible in the short list as no renewable heating options were selected.

Based on several indicators such as for example access to information, focus on delivery of a service on top of technologies, we selected the cases for further analysis. The table below highlights the selected cases.

Category of Energy Efficiency service	Name of business	Description of proposition	Success Declining – Stable o Growing +
Retrofitting & Total Solutions	Reimarkt	One-stop shop for retrofitting toward an energy neutral home	++
	Nederland Isoleert	Insulation installer that insulates for a fixed price, with a quick process	+++
	Buurkracht	Community based platform that tries to achieve energy saving in a neighbourhood.	++
	BAS Nederland	Provides energy efficiency measures and renewable energy to reach an energy neutral home.	+
	Woonconnect	Provides a smart, online tool, where buildings can be configured to the likings of the resident.	++
Smart management systems (home/industry)	Greeniant	Provides smart solutions to specific problems using disaggregation of smart meter data, up to the appliance level.	--(bankrupt)
	Eneco's Toon	Eneco is an energy supplier that also provides Toon to its customers; Toon is a smart thermostat that provides insight in energy use as well.	++
Lighting Solutions	Philips Lighting	Philips provides light as a service. Instead of delivering light bulbs they remain ownership of the product, but provide services instead	++
	LED Design Holland	The firm is a LED installer that provides lighting solutions from design to implementation.	+

In the chapter below we provide case descriptions for each of the services.

Smart Management Services

The Story of Greeniant

Meet Geert Jan Dirven. He is founder and CEO of Greeniant. Before starting Greeniant, Geert Jan had been in the IT business for many years and learned that many elements of the firm's process are being digitalised. In the supply chain it was of major importance to predict demand in order to optimally distribute resources, personal and machinery. The accuracy of your prediction correlates to whether you make a profit or lose money. Geert Jan and some colleagues realised that the possibilities of the huge quantities of data are almost limitless. It struck him that data might be the new oil. Using big data allows you to iteratively control the assumptions used to make the predictions about demand. This makes the predictions more accurate. This process can also help to de-aggregate information that is provided in bulk. As it happens, a new source of data was being rolled out nationwide, in several countries: the smart meter. Geert Jan realized this might be his business opportunity.

He hired some employees, very intelligent tech nerds, to develop a very smart, highly secret algorithm. This algorithm de-aggregates the P1 data from the smart meter and is able to recognize the specific energy-behaviour of all electrical devices in a home. For example, when the device is showing abnormal usage patterns you could be informed that repairs have to be done or a replacement is needed; a proper smart solution to many problems.

Greeniant was founded: 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. But along the way, Geert Jan is facing some severe problems. His tech nerds know how to develop an algorithm, but they do not know what their users are really interested in. And Geert Jan realizes, he is not managing a tech business, but a service business. Providing a service to an end-user is hard if it requires a specialized solution; the firm would have to re-invent the wheel for every customer. To make this feasible Greeniant targeted firms with a large customer base, thus becoming a B2B2C business. These firms could then provide a service to their customers while Greeniant receives a service fee based on the number of end-users the service reaches. In the first years of business Greeniant provided services to a diverse group of clients: energy companies, insurance companies, an association for farmers and more.

The solutions took the form of an application or online platform where users can view their analysed data and what action should be taken. One of the key-activities is identifying what aspect of the data can help a user and consecutively designing an app or platform to make the findings actionable.

PARTNERS Eneco (R&D partner) Investor Knowledge institutes Technology providers (technology, prodive)	ACTIVITIES App development Organizing meetings with users Data processing and interpretation	VALUE PROPOSITION Creating solutions that help the user in their process and energy efficiency through data provided by the smart meter Insight and solutions User-experience	RELATION Personal during project design User-experience is key	CUSTOMER SEGMENTS Business to business to consumer: the firm targets businesses with many users (insurance companies, associations, energy providers)
	RESOURCES Data Smart meter		CHANNELS Finding end-users through businesses Online platform and apps in use-phase	
COSTS Solution & app development Data analysis Research for and about customers		REVENUE Service fee based on the number of users		

Figure 1: The business model canvas of Greeniant. Template based on Osterwalder and Pigneur (2010).

VALUE PROPOSITION		CUSTOMER SEGMENTS	
PRODUCTS SERVICES Smart solution to a clients specific problems Energy efficiency	GAIN CREATORS Online platform or app Analysis of data Energy efficiency	GAIN Awareness of energy use or functionality of specific appliances Energy savings Insight	CUSTOMER JOBS Each customer has its own specific problems that can require a smart solution e.g. alerting before things go wrong, or appliances break
	PAIN CREATORS Alerting based on statistics and models	PAIN Unexpected appliance failure	

Figure 2: the Customer Value Canvas of Greeniant. Template based on Osterwalder and Pigneur (2010).

Research partners have played an important role in the development of Greeniant and its user oriented approach. Several partners helped them with research on these topics. Examples are Eneco, Essent and Eon, energy suppliers that are interested in energy services. This interest was partly generated by the energy efficiency directive which obliges them to reduce the energy demand of their end-users. Knowledge institutes (universities, high schools) also worked on this type of research.

Sensing user needs

Sensing user needs was seen as pivotal for the success of the firm as each client requires a different solution, but this came only later in the firms development. The start was very much focused first on creating this technological solution. A second issue was that greeniant found out through their turn to become a B2B2C enterprise, that when delivering a solution for a user that is different than the paying client two value propositions are required: one for the user and one for the client. You have to know the needs and wishes of both stakeholders. For this reason research was done with several partners and the client, but also the end-user is involved in the process of developing a solution; the information was thus not only based on big data.

For example, for one client (a farmer's 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 and 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 milking tubes that lasted for a specific time (e.g. 150 hours of use). The cumulative time that a tube was used was kept track of only in the head of the farmer. Alerting the farmer that he had to change the tubes was a service that was needed and much appreciated and saved energy as well as the time to replace the tubes was much more accurately determined. And more importantly, replacing the milking tubes in time prevented wrong milking of cattle with all the illness following this milking. This showed Greeniant that they had 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.

Sensing user needs was a well-developed capability, much needed to provide the unique and tailored solutions to the end-user and client. Greeniant has become aware of the context-dependent needs and wishes of its clients and users. In this sense it learned the capability of conceptualization.

Entrepreneurial Journey

Greeniant was founded with the assumption that providing information about appliances and its energy use is a valuable service. However, through interaction with family and friends and a research project with Eneco the entrepreneur was shown that his assumption was wrong: energy usage of electrical devices is a non-issue; people were simply not interested.

During the research with Eneco they decided to simply go to the end-user and ask what problem could fit to their solution. It turned out that Greeniant was actually too much focussed on technology: it's not about the washing machine and its energy use, but on the practice that it is used for: washing. Washing is a process with

many steps that can be made easier. Providing alerts as to when the machine needs cleaning or an inspection, again, turned out to be of more value than the information how much each wash costs in terms of money and energy.

It was clear that Greeniant and its employees knew how to develop algorithms and design custom solutions. They knew what their solution was, but their real challenge was to find problems that they could solve with their solution.

Understanding user needs was a skill that lacked at the start, but developed. The realisation that these user needs are important might have come too late for the firm, which went bankrupt end of 2015.

In the ecosystem of stakeholders there were matches and mismatches in relation to the user-centredness and service dominant logic Greeniant applied. A strong mismatch 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. Greeniant noticed that the mismatch with the investor was a much broader problem. Similar mismatches are seen at various stakeholders, such as the local and national government, utilities, technology suppliers DSOs and other clients; they have not realised yet that there are more values to offer than energy efficiency alone. 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 which tend to be unrelated to energy. The only like-minded stakeholders in the ecosystem were the enablers of the business model; the research partners and several clients

There is also a more general context that influenced the business model. As Greeniant did not serve only a specific market type a lot of different market contexts played 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 was also an important point of consideration when looking for other countries to expand to. Greeniant was aware of its context and the problems that can be created. However, orchestrating and aligning different actors in the ecosystem seems to be a skill that was underdeveloped.

Furthermore, finding a general formula for value creation is hard when working with many different types of customers in different markets. Scaling and stretching is another capability that required more development.

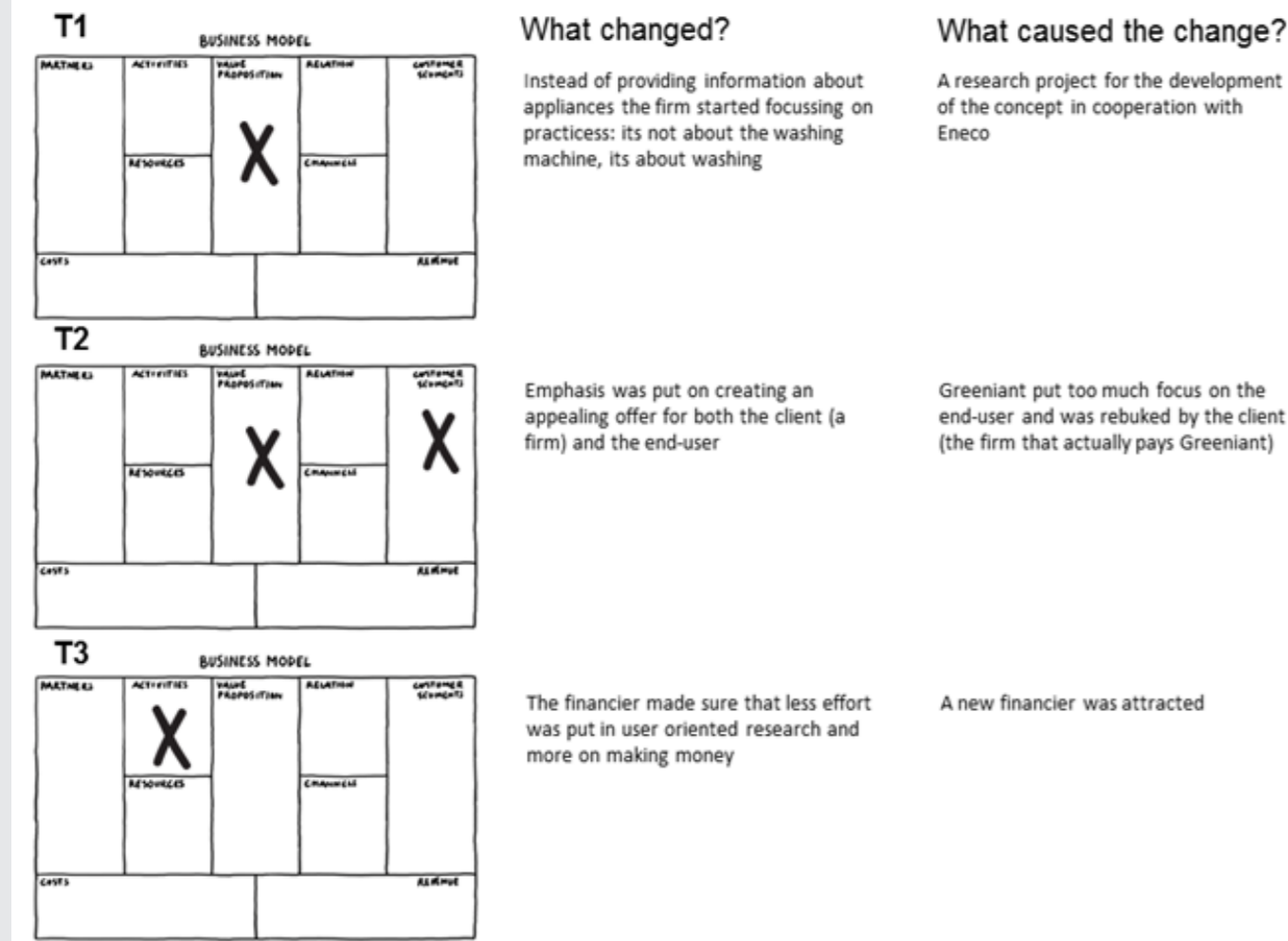


Figure 3: the Entrepreneurial Journey of Greeniant.



Figure 4: Where do Greeniant and its stakeholders stand in the shift from delivering products to services?

The Story of Eneco

Eneco is a Dutch energy supplier that was founded in 1995. It currently has around 7000 employees and is active in Belgium and the UK as well, serving a total of 2.2 million customers (Eneco, 2014).

Before the liberalisation of the energy market Eneco had a monopoly and thus no customers in the market sense of the word, Eneco supplied to a fixed region, you had no choice in which supplier you had. With the liberalisation this all changed. After the liberalisation of the Dutch energy market Eneco noticed a growing competition on energy price and a growing threat of customer churn. Eneco also feared to enter a commodity trap. Furthermore the Authority for Consumers and Market checked the margins on energy making competition on price and thus increasingly smaller margins were possible, creating a difficult business model, certainly given the large overhead of Eneco because of its size. A business as usual reaction of several competitors was to choose for efficiency and reduce production costs. Building new energy plants, to produce more efficiently and get a lower production price for energy so they could sell it at a better price.

The CEO of Eneco, however, had a different vision. He stated that sustainability would be a lasting trend and that Eneco had to choose a different path and had to create more value for its end-users. Starting 2007 within the firm all eyes turned to sustainability and becoming a "beloved company" (Interview Eneco, 2015). The combination of both the CEO vision and the external pressure from the Energy Directive led Eneco to make a very big and very quick change in its business model. In a short time span Eneco stopped investing in fossil fuels and mainly invested in renewables. Next to activities related to generating renewable energy, energy efficiency and development of new energy services also featured prominently in the new activities. Eneco built its new business model around three strategic pillars: sustainable, decentralised and together. Eneco briefly considered focusing on services such as insulating their client's homes but quickly decided there was insufficient competitive advantage in that. Eneco is quite idealistic, but with the aim to make money out of this idealism.

Eneco decided what was needed was a much stronger focus on the demands and needs of customers. In 2010 Eneco decided to develop a service to help their customers save energy. In a way a counterintuitive approach for a company selling energy. However, next to strongly building on this vision of the CEO, Eneco also reacted

to an expected European Energy Directive that would demand energy suppliers to reduce energy consumption of their end-users. Eneco decided that the necessary change towards becoming a sustainability focused company, a trustworthy company could also help improve the quality of the relationship with their customers and thus be as a customer retention strategy.

For the private household client segment Eneco started proposing Toon, a smart thermostat with a big feedback display co-developed with a start-up called Quby, which also provides insight in energy use and related information such as weather forecast. Eneco invested several hundred thousand euros in this start-up. This led Eneco from a very mature energy supply market, into a much less mature one. But Eneco, from the start saw this smart thermostat as the entrance points in households, combined with the strong emergence of smart phones it had the potential to develop into an interactive smart home interface, allowing Eneco to grow into providing services beyond energy. As a consequence, another big change entered the business model in 2012: Eneco made a strategic decision to cooperate and partner with start-ups and large established companies such as Philips to add services to their basic proposition, supply energy. They decided to invest millions of euros in start-ups.

Eneco is also working with universities, on technical issues, but also on social innovation. They are now looking at healthcare situations, what's the effect on the patients of the atmosphere, the indoor climate, the installations, how can they be of better use? What's the effect on their behaviour. Not only focused on Toon but much broader. Initially Eneco offered Toon to customers engaging in a long term contract. As of the start of 2015 Toon also became available for customers that do not have an energy contract with Eneco after research by a civil society group identified that energy suppliers such as Eneco were breaking a law (Wet Financieel Toezicht) by providing apps and products such as Toon to clients as part of the contract without making explicit what the costs for Toon were. At the time of the interview (mid 2015), Eneco had installed more than 160.000 Toons. Toon is now given as part of the package when a five year contract is signed; without a (long-term) contract it will cost approximately 300 euros. Toon is mainly 'sold' through the traditional channels for Eneco, such as its customer service department, call centers etc. but Eneco increasingly uses extensive marketing channels such as the television to sell its brand and product.

The value proposition being sold to the customers in the beginning centered on being in control. Control over your bill, energy in your home, but increasingly Eneco is now focusing on other values such as safety (fire alarm), convenience (remotely putting lights and thermostat on and off), independence (monitoring of generation from PV), wellbeing and comfort, and a good feeling about your contribution to sustainability.

Eneco's resources are focused also on the value of networks, and its customers. Next to more traditional resources as the apps and products and capital. Cost structures are different from other companies, with a lot of cost categories revolving around investing in innovation, development and investing in start-ups. Next to the old cost categories of energy purchase and supply and back-office.

The revenue system is not yet fully transitioned to a service model, but far underway with energy sales as monthly fees and the costs of Toon as monthly fees (if a transaction at all, given it is supplied with a long term contract).

Eneco has a very specific perspective on competitors. Google, for example, could be a competitor when you compare Toon to Nest, but on the other side, Google is building a huge datacentre for Europe in the Northern Netherlands, and Eneco is providing this datacentre with sustainable wind energy. For Eneco a competitor can be a partner and vice versa. This also applies for, e.g. banks. These are Eneco's partner. But at the same time, with the negative interest Eneco is telling people they are the competitor of these banks because investment in their wind farms against 2.5 or 3.5 percent interest is better business. According to Eneco this whole market is changing so fast that the notion of competitors is changing as well.

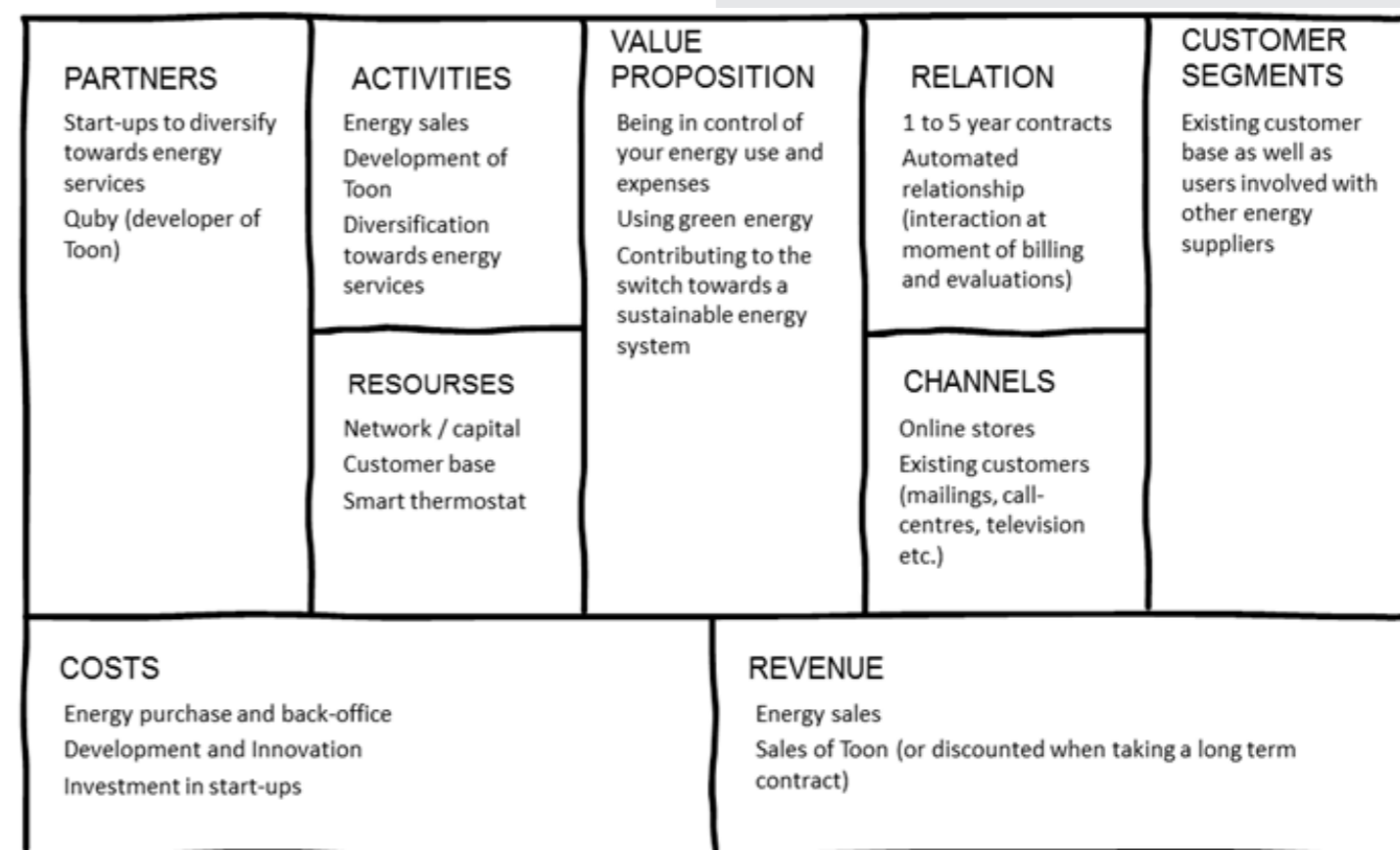


Figure 5: The business model canvas of Toon. Template based on Osterwalder and Pigneur (2010).

Sensing user needs

Sensing user needs has become imperative to the survival of Eneco since the end of Eneco's monopoly after the liberalisation of the market. Initially Eneco organised test groups (originally consisting of employees but this broadened to include end-users) and explicitly asked for feedback but now they also actively talk to end-users and active co-creation or co-innovating is organised by involving users and other stakeholders in Hackathons or design competitions. "You can try to innovate by yourself, which takes a lot of exercise, money and time. If you have open innovation, you get many more ideas in less time, with less money" (Interview Eneco, 2015). Eneco decided for this open innovation strategy or crowdsourcing/ e-sourcing after a trip to Silicon Valley.

The value of the capability of sensing user needs for the development and innovation of

the business model and for conceptualising capabilities became even more apparent with Toon. Toon was first 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 Eneco could deliver more value than a smart thermostat. Toon had the potential to be an interface for a smart home and all sorts of applications that come with it; "the brain for your smart home" (Eneco, 2014). 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 had to work on becoming trustworthy and communicating transparently, opening up its books, showing how its price is built up and showing what's in it for Eneco. To that end Eneco is piloting with corporations in Eindhoven and Rotterdam.

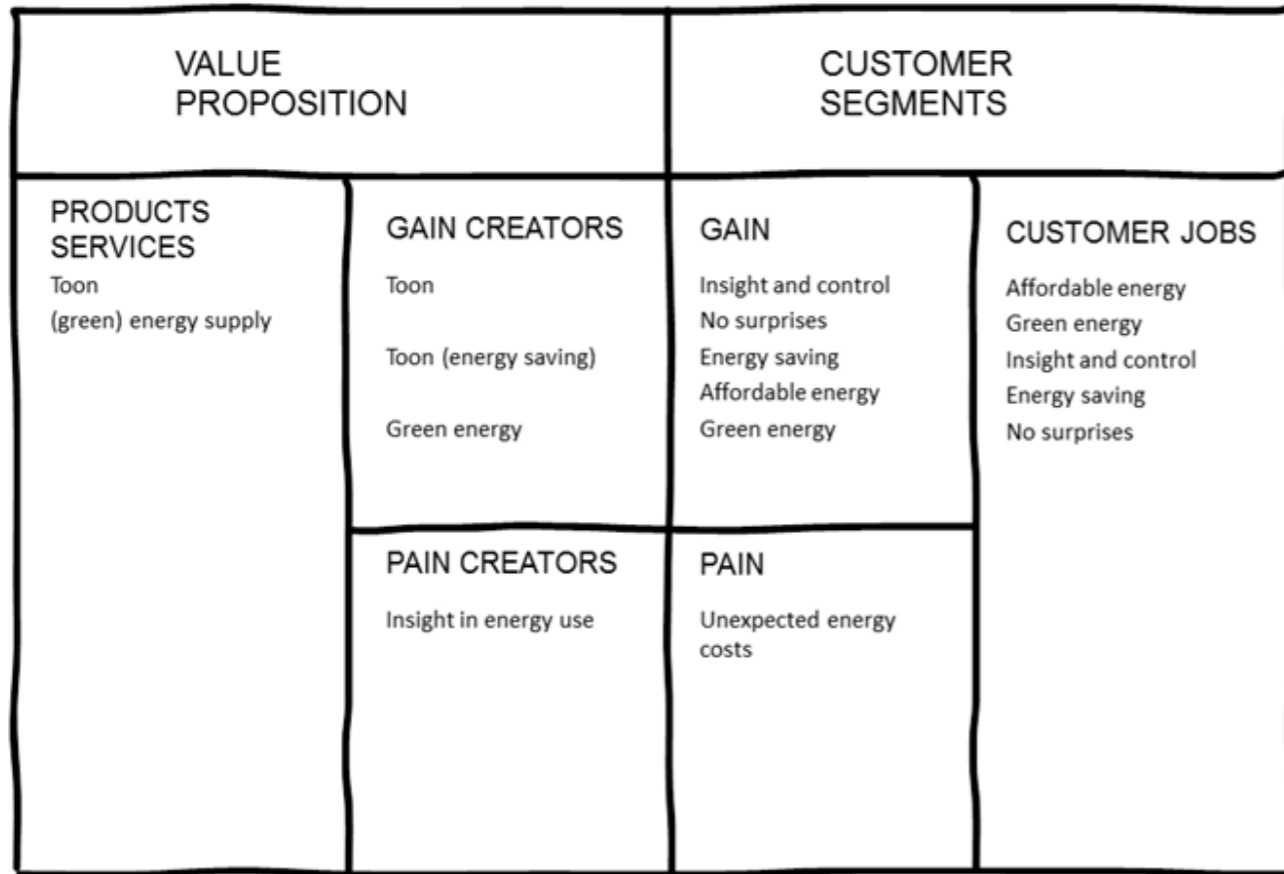


Figure 6: the Customer Value Canvas of Eneco's Toon. Template based on Osterwalder and Pigneur (2010).

Eneco however also involves its users in developing its scaling (branding and market uptake) capabilities. Eneco actively engages in conversations with media and other kinds of critics and follows influential bloggers and vloggers in order to be able to be a participant in the conversation. Eneco explicitly focused on developing its stretching capability, making sure the whole company's mind-set changed and

that the whole of Eneco would start focusing on customer needs, finding out and asking 'Why'. 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 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.

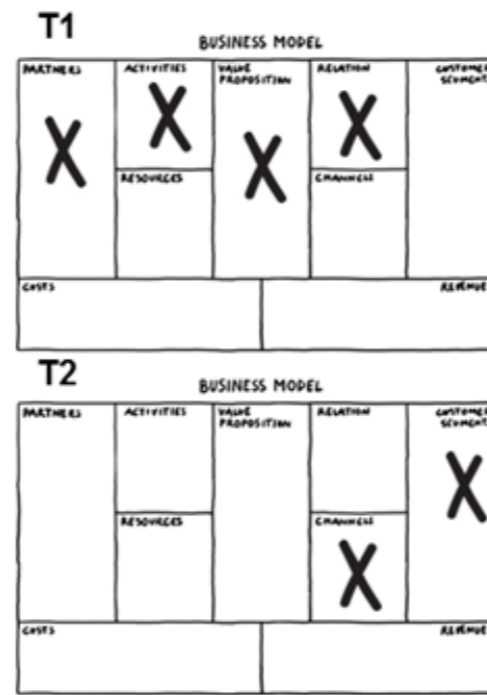


Figure 7: the entrepreneurial journey of Eneco.

What changed?

Eneco started adding more energy services to their proposition and had to further involve the user as there was no longer a monopoly position

Start-ups are partnered with to add services to the proposition

What caused the change?

Fierce competition on the price of energy after the liberalisation of the energy market where Eneco lost its monopoly position. Furthermore the CEO foresaw a change towards sustainability and services in 2010.

A lacking uptake of Toon

Eneco is not finished yet in its transition from delivering products to delivering services. Eneco wants to become a sole service provider with products facilitating the service. That is also why Eneco wants to provide Toon 'for free': "If you are changing your business model from products to services. It's also about the trend of not having assets but access." For Eneco the residential segment is slightly more challenging

than the commercial and SME one, especially when it comes to guaranteeing potential savings. For office clients they already do provide energy performance contracts. For households they do not yet because they have insufficient control over the energy use. Automation and demand response are the next step, and Toon provides the access.

Product

Most competitors are just starting to add services to their product oriented energy sales part. Eneco is a bit further in the switch and also try to communicate values related to insight and control in energy savings and costs. Quby, the technology supplier for Toon, focusses on product development only. Society is used to the traditional energy supplier (without additional energy services) The government seems to have no specific influence in terms of PDL/SDL

Service

Eneco is in a phase of transitioning to a more service oriented approach. Eneco's marketing goes beyond energy prices but also speaks of the jobs that Toon can do for you



Figure 8: where do Eneco and its stakeholders stand in the shift from delivering products to services?

Retrofitting and total solution cases

The Story of BAS Nederland

Meet Arash and Richard, two entrepreneurs who founded Bas and developed its value proposition: the path to zero. This path to zero means that the customer, often a firm, becomes independent from fossil fuels by saving energy and generating renewable energy. Typically the client pays a fixed periodical sum for the energy service. Saving energy frees up a part of this fee to reinvest in energy saving measures. The model can be seen as taking an energy mortgage; the client commits himself to paying a fixed monthly fee for several years after which he will be left with a (close to) energy neutral situation. This should lead to a situation where the client is independent from fossil fuels.

The development of the path to zero was led and promoted heavily by Arash, a true idealist and inspiring speaker. He believes that the traditional type of energy supplier is soon to be obsolete as the driver of these firms is to sell as much energy as possible while the customer, the environment and government all want to see minimized energy sales. Richard, on the other hand, is the more business oriented entrepreneur who is currently CEO of Bas Nederland, Arash is now looking for other challenges outside the firm.

Bas Nederland is currently still an energy supplier, however they want to split up the company and built a "Chinese wall" between the energy supplying part and the part that provides the path to zero. 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.

Generally the customers are energy related firms, SMEs and firms with a lot of users themselves (e.g. healthcare sector). According to Bas Nederland they could serve 10 times as many customers as soon as their offering is completely finished and fine-tuned. Currently one of the key-activities is still to continue development, especially software related; the firm's aims to make an app that enables the firm to do some energy auditing itself, cutting costs drastically.

The costs of the firm currently consist of doing audits and implementing measures as well as the further development of the concept. On the other hand revenues are created using different financial methods. On the one hand there is the energy mortgage as discussed earlier, but also other ways of financing are explored. For instance, some firms give Bas Nederland a budget to implement several measures or simply pay for the measures.

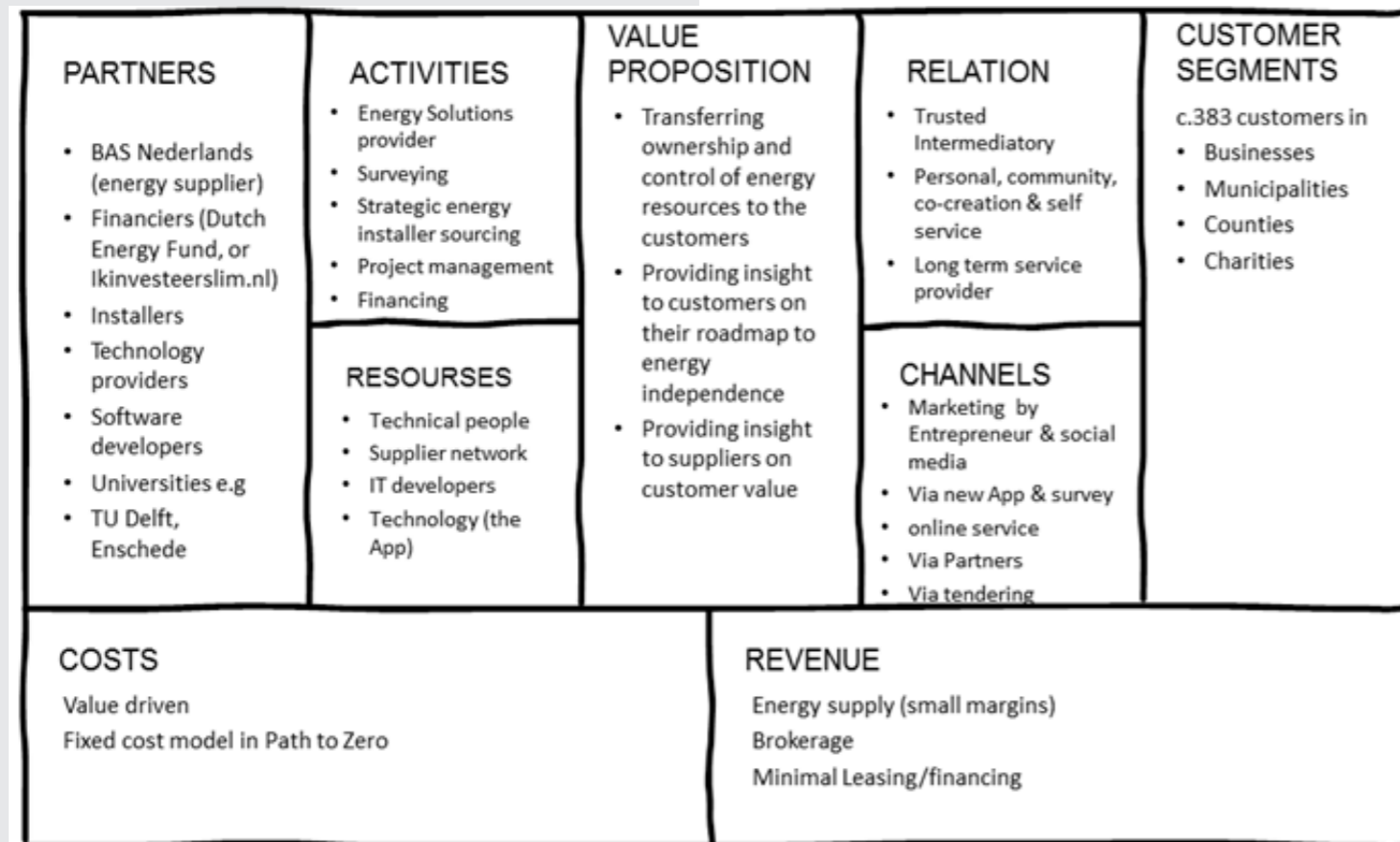


Figure 9: The business model canvas of BAS Nederland. Template based on Osterwalder and Pigneur (2010).

Sensing user needs

The importance of sensing user needs is recognized at Bas Nederland. The firm has two main ways to interact with their users. Firstly, the firm uses face-to-face interaction with the 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.

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: Like the case of Greeniant, Bas Nederland has to provide value for 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. Other important pains and gains for the customer are also uncovered in the process: there is often a lack of expertise and knowledge

present in firms to completely implement different energy efficiency measures. This tends to be a hassle that Bas Nederland can prevent.

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.

Currently the main communication with the client and end-user takes place through direct interaction (one-on-one) in the design 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. The entrepreneurial skill of sensing user needs and conceptualizing is thus being further developed but center stage in the business model.

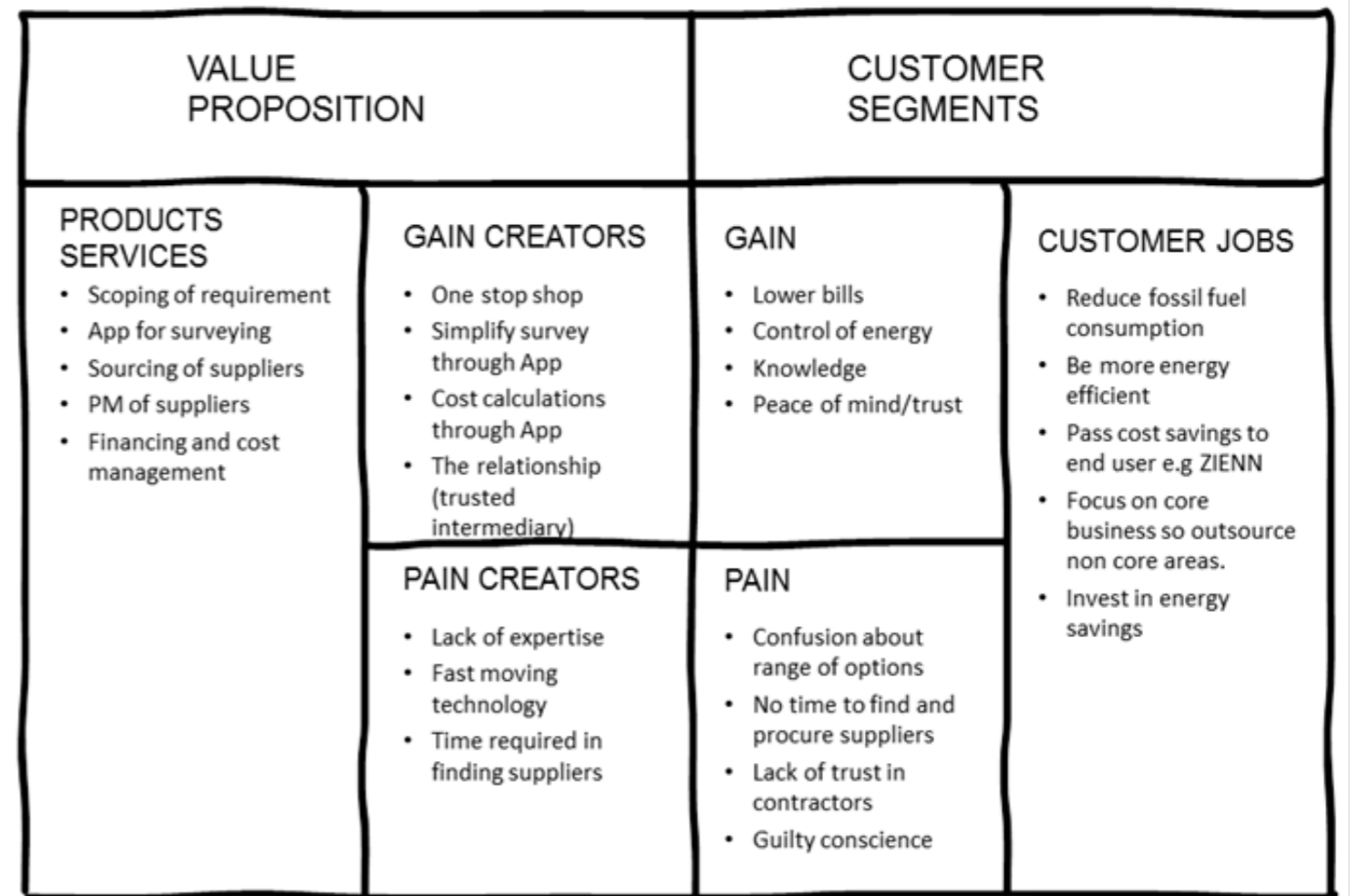


Figure 10: the Customer Value Canvas of BAS Nederland's path-to-zeros. Template based on Osterwalder and Pigneur (2010).

Entrepreneurial Journey

The face-to-face meetings often lead to lessons learnt 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.

After the interactions mentioned above several parts of the business model thus had to be 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 lessons learnt also led to a focus on software development (the app can lower costs for auditing significantly). The value proposition was also changed more incrementally on the 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.

An example of the process of learning based on the user interactions 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 of the business model (Interview Zienn, 2015).

Besides this, following the interactions Bas Nederland noticed 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 to convince more firms to join the path to zero.

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.

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 launch 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 are 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. In this sense the entrepreneur has the skill to setup and align a network of stakeholders; the capability to orchestrate and align is well developed.

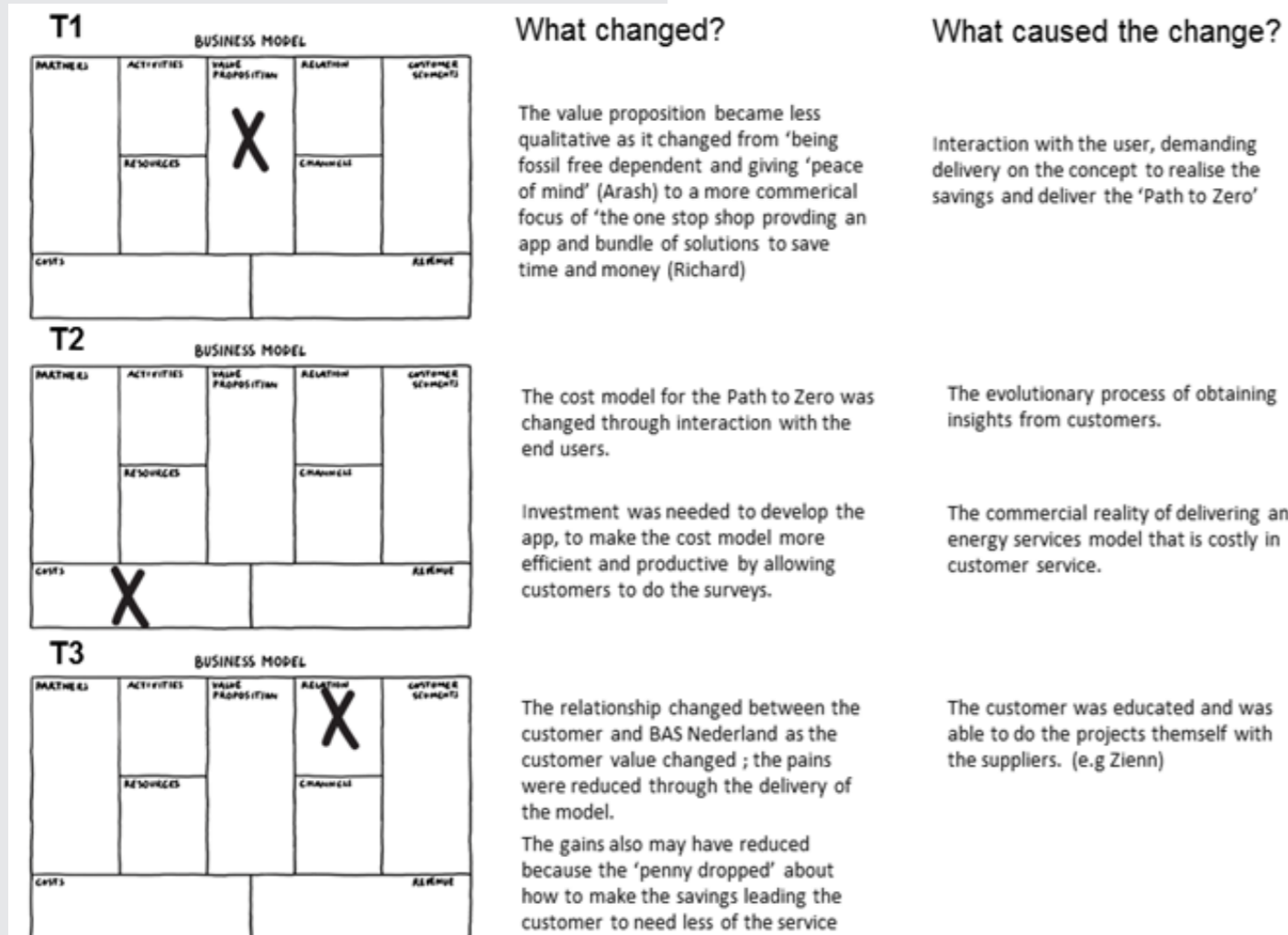


Figure 11: the Entrepreneurial Journey of BAS Nederland.

Product

The Godfather enabled BAS to be a supplier of energy but is not necessary for the energy services model

There is no certification scheme for the suppliers. Official institutions are not involved in the position of BAS Nederlands on the paradigm

Competitors are not yet driving Bas Energy along the paradigm. Being at the service end of the paradigm gives the competitive advantage.

Service

Both marketing and communication and providers of content move Path to Zero and BAS Nederlands along the paradigm..

Society's expectations are moving further towards the service paradigm.

Providers of systems and providers of services work in partnership to deliver the Path to Zero, however the App will potentially move the Path to Zero less further along the paradigm by making the survey 'self service'.

Financiers are important enablers and have the potential to be come part of the service.

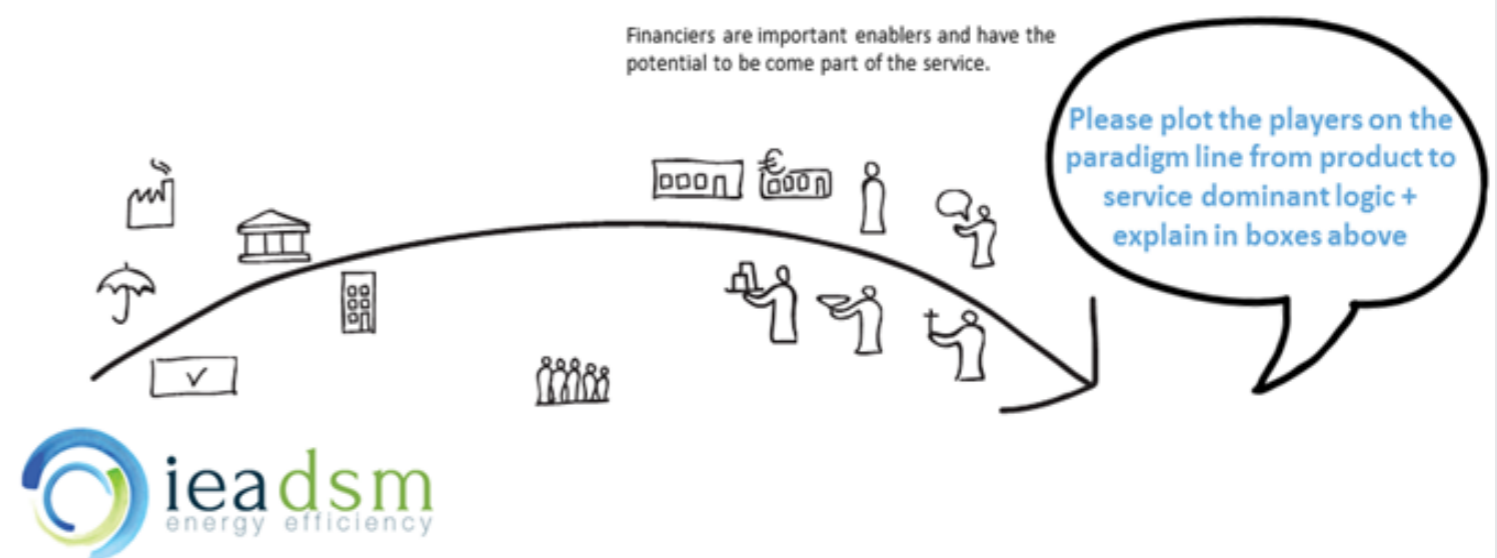


Figure 12: Where do BAS Nederland and its stakeholders stand in the shift from delivering products to services?

The Story of Reimarkt

Meet Marcel. Marcel is founder of Reimarkt, a firm that offers retrofitting solutions. In 2012 Reimarkt won a tender as a member of a consortium with builders. He joined with housing associations to offer their tenants retrofitting solutions. As an architect, Marcel knew the market very well. Many houses need insulation, and in Marcel's opinion, this technocratic market wouldn't get there. Marcel wanted to create a new and different insulation proposition, one that would be tailored to the wishes of the user.

Reimarkt is what he calls a retail concept. It includes a one-stop-insulation-shop with all retrofitting possibilities, easily explained. In the first year, Reimarkt was quite successful. A deal was made with the town of Enschede and housing associations to target tenants exclusively with his (subsidized) offer.

But subsidies came to an end, and Marcel is ready to target home owners. So he did some research, and learned that these home owners aren't really interested in insulating their homes. In fact, home owners don't want to buy insulation, they are interested in spending their savings on a holiday...

One of the key characteristics, still in early development, is the efficient and intelligent database of housing typologies. This database makes the regular house-scan, a personal advice on what measures should be taken, obsolete. However, Marcel learned that home owners still want personal advice, based on a home scan. And also, to a home owner, energy is not an issue. In response, Reimarkt is trying to focus on energy neutrality and buildings that last and are designed for pleasant living (Interview Reimarkt, 2015). But, this is hard to standardize. At the moment Reimarkt is still struggling to understand how to market the concept.

For Reimarkt the key-activities involve the creation of solutions for housing typologies, testing these in the market and improving the offer. Besides that, the firm focusses on marketing; they hope to spread the word by using each retrofitted home as a success story. Implementing the solutions is done by Reimarkt's partners. These partners, construction companies, have to actually deliver the retail concept. In this sense Reimarkt is the intermediary, or a B2B2C enterprise. This is also reflected in the revenue model: Reimarkt receives a fee for measures installed and needs subsidies to work on development of the proposition.

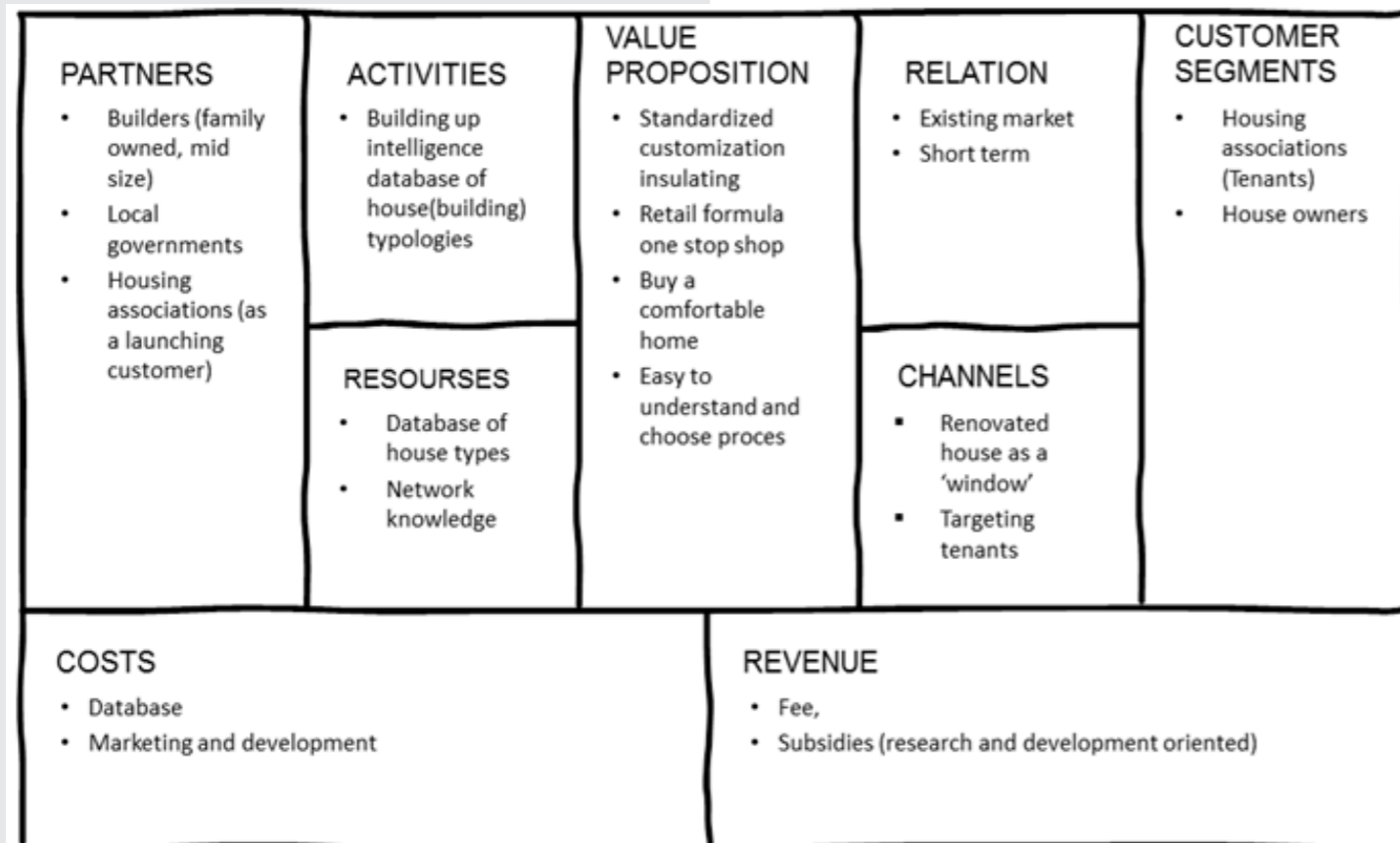


Figure 13: The business model canvas of Reimarkt. Template based on Osterwalder and Pigneur (2010).

Sensing user needs

Reimarkt puts a lot of effort and time in involving its user and conduct co-creation with customers. The firm tries to get a quick reaction of users on new products to get insights for further product development. Marcel tries to operate on the basis of the 'lean start-up': start small with creating a viable business case, after which you focus on scaling. This co-creative process turns out to be difficult and time consuming, however, Reimarkt is learning.

In many cases assumptions about the 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). The insight suggests that making the results of energy efficiency measures and integral solutions tangible in terms of living needs and wishes instead of monetary and energetic gains is a starting point.

The way Reimarkt engages in frequent interactions with the user and tries to innovate the firm's offering indicates that the entrepreneur is capable of conceptualizing. Furthermore, Reimarkt involves the user in a different way: once a home is retrofitted, it is set as an example for the rest of the street. Neighbours can experience the result in a trustworthy situation. A customer can thus be used as a trusted sales channel towards its peers.

Sensing user needs is a capability that thus is well developed and put in to practice. However, problems arise when taking the proposition to a wider audience. Difficulties are found in scaling and stretching the proposition. There is a potential inconsistency in the business model. Although Reimarkt is providing a service, key in his model, aimed at scaling, is efficiency through mined intelligence, big data. In a way this is a product dominant characteristic which does not yet align fully with the service oriented approach.

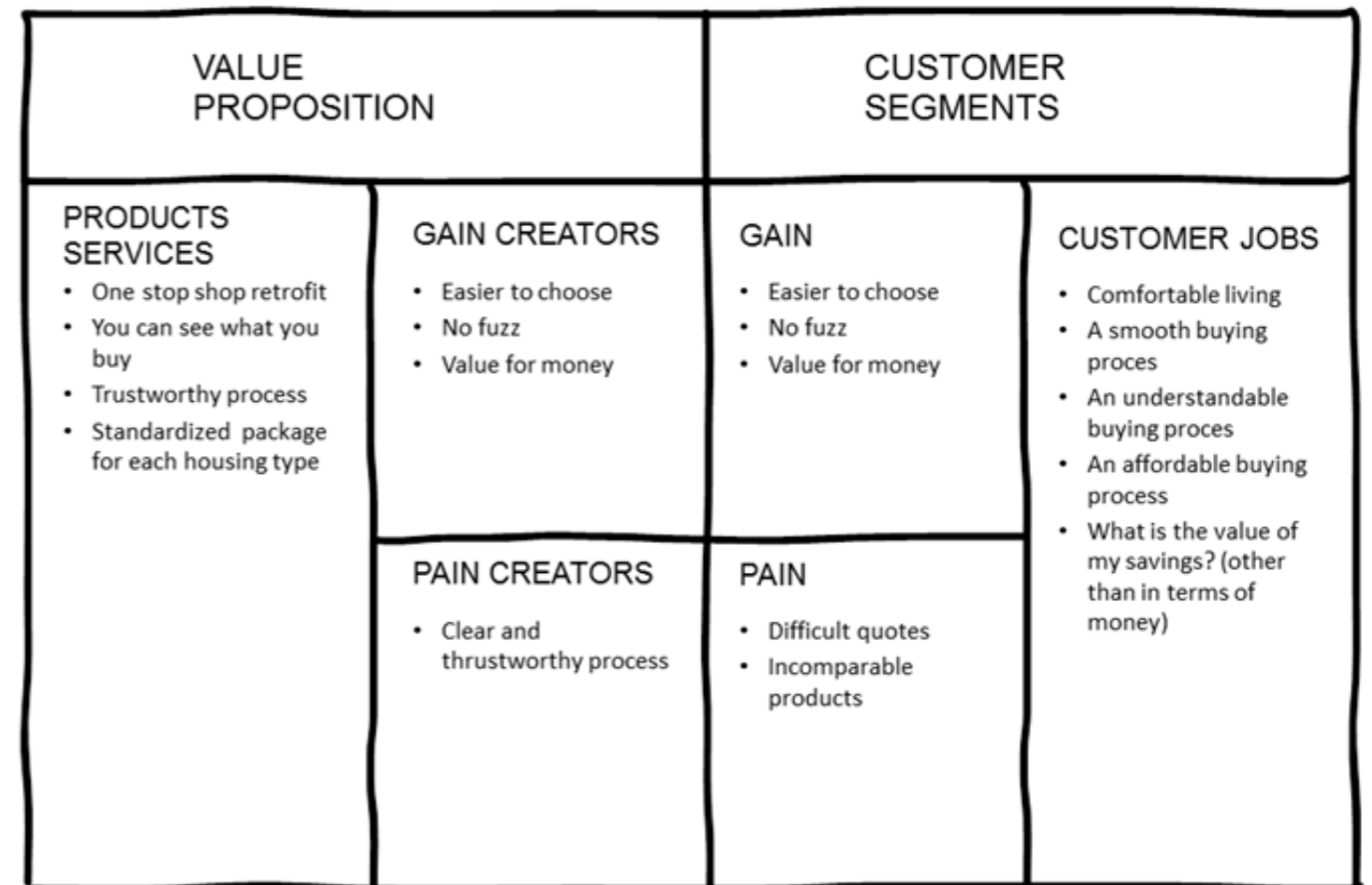


Figure 14: the Customer Value Canvas of Reimarkt. Template based on Osterwalder and Pigneur (2010).

Entrepreneurial journey

As an architect, Marcel had his first experience with home construction and retrofitting. He expanded his role in the field when becoming director of KAW, an institute that works on urban renewal. In his role as founder of Reimarkt the entrepreneur had to set up a network of partners and responded to a tender to enable the development of the concept. To further develop the retail concept and scale it the firm requires more financial resources.

A major hiccup in his business model still is the choice of partners. Where Reimarkt wants to provide 'personal' solutions, his initial consortium partner focused on efficient, low cost processes. Because of this the user got a diffuse message, a clear lack of orchestration skills at that time. It turned out that the partnership was not working because of these diverging views.

In a way the business these initial construction companies are in is opposite to the business Reimarkt is in. To restore balance to the firm's ecosystem new partnerships were made with more local, small-sized, family-owned construction companies. These companies are more flexible when it comes to adopting a retail concept as Reimarkt's and orchestration is more easily reached.

Furthermore, after their launch in cooperation with housing associations, Reimarkt focussed on reaching home owners. However, as it turns out, home owners and tenants are different customer segments. In a way a tenant isn't a customer, only a user. A home owner has different needs and wishes and has a very different 'relation' with the house he lives in. These differences have major implications on the value proposition that needs to be offered.

Context

Reimarkt's focus on pleasant living and thus providing an outcome rather than a product is a step away from the usual, product oriented business logic. Even though this more service oriented approach might appeal to users, it has downsides too. As mentioned earlier, it was hard for Reimarkt to find like-minded partners that could deliver their retail concept. On the other hand, the municipality and housing corporations were in line with Reimarkt and the service approach. These actors allowed to develop the concept in the first place. In contrast, Marcel believes that the one-dimensional and technocratic approach of many subsidy programmes and financing options is detrimental to the market rather than stimulating. He believes that these measures should also be oriented on outcomes rather than products.

Besides that, the firm experiences specific legislation for the social rental sector as a barrier. In the Netherlands there is a social housing segment in the market. In this sector the rent cannot exceed a certain limit; investing in these houses is thus harder as the investment cannot be paid back by raising the rental price. Furthermore, in comparison to home owners there is an incentive lacking though: housing corporations have the obligation to improve their energy efficiency, which provides them with a different basis for cooperation than home owners.

The next Figure illustrating the paradigm shift, shows that, in terms of business logic, Reimarkt's stakeholder network is very diverse and poorly aligned, lacking orchestration.

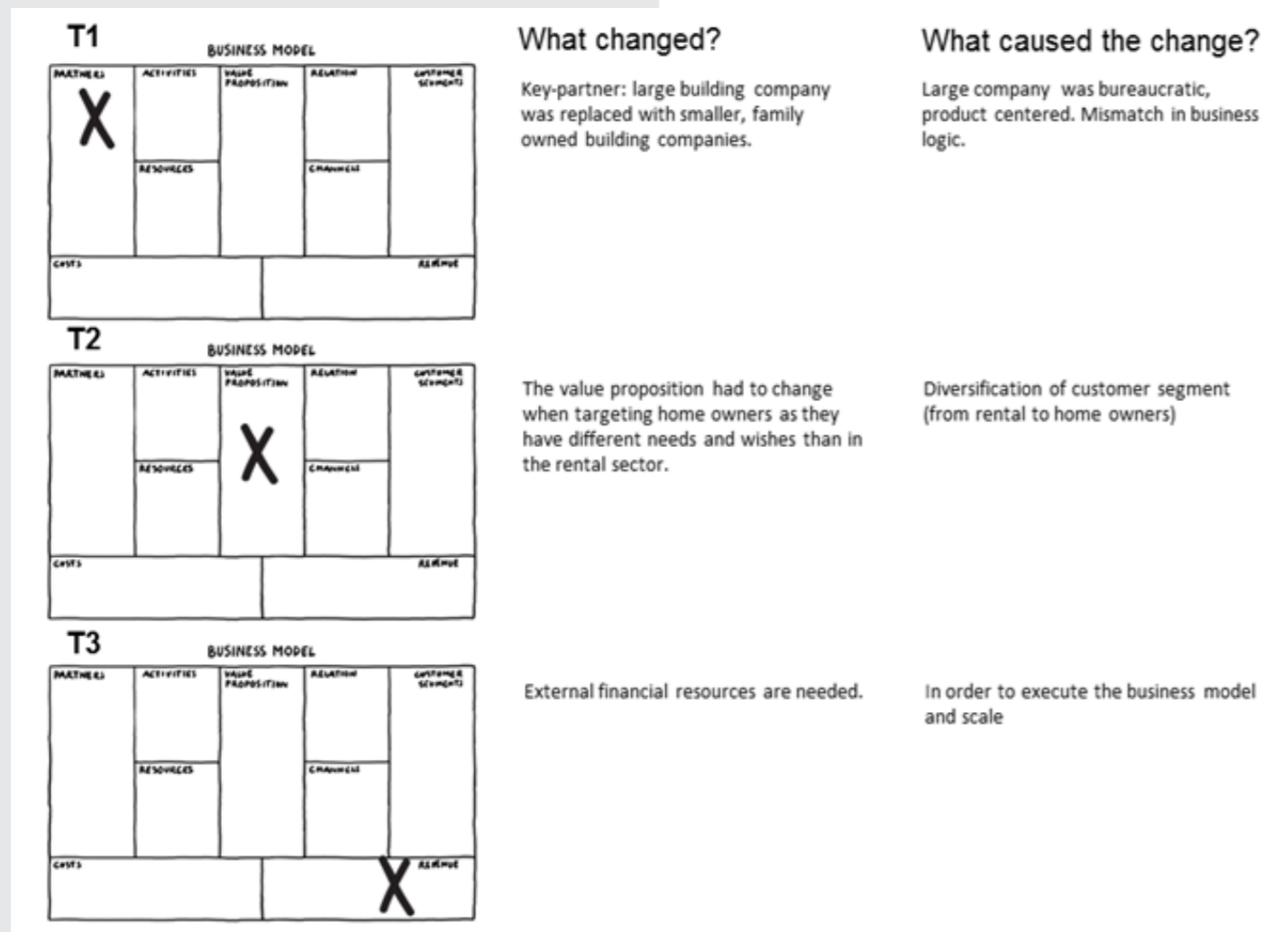


Figure 15: the Entrepreneurial Journey of Reimarkt.

Product Service

Product
 Construction companies are generally traditional and product minded.
 Competition in the market delivers products, not outcomes
 Subsidies are product oriented, rather than outcome
 The mass population is not used to firms delivering an outcome

Service
 Reimarkt wants and propogates to deliver an outcome.
 The enabler, housing corporations, is in line with Reimarkt and provides a customer base
 The entrepreneur and KuuB, act as a service oriented godfather
 Local governments supported Reimarkt



Figure 16: where do Reimarkt and its stakeholders stand in the shift from delivering products to services?

At the moment, the ecosystem around Reimarkt is poorly aligned, even though Reimarkt has spent over two years in setting up the full collaboration. This shows that either Reimarkt has been unaware of the significance of an aligned ecosystem, or it has not been able to fully change the situation. In conclusion, the orchestrating capability is not well developed yet.

As discussed above, the firm's ecosystem is not aligned; the same can be said for Reimarkt's business model in general. On the one hand it is completely focussed on providing services and outcomes, while on the other hand open data is used to minimize the customer relationship as there is no need to come to the home for a personal chat.

The Story of Nederland Isoleert

Meet Raoul. He is one of the two founders of Nederland Isoleert (NI). Raoul became an entrepreneur when he was 23, but founded NI in 2012, when he was 32. He didn't start NI because of his ambition to green the country. He started it but because he accidentally found the insulation market showed a yearly growth of only 2-3%. As more than 50% of all the privately owned houses in the Netherlands needed insulation, the market was not saturated nor was the competition ambitious: it would take ages to insulate all residences in the country! Once he realized this, he knew that this market would be his new business opportunity.

Together with his business partner they dived into the insulation market and evaluated their competitors: two or three family owned companies dominated the market. They didn't show any real ambition to grow or to innovate their offer as their current business had been doing just fine for years. Most of the innovations were in the supply, or product side of the proposition. In practice, only specific technical innovations to improve the RC quotient of the insulation were incorporated.

Also, Raoul realized that some strong conventions about insulating homes existed:

- Every house is unique, it needs to be visited and measured before one can send a personalized offer;

- Every consumer is used to having a choice in the type of insulation materials that will be used;
- Insulating is a very complex thing; consumers do not really understand what happens and what differentiates the approaches and materials.

Raoul on the other hand, believed that there is nothing simpler than wall insulation. He knew: if I can find out how to sell it, I'm in business. To make the business as simple as he believed it to be he took a couple hands-on decisions: the only offer was one type of (cavity) wall insulation. He offered this as a transparent and easy to process option, all for a standard price. By being reliable and friendly to clients and by hiring professional installers he already was very distinctive from his competitors. With a door-to-door campaign in a small town in the centre of the country, he managed to sell his offer. He tried, and still is trying, to find new ways to sell his wall insulation offer and the firm is growing really fast. NI grew to be the second largest Insulation player in the market over the course of three years.

A key element of the business model is it's easy to comprehend value proposition. To enable this, a specific revenue model had to be chosen: standard pricing for standard houses. As the Netherlands has a lot of standard houses, virtually any house with a cavity wall can be insulated for the price of 750 euros. Besides that, the firm focussed on doing their key-activity, providing insulation, in a quick, transparent and decent way. Doing so, NI generated more trust. Controlling

the value chain becomes more important in this scenario, as you have to guarantee that your partners operate on the basis of the same principles. The capability to orchestrate a value chain that coherently provides an understandable process that is easy and user friendly was important and can be considered as a well-developed capability.

To create a viable business case NI decided that going to every customer to measure the wall areas that are suited for insulation would be too expensive. To avoid this, they used open data as an important resource. For example, combining google streetview with other readily available data allowed them to remotely measure and asses the walls of most houses. That way, a cost and time intensive step was eliminated from the process (Interview Nederland Isoleert, 2015).

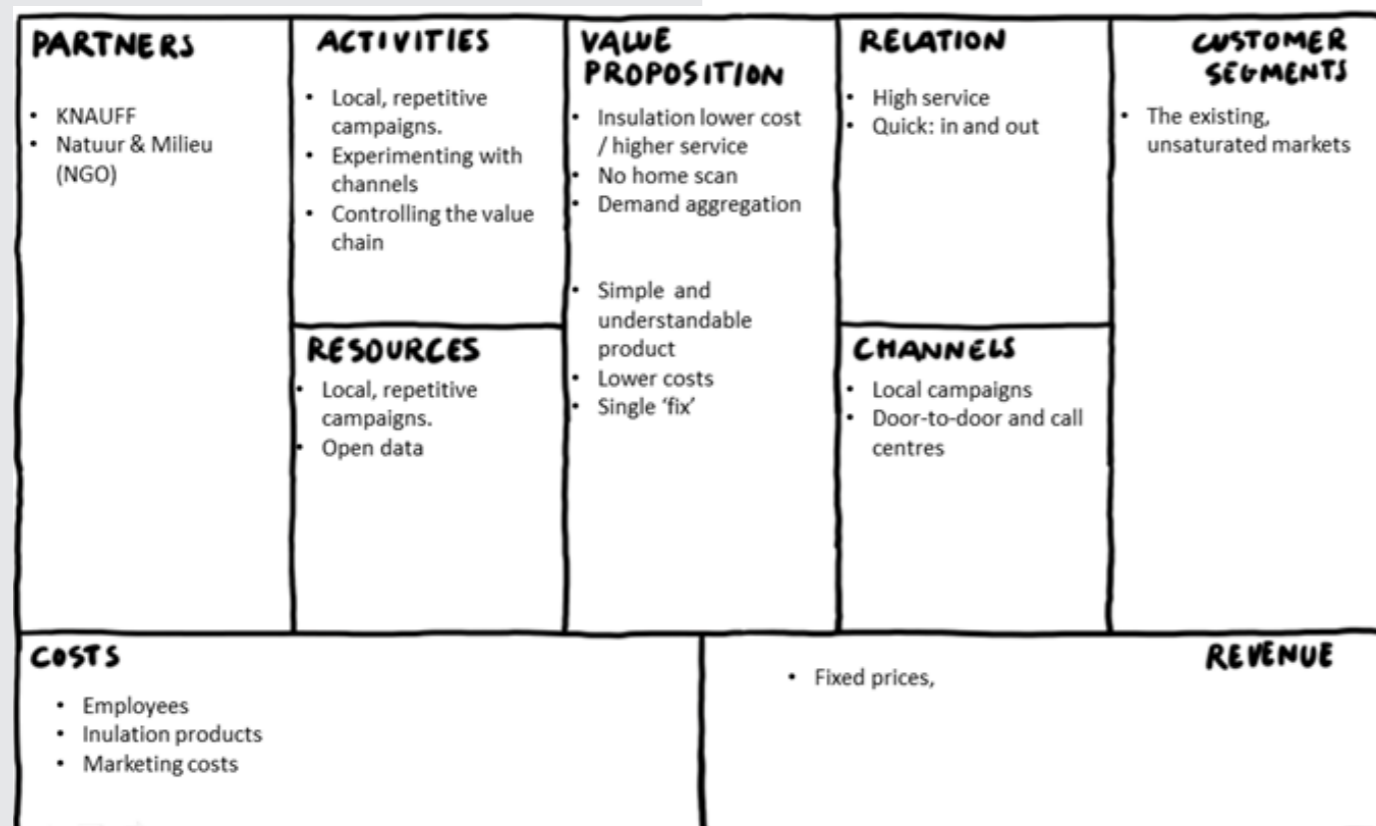
As the entrepreneurs understood market imperfections and anticipated on them a viable business case could be created. However, the right channels still have to be found to sell the proposition. To find these channels NI experiments with different approaches, ranging from door-to-door acquisition, call-centres and more locally initiated pilots. Even though Raoul is no proponent of intense user involvement or co-creation the sales process is co-created; NI experiments with different channels and strategies to learn the best way to bring his offer to his clients (Interview Nederland Isoleert, 2015).

Sensing user needs

NI excels in seeing what is not working in the current market and linking this to a new concept. One of the pains that they found was an apparent complexity in the number of technical solutions and providers; the supply side seemed a mess. Different firms operated on, seemingly, unrelated prices. Furthermore, you need to actually call a company or request an offer elsewhere; this information was not available on the websites. Operating on fixed and transparent pricing meant a radical business model innovation for the market.

Secondly, Raoul noticed a difference with other markets. In most markets, for example in car maintenance and repair, it is actually not required to know about the technicalities for the user. However, in the insulation market the user is expected to make a choice between different types and approaches to insulation. By offering a standard solution this choice is taken away from the user.

As mentioned earlier, another common convention in the market is that insulating a house is a long and troublesome process which often leaves a mess behind. These problems are dealt with by NI as they perform remote measurements and can install the insulation without anyone having to be at home, leaving the site as it was before their involvement.



34 Figure 17: the Business Model Canvas of Nederland Isoleert. Template based on Osterwalder and Pigneur (2010).

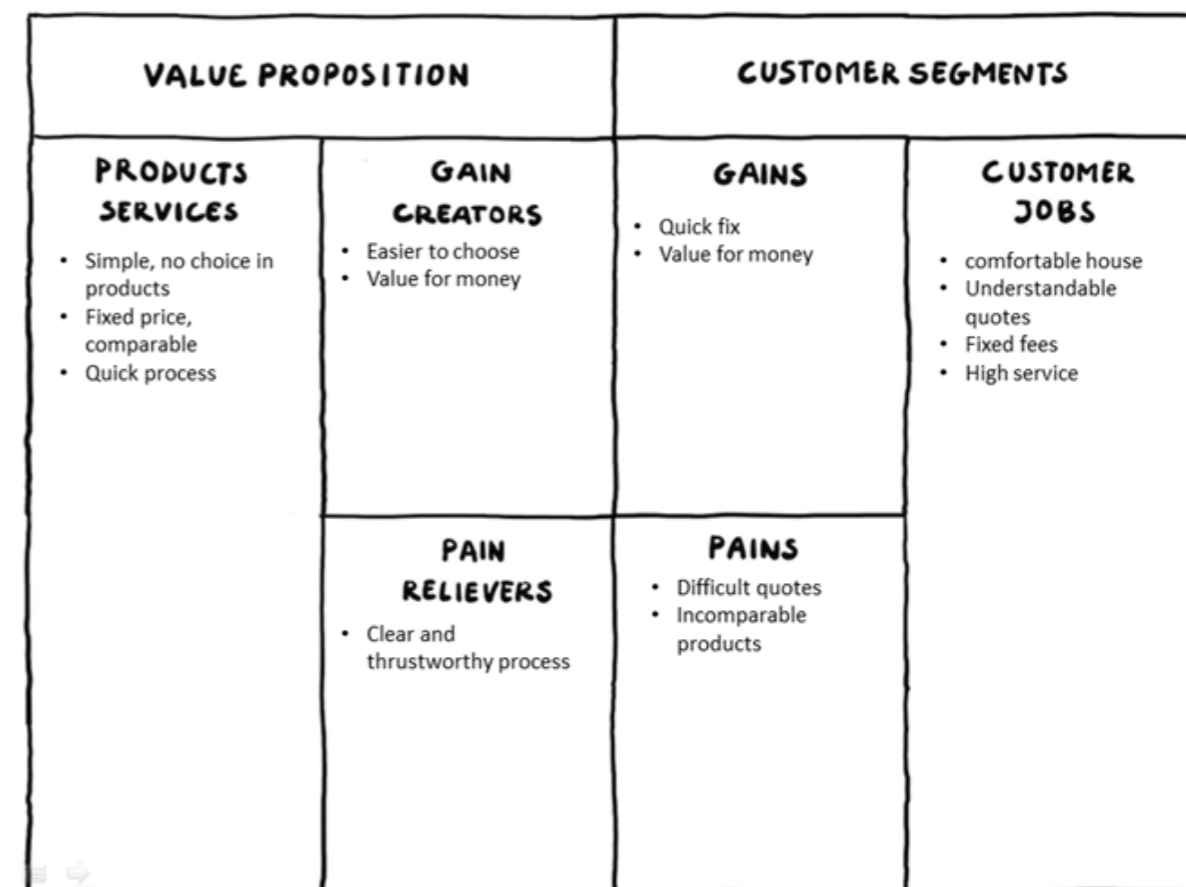


Figure 18: the Customer Value Canvas of Nederland Isoleert. Template based on Osterwalder and Pigneur (2010).

Sensing these problems and being able to conceptualize the value and provide this in an improved offering are entrepreneurial capabilities that are well developed at NI. Likely these capabilities were developed during earlier entrepreneurial experience with different firms across various markets. Raoul seems capable of understanding, possibly even 'feeling' the market conventions, how home owners evaluate offerings and was able to translate it into a smart and successful offer.

Partnering with a Dutch NGO (Natuur & Milieu) resulted in several of the insights that, eventually, were the basis for NI's offer. The firm responded to a tender that was set by Natuur & Milieu, which they won because of a radically different approach to the market. Together with the NGO the decision to have a fixed price and remote measurements were taken. These types of partnerships were a boost for the firm, allowing them to actually respond to the observations in the market.

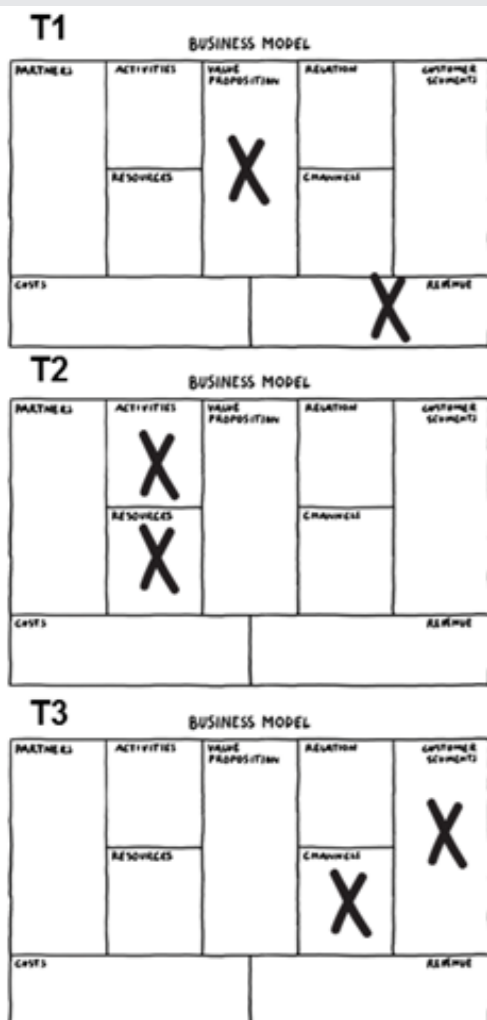
Finally the firm is stretching and scaling in the market. NI was able to package their offerings in a way that large user groups recognize the value of those offerings. This led them to grow to be the second largest firm in the market over a couple years. According to Raoul, he intends to keep on growing and eventually have the whole of the Netherlands insulated over the course of twenty years (Interview Nederland Isoleert, 2015).

Context

Some contextual factors are viewed as barriers by Raoul. For one, he would rather not have the market being subsidized. According to the entrepreneur subsidies make a market unpredictable and makes competition difficult as there is no longer a level playing field; especially if a certain party gets subsidized to go into a local market while others don't.

Raoul sees the role of further developing the market for the government and entrepreneurs. As long as awareness is created through national campaigns the whole market is boosted; then it is up to entrepreneurs like himself to provide the offerings as there is definitely a feasible business case.

In terms of business logic NI is ahead of the rest of the market. The firm is found in the middle of being product versus service oriented. Most key-stakeholders in the ecosystem have the same position (the NGO, the user, partners). Compared to NI the competition is much more product oriented and provides less service. However, it seems that the firm might have brought about a shift in the market as other companies can't fall too far behind. For the moment, NI is still better aligned with the market.



What changed?

NI entered the market and radically improved the value proposition in the market. They offered an easy, understandable offer with a fixed price.

Usage of publicly available data to remotely measure walls instead of driving to the customer and measuring on site.

Different channels are experimented with. Focus on channels focus from door-to-door to pilot projects with more aggregated demand.

What caused the change?

Observing an almost stagnant market

Partnering with Natuur & Milieu

Observed high costs and time intensive process of wall measurements

Ongoing search to find the best way to sell their offering

Product

Nederland Isoleert itself delivers a single product in a way that is as standardized as possible
 Nederland Isoleert mainly focusses on finding the right channels and marketing message
 Competitors offer similar, but less, value (their offer is more opaque, more of a hassle)
 The user is still used to product oriented firms, but are frustrated by the lack of service to some extent.

Service

Enablers, like the NGO natuur & milieu, have pulled the business model of NI towards the service oriented part by demanding transparency and clear pricing
 Local governments actually supported firms that offer more integral solutions than a single product

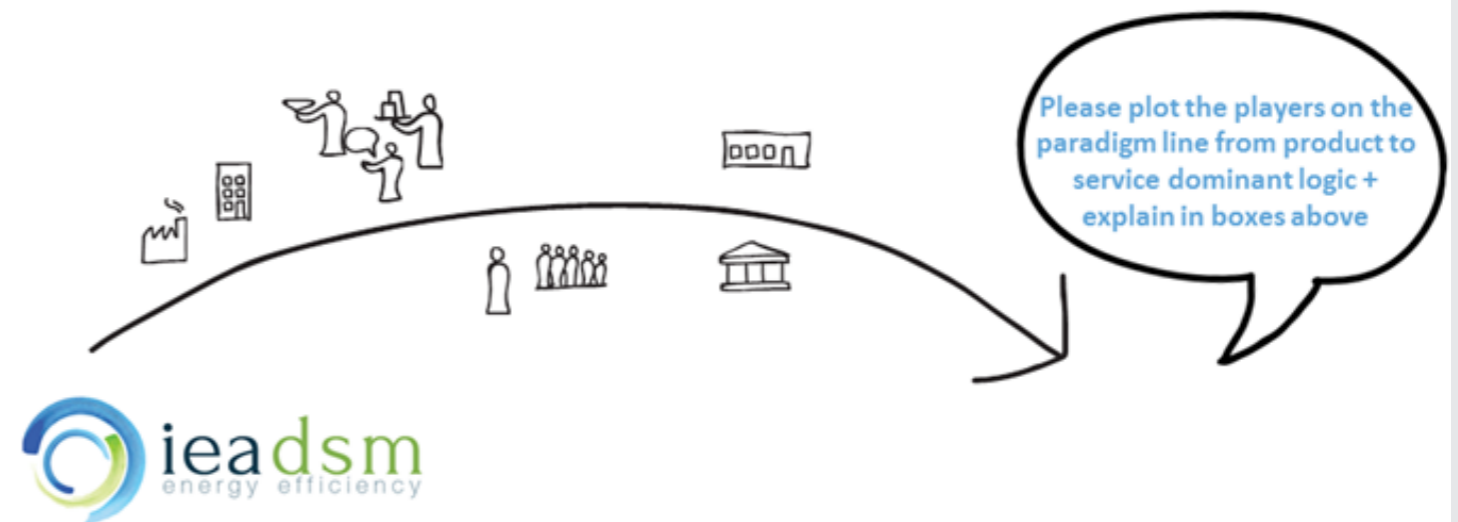


Figure 19: the Entrepreneurial Journey of Nederland Isoleert.

Figure 20: where do Nederland Isoleert and its stakeholders stand in the paradigm shift from product to services?

The Story of Woonconnect

Paul van Pelt, an architect and CEO of a successful organization delivering beautiful designs for buildings, decided in 2011 to combine several technologies and databases his company had been developing since 2001 such as bouwconnect (a BIM model), a database, a geometric engine, rendering technology into one tool aimed at the building sector: Woonconnect. They did this because they felt the need for a tool that was interactive, digital and that could generate its own configurations of a variety of building models.

In principle Woonconnect is a tool being sold to several types of clients with different types of value propositions. For example, it is being sold commercially as an online sales and marketing tool to builders and real estate managers to allow potential clients to demonstrate different potential configurations of homes, their consequences both physically and financially (both new buildings as well as renovations) online. The added value of this proposition is that it saves businesses a lot of marketing effort, it allows the personalisation of the offer because the potential client can create a very personal profile in Woonconnect, including habitual behaviour, and the configurator then calculates the benefits. As such Woonconnect generates a quote automatically, and saves the business a lot of money. This type of tool was not available yet and provided a cheap way for builders to calculate potential offers quickly for clients.

However, the tool is also used as a more strategic decision tool for housing corporations that aim to renovate their building stock. Quickly rendering different options, including the financial, energy and exploitation consequences is of great benefit to corporations. In addition the tool can then be used as an engagement and or communication tool between tenants and the housing corporations for those housing corporations that care about the needs of their tenants. In these instances the Woonconnect tool is a process facilitating tool. In addition the tool allows for a great process efficiency regarding the procurement process. The tool can provide exact output as to how many measures and which ones are needed, when and where, including drawings and calculations. That saves a lot of personhours.

However, Paul van Pelt has also a more idealistic ambition, he aims for Woonconnect to allow for the visualisation of the whole of the built environment in the Netherlands, facilitating discussions and interactions between all involved stakeholders in decision making processes around this built environment. It also provides

public stakeholders such as municipalities with the opportunity to have an up to date digital repository of the building stock in their area. The configurations that Woonconnect can render can be varied, energy measures are only one of the configuration options, Woonconnect also allows playing with configurations around safety, health, wellbeing, comfort etcetera. 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.

Paul van Pelt appreciates that an energy only approach will not work. People do not have energy on top of mind, they try to organise their life. In several projects Woonconnect uses surveys to find out what the pain of end-users is, energy is not even in the top ten of pains. That does not mean that a focus on energy is not important, it can be a solution to other pains being experienced such as moist or noisiness of homes. Although Woonconnect positions itself as a product supplier, they do more. They explicitly advise their clients about how to achieve their goals by explicitly sensing their users or tenants needs and providing several tools within Woonconnect to achieve this sensing. Woonconnect ideally would become a societal infrastructure that would have to have a civic society owner. It would generate data about the built environment that allows users to play with different configurations and see the effects in multiple dimensions. It would also allow for business developers to have a database to work with when designing possible propositions. For the moment Woonconnect is a B2B2C proposition, they do not supply directly to private home owners, delivering to that segment, i.e. rendering options for only one home is still too expensive. Woonconnect thus aims 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.

Woonconnect partners with KPN, a telecom company. KPN is a strategic partner to Woonconnect, and offers Woonconnect as add-on service in projects they already deliver.

In addition Woonconnect makes use of the software of the partner Bouwconnect and works strategically with local governments who act as launching customers in pilot projects. In terms of activities and resources, it is clear that Woonconnect puts a lot of effort in building and exploiting its database, the platform and using this to provide an offer that is as customized as possible.

The revenue model is not yet fully established. Woonconnect needs to develop further to assess its value for different types of users and what that value is worth for them. This is partly investigated in pilots and subsidised projects. Currently, for these services and creating this infrastructure the client pays 250 euros per building and an annual service fee per home of 5 to 10 euro per year. Woonconnect is not yet making a profit, certainly not when counting all the investments since 2001. However, Paul van Pelt is expecting the tool to fly and volume to be created. In its role as a societal infrastructure the tool would have to be financed by public private partnerships. Costs incurred relate to the set-up of the database, and digitising the homes Woonconnect aims to target.

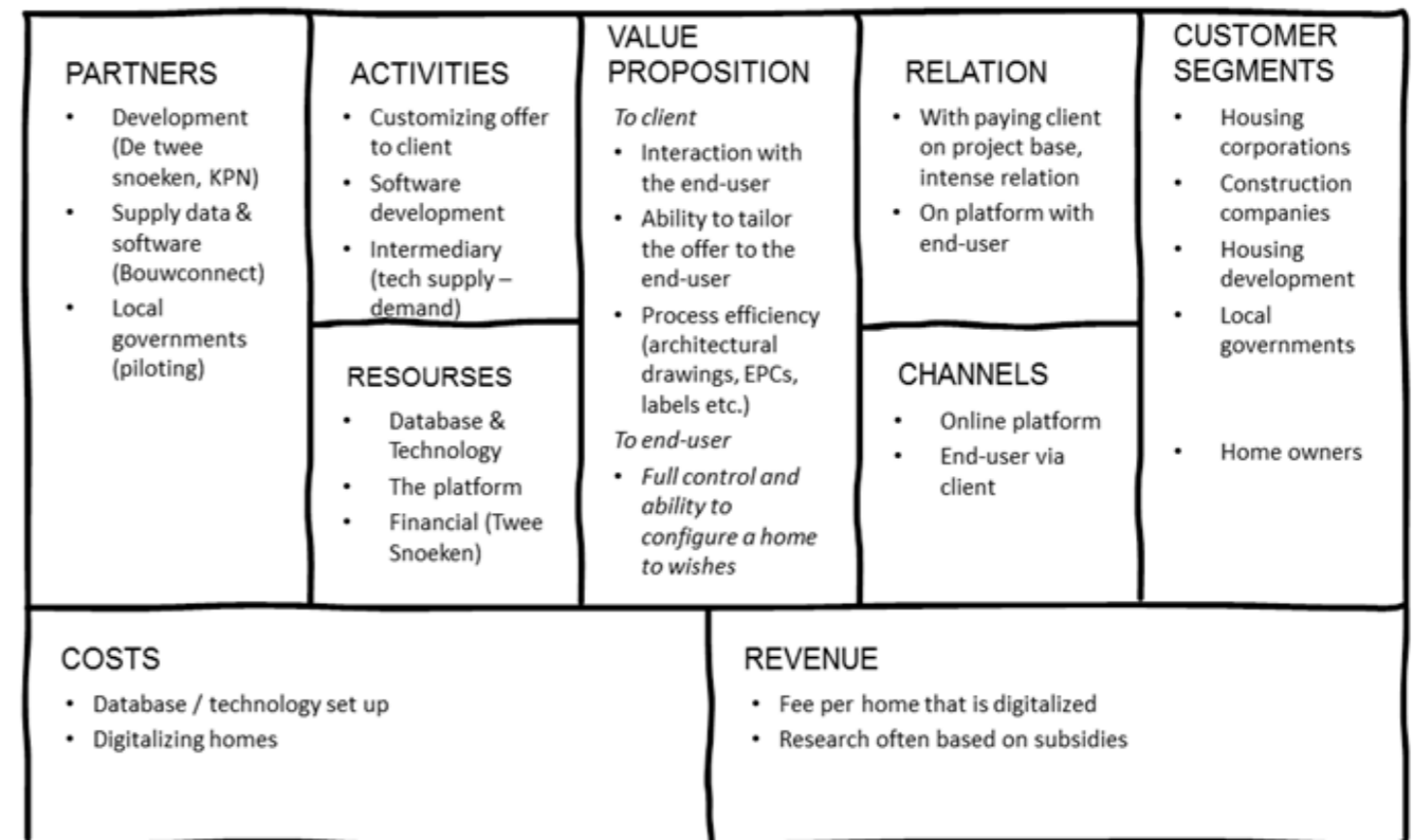


Figure 21: the Business Model Canvas of Woonconnect. Template based on Osterwalder and Pigneur (2010).

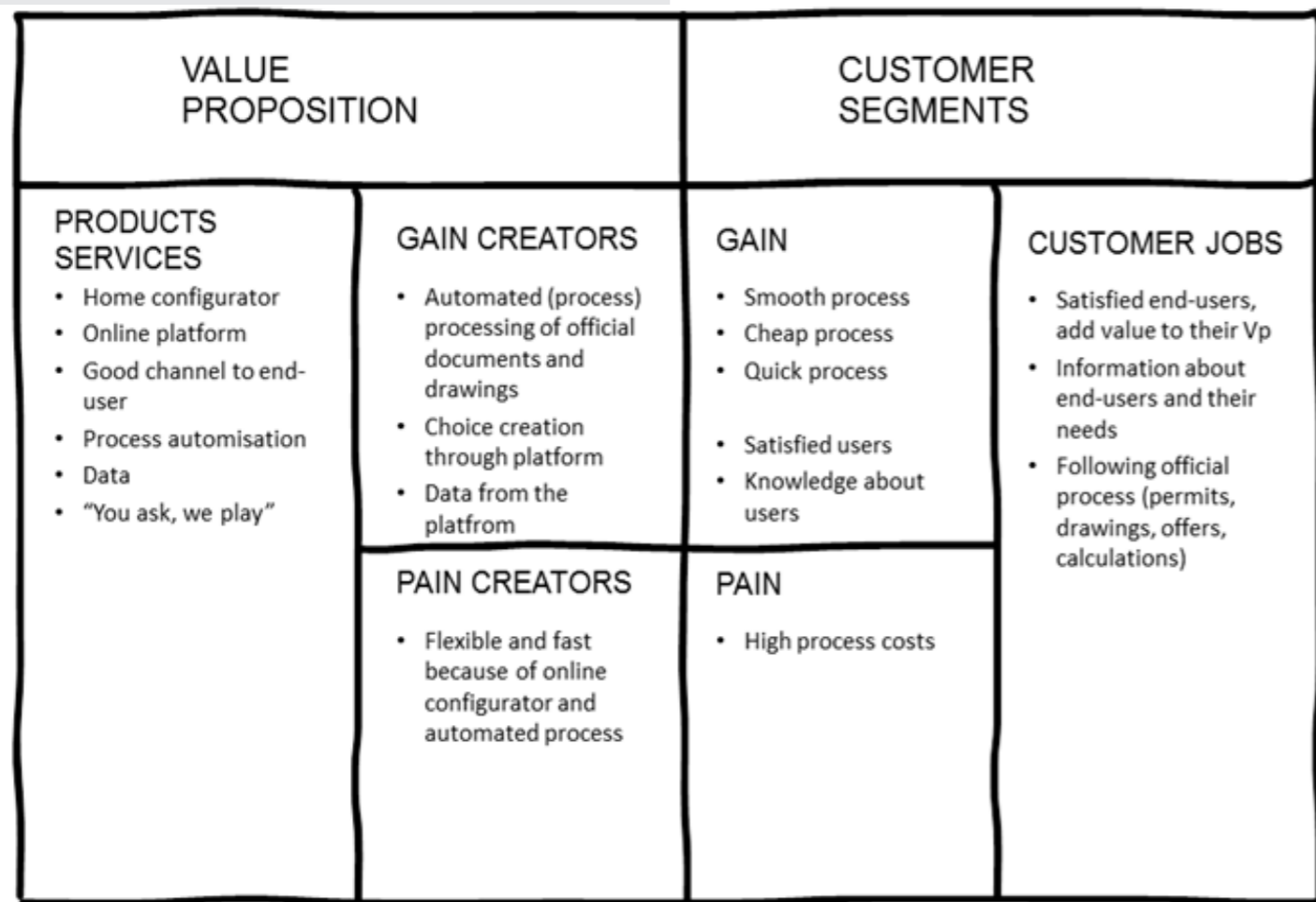


Figure 22: the Customer Value Canvas of Woonconnect. Template based on Osterwalder and Pigneur (2010).

Sensing user needs

In terms of sensing of user needs, Woonconnect demonstrates strong capabilities in really sensing user needs of both their clients and the end-users of these clients. 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: "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).

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 to 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 end-users (tenants) are thus not taken into account as much as Woonconnect would recommend to.

Sensing technological needs is also done regularly although the tool is so different from what is out there that Woonconnect does not feel competitive stress. There are other configurators, these however are much less advanced and only offer several pre-defined choices.

The conceptualising capability is developed quite strongly as well. Woonconnect intentionally organizes interaction to learn and improve and innovate the services. 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. The changes made in the business model after interaction are mainly incremental, yet the business model is open to change the value proposition as much as desired by the paying clients.

Woonconnect thus interacts with the end-user in the design as well as use phase. One of the changes relates to the way people are asked for feedback. User wanted 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. 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 builds up trust in the service.

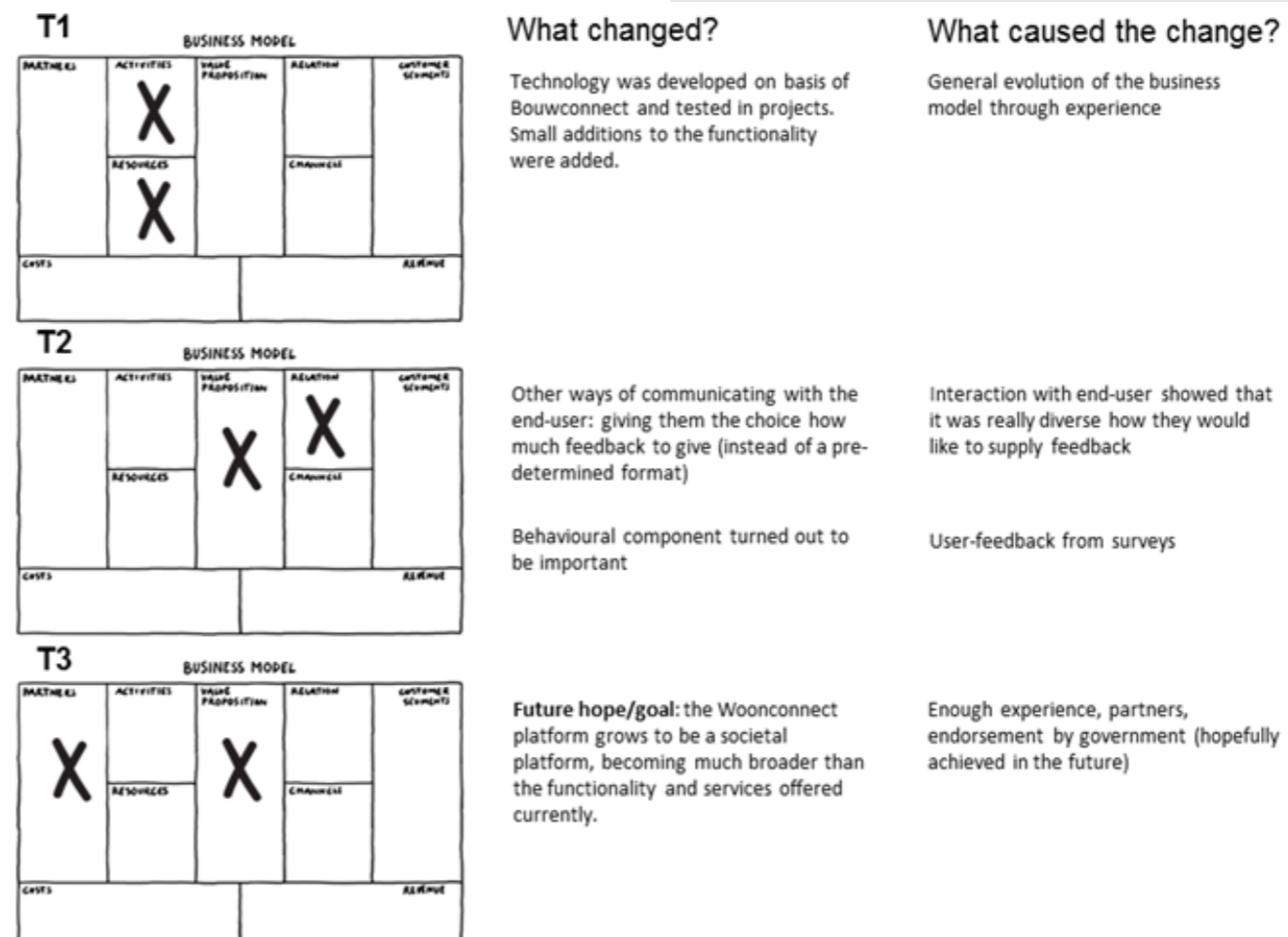


Figure 23: the Entrepreneurial Journey of Woonconnect.

One of the context 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. 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. In addition, the clients and users in the construction sector are not used to the freedom of choice that Woonconnect offers: In that sense competitors that offer a more limited degree of choice are more in sync with the expectations of the end-user; in a way Woonconnect creates value that is not yet demanded, is stretching the system. Woonconnect on the other hand is in sync with some local governments. Especially the co-creative nature, where the end-user gets a voice in the process sometimes appeals to some local governments.

Product

Competitors are non-existent / mainly traditional players
 Suppliers simply offer products
 Society not used to having choice, used to traditional product centred approaches
 Government supports both regime and niche

Service

Government supports both regime and niche
 Government uses Woonconnect in projects (province)
 Godfather had vision of Woonconnect offering all kinds of values
 Clients see the value in offering choice and process automation
 Subsidy by EU → match in vision



Figure 24: where do Woonconnect and its stakeholders stand in the paradigm shift from product to services?

The Story of Buurkracht

Enexis is a DNO operating in the larger part of northern and eastern Netherlands. Like all DNO's, Enexis is responsible for the replacement of all the electricity and gas meters within their supply area by a smart meter. For Enexis, this adds up to 2.7 million meters or stated otherwise: 2.7 million households. One of the main ideas behind the smart meter is that it will motivate house owners to become more energy efficient. However, Enexis realized that only installing this meter is not enough to reach energy saving goals. In most Dutch homes this meter is placed in small cupboards in the hall near the entrance door. Not the place to visit daily (Interview Buurkracht, 2015).

Additionally, many Dutch houses are still poorly insulated. Despite many campaigns, and despite the fact that most house owners are aware and willing to do something, current energy saving propositions did not lead to a large market uptake. There is lots of room for improvement. But how do we persuade house owners to insulate their homes and change their behaviour?

In the summer of 2012, Enexis decided to tackle this challenge. The main challenge was: design a service that will lead to a breakthrough in Energy Saving for house owners thus enhancing the relevance of the smart meter. Enexis created a design team, consisting of mainly external professionals who needed to bring a fresh, new solution to this tricky challenge. The team was convinced that the key to design a relevant solution lied in the understanding of motives, attitudes and behaviour of house owners and other relevant stakeholders. They ignored some very sceptical voices at Enexis, like: "We already know people just don't want to, they are not interested"

The team started interviewing house owners thoroughly on their energy attitude. They created different personas that were researched further by extensive context mapping sessions. This is a method that uses generative techniques to get deeper insights in people's motives and attitudes towards energy efficient behaviour and insulating homes, in the context of their daily practice. A new proposition was created. A key insight the proposition was built on was: energy efficiency is a goal, but energy-efficient behaviour is a process.

Energy saving is usually a process on household level that takes months, sometimes even years to realize. A process with many opportunities for behaviour change, but nevertheless many people never reach their goals. For example, every year,

one receives their energy bill. For most people this bill is a complete puzzle. It takes a lot of effort to decipher. When the bill is higher than expected, this is for some people a starting point to take action. Or, in winter when feet become cold, people start to investigate their options for more comfort of the floor in their homes. Their sources of information are the Internet, and discussions with their next-door neighbour. Some eventually do research on technical stuff, like the variety of materials or installation options (Interview Buurkracht, 2015).

For many people this process is a sequence of frustrating experiences. Receiving an incomprehensible bill is one thing, but most information is very technical, options are difficult to compare and certainly not presented as a solution to their personal problem. Not only is the information complex, it is almost impossible to get a grip on the real value of an energy saving measure. So, to most Dutch house owners, the process of Energy Saving is annoying, complex and time consuming. At the start of this project, most of the people that actually did insulate their homes were either energy saving freaks, or survivors in a frustrating process. The majority of house owners dropped out of their energy saving process before achieving any results.

Current service providers focus on the effect: insulate your roof and save money. Very result oriented indeed, but obviously not very effective. Their propositions ignore the energy saving process. They fail to take the perspective of the house owner into account. Therefore, it is not surprising that their prospective buyers dropped out of the process. Enexis found there is a need for a process approach instead of products, like the next smart device. A process designed to help a house owner with saving energy as the next logical step. Enexis had to shift the focus from the end result to the experience.

The power of communities
 Enexis also found that there is one specific situation where energy saving becomes a high impact subject and a lot less frustrating. This is when small, local communities (neighbourhoods, streets) join efforts to save energy together or invest in solar energy. Then energy becomes a high interest topic. They found that small local initiatives potentially were very successful. And so they learned that the spirit of local community could help Enexis create a successful solution.

And although they are different in many ways, local communities have one thing in common: they want to feel in control.

All of the local initiators emphasized the need to be able to make their own choices, to be and to stay in control. After all, it is their neighbourhood, their home and roof. They emphasise their autonomy, but that should not be interpreted as if there was no need for support. Enexis decided to harness the power of the communities in voluntary neighbourhood teams, who are guided by a new organization: Buurkracht.

Buurkracht, which literally translates to neighbour power, is a very carefully designed process that supports existing local initiatives in their efforts to save energy. Enexis is the mother at a distance, providing the necessary means to run Buurkracht. Buurkracht has no profit goals. It measures its success by reduction of CO2 as a result of the measures that are taken. A team of nearly 20 community-coaches support local initiators with know-how on insulation as well as how to run a community energy saving campaign. Every participant in the neighbourhood is connected to the Buurkracht platform, where they can see their energy usage patterns, but also the savings they've reached with their community.

The users are involved in finding out what measures are required in the neighbourhood. For example, they walk through the street in the evening with a thermal camera to see how the insulation holds and whether there is draft. Consecutively the neighbourhood team selects measures and decides where to purchase them. Buurkracht is convinced the local approach is successful. By now, they've built a solid network of supporting local and regional governments, cooperatives and energy foundations (energy touchpoints) who know their locals and who can exert their local influence to motivate the communities to reduce their energy consumption.

As Buurkracht is very successful, Enexis finds itself in some difficulty financing the process. Therefore, alternative sources are being researched. In 2016, Alliander, The second largest DNO in the Netherlands, will join the Buurkracht process. Also, subsidized research must provide some extra resources. Datamining professionals are being attracted in order to provide detailed intelligence on the value of the Buurkracht initiative in terms of CO2 reduction, social cohesion etc.

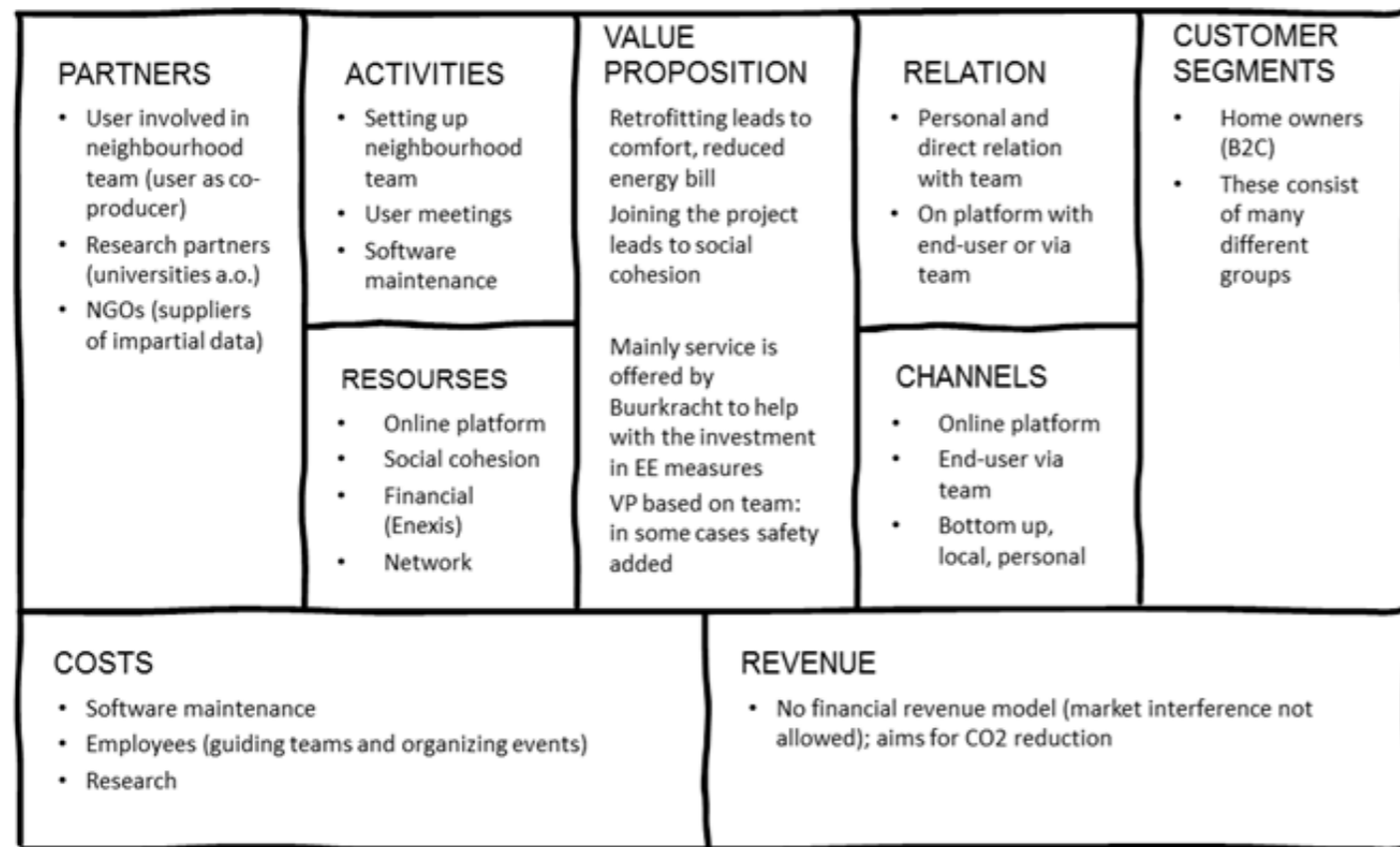


Figure 25: the Business Model Canvas of Buurkracht. Template based on Osterwalder & Pigneur (2010).

Sensing user needs

Sensing user needs is taken extremely seriously in the developing phase of Buurkracht. The initiative originates from the idea that old ideas and old opinions on how to solve the 'insulation' problem of all the houses didn't prove to be successful at all. A new perspective was needed and this could be found at the house owners themselves. However, the capability wasn't well developed within the organisation, hence, there was a lot of resistance towards the approach at first. Therefore, professionals from outside the organisation were hired to fulfil this capability.

The organization also involves users to help with sensing user needs in the community. As it turns out, locals have a more natural feeling for the priorities and problems in a neighbourhood.

This way only a few people have to invest time in understanding the market and social cohesion can persuade other members of the community. Besides this hands-on approach, several instances (educational and public) are involved in more fundamental research on user involvement and uncovering its needs.

In a way, Buurkracht is far ahead of the Enexis organisation and consequently the stretching capability needs development. Enexis still is a traditional, tech oriented organisation where a lot of effort is being put in fulfilling the task of maintaining the grid. However, a few of the Enexis directors were dedicated to bring Buurkracht alive.

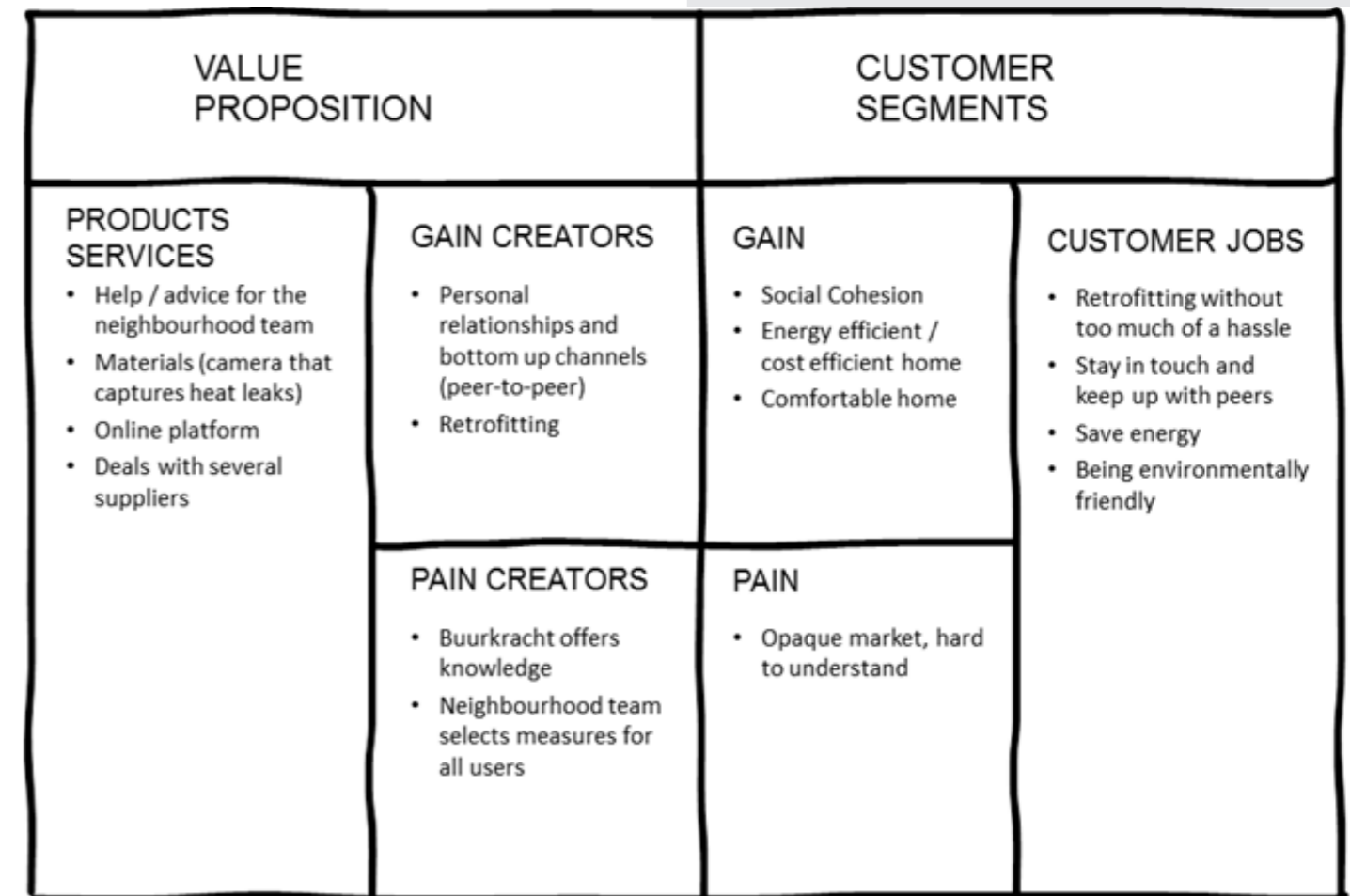


Figure 26: the Customer Value Canvas of Buurkracht. Template based on Osterwalder & Pigneur (2010).

Entrepreneurial Journey

As mentioned earlier, Buurkracht learned that users have a good sense for the problems in their own community; this makes them a convenient means to uncover some of the tacit needs and specifics of a neighbourhood. For example, in the city of Breda the neighbourhood team noticed safety was an important issue and one of the volunteers 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" in the process. This is a person that supervises the neighbourhood and acts as a personal channel towards law enforcement. The city marine can recommend measures to improve the area's safety. In the city of Breda the city marine emphasized the value of insulated glazing (double or triple pane) in terms of safety as well. There clearly is room for co-creation in Buurkracht's business model.

Furthermore, it was learned that various user groups have a different opinion about these types of involvement in the neighbourhood; whereas the elderly tend to welcome this type of local contact other residents, for instance students or young couples, will not be as interested in such initiatives. To accommodate as many user groups as possible the process was kept open and any user can put as much effort in to the programme as he or she likes. In general, the broad variety of needs and wishes of very different user groups that are geographically linked is accounted for as much as possible.

Buurkracht has the orchestration capability well developed; the focus is completely on realizing a coherent customer experience. This resonates not only throughout the business model, but also through the stakeholder network, where essentially any decision is left open for the user.

Buurkracht is highly service oriented. The whole process is tuned to co-creating value with the user. However, as the organization recognizes, not all stakeholders in the ecosystem reason with a similar logic. In fact, there are even user groups who prefer a more product oriented approach, rather than being involved and spending time on the initiative.

Besides that, most competitors and suppliers in the market are product oriented. They are focussed on delivering a product and making a margin. Even Enexis, the mother at a distance, is much more traditional than Buurkracht; a reason for Buurkracht to look for employees outside its mother firm. Many of these stresses in the firm's ecosystem are not noticed as much by its user. Letting the user take important decisions, such as selecting the supplier, may be a way to work with different business logic in an ecosystem. It seems as though Buurkracht is aware of the different value they provide in relation to the expected value and that their conceptualization skills are well enough developed to counter this.

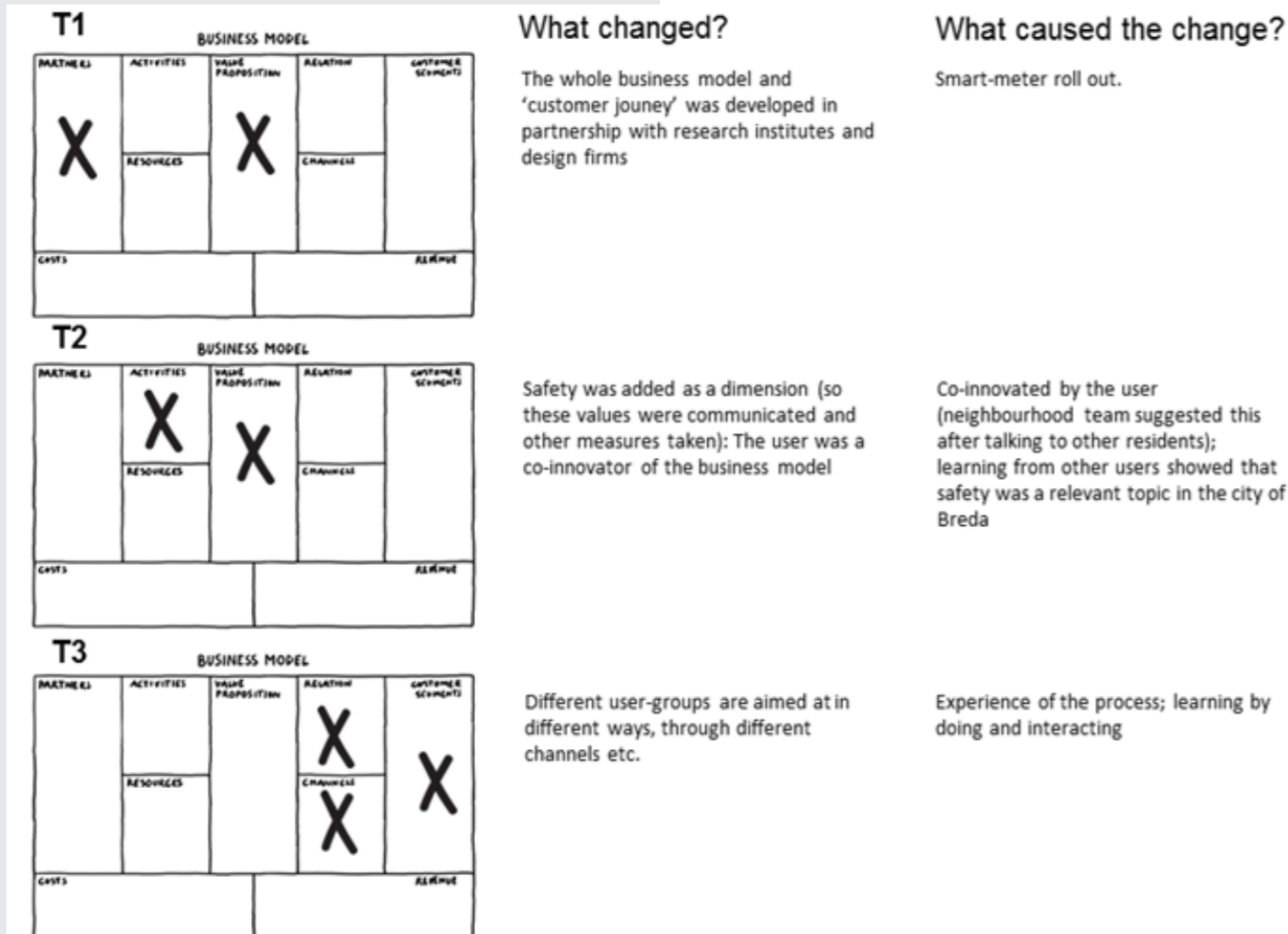


Figure 27: the Entrepreneurial Journey of Buurkracht.



Figure 28: where do Buurkracht and its stakeholders stand in the paradigm shift from product to services?

Lighting solutions

The Story of Philips Lighting

This is Anton Philips, one of the founders of a large multinational that today produces a broad range of products. Philips' origin lies in the city of Eindhoven where it was founded by Anton's father and brother, Frederik and Gerard, in 1891. The firm started in the business of producing light bulbs, it has been their market for many, many years now. When, in 1895, Anton, a real entrepreneur, got involved in the firm's management Philips grew and is currently a multinational active in areas ranging from Healthcare to Lighting and several appliances. The firm knows everything there is to know about innovation processes, efficient manufacturing lines, plant management, human resource management and many more aspects to running a company.

Even when the LED was introduced, Philips didn't blink. But then something completely new happened. A partnering architect, Thomas Rau, asked Philips if they could help him in his vision: to not own products that you don't need. Instead of buying and owning lamps the architect suggested buying light and paying for the service of having light. Philips agreed and Thomas Rau founded Turntoo to partner with Philips and work on further development of the concept.

Providing light as a service meant significant change to Philips' business model. Not only

the value proposition changes significantly, also the key-activities are broadened. Besides manufacturing the LEDs, maintenance, management and service contracting become key areas as these services are added to the offering. Furthermore, Philips does not sell its LEDs. Instead, it owns all of them. This means that Philips will have a much larger responsibility in refurbishment and recycling, a new area for the firm that also enables them to work on a circular economy. Engaging in service contracts and being judged on the performance of the outcome (light) instead of the product meant a significant change in the customer relation Philips maintains. More intensive communication was needed and the relation lasts a much longer time as the system requires maintenance and inspection during its lifespan.

The customers that are targeted are specifically chosen. Philips aims to reach a customer segment that it knows to be interested: firms that are enlisted with the Ellen MacArthur foundation. These firms have already indicated to be interested in the circular economy and will very likely be interested in light as a service too. The foundation turns out to be the main channel in the acquisition of light as a service projects. Besides the foundation, Philips and Turntoo also partnered with other firms, for instance Deloitte and Cofely, where they could experiment with the concept.

The radical change in business model clearly affected the costs and revenues. The costs significantly shifted from creation of a product to extra costs in maintenance, refurbishment and service contracts. On the other hand the revenue model now relies on firms paying per lux instead of LED.

Sensing user needs

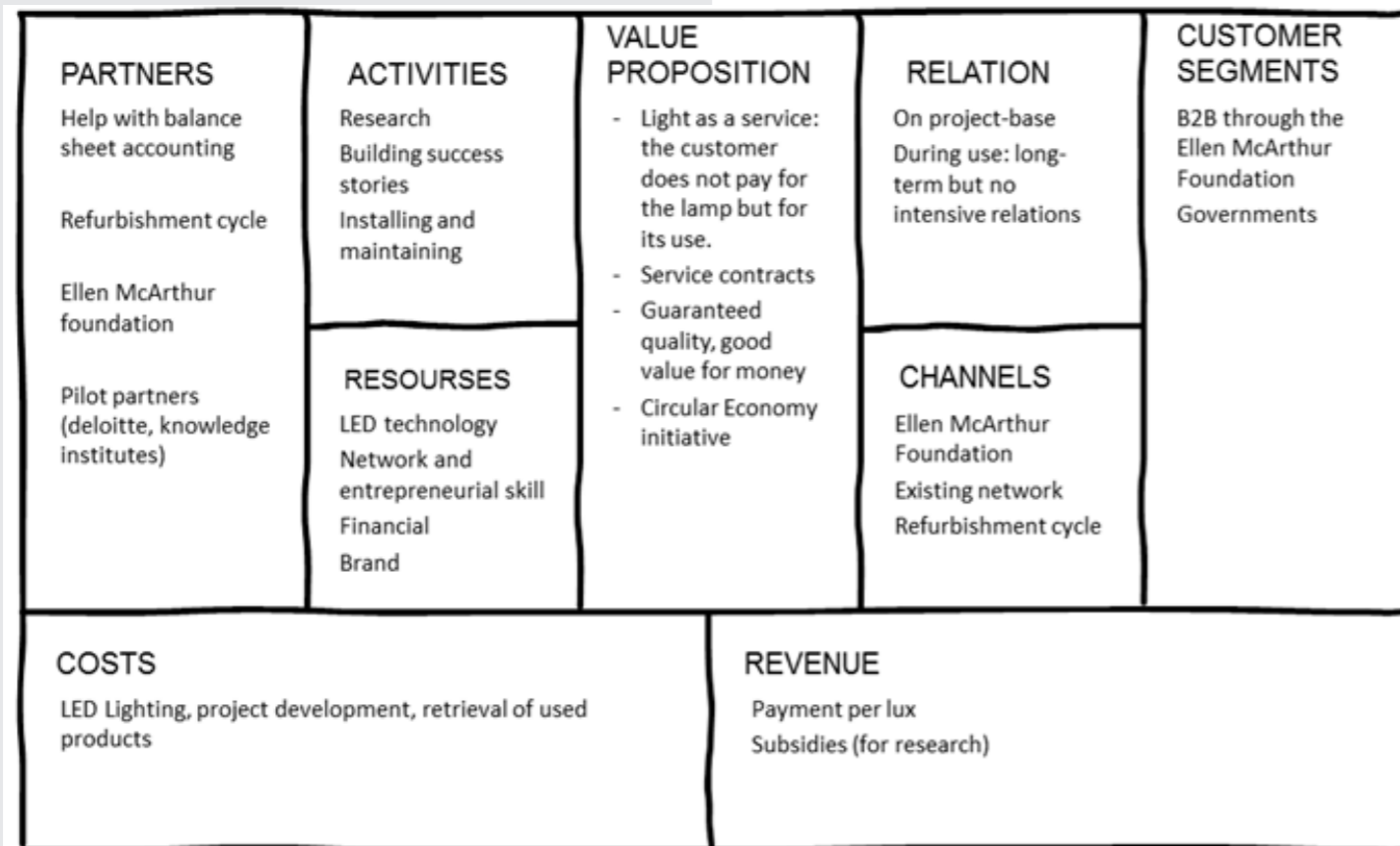
As a multinational, Philips looks at sensing user needs from a high level. The user is consciously learned from through broad market research which is performed to look at needs and wishes in different markets and contexts. Besides that, for more innovative solutions like smart lighting, pilot projects are organized. 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. Sensing user needs and conceptualizing the desired value are skills that are appreciated and developed in the firm.

An example of a pilot project 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' LEDs 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 through the smart phone.

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 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).

From Philips' point of view the needs and wishes of the customer have not changed, nor has Philips' approach. In essence, the user has always wanted reliable, but mainly cheap lighting. This has been a driver to make lightbulbs more efficient and also led to a change from incandescent lighting to LED. The new business model, lighting as a service, in a way continues the path set out long ago: engaging in a circular process increases the material efficiency and in this sense is the next step towards cheaper lighting.



48 Figure 29: the Business Model Canvas of Philips Lighting. Template based on Osterwalder & Pigneur (2010).

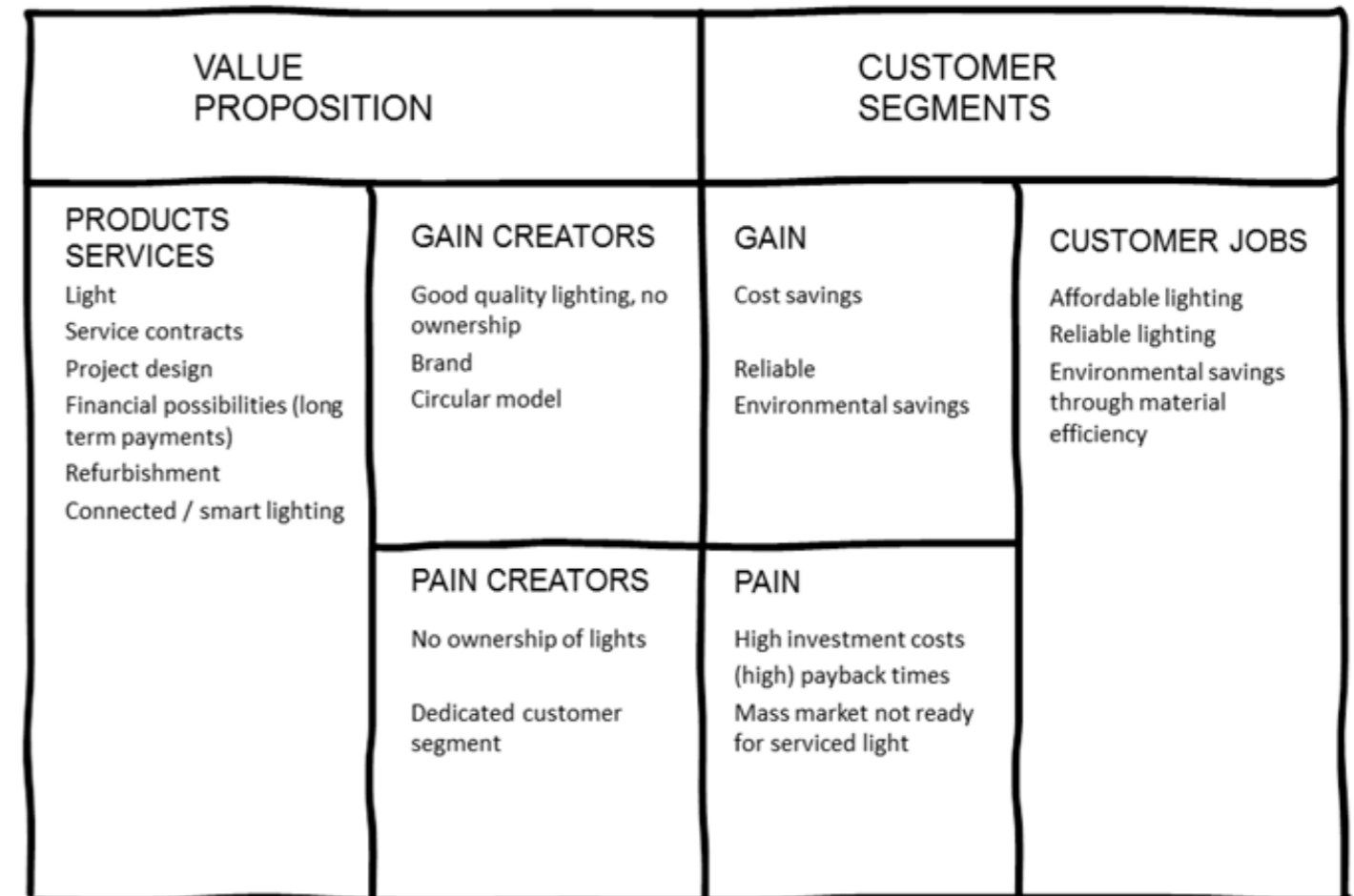


Figure 30: the Customer Value Canvas of Philips Lighting. Template based on Osterwalder & Pigneur (2010).

Entrepreneurial Journey

Philips as a firm has seen an extensive entrepreneurial journey with many years of experience. However, even for such an organization a complete business model shift can be challenging. The most important changes in the business model that Philips operates are triggered by the switch from a product to service supplier. As mentioned earlier, this switch was not solely made on the basis of insights provided by user interactions. The switch was rather based on the potential to decrease costs and by insights that the firm had from the architect Thomas Rau (Ellen MacArthur Foundation, 2011) and developments in circular economy (Interview Philips, 2015).

These factors led to a fundamental change of the business model. In fact, all business components were affected either directly or indirectly. For instance, Philips anticipated that not all their

clients would be interested light as a service; they thus tried to create a dedicated customer segment through involving the Ellen MacArthur Foundation.

Several other problems were encountered in the process. The need for balance accounting resulted in new partnerships, which would bring the expertise. From these examples it becomes clear that Philips is capable of taking a macro perspective and seeing what is needed to make the system work. Their capability to work with the context and orchestrate the network is well developed. They successfully found new partners with a different focus which fulfilled the new capabilities that were needed. At the moment they are already organizing the recycling process of LEDs that are to be returned when they break; thus planning decades ahead.

Philips recognizes that scaling the proposition is hard as 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. However, Philips is well aware of this phenomenon and their capability to scale the offering is likely developed.

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.

Philips is positive about the pro-active stance of the national 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.

Philips has a clear strategy in relation to the stresses between stakeholders due to different business logics. As they see that the mass market is not ready for their innovative business model they found a dedicated customer to slowly create a change in the market on the basis of success stories, slowly stretching the context. Even though there are stakeholders with different business logic in the ecosystem, Philips knows how to work with them.

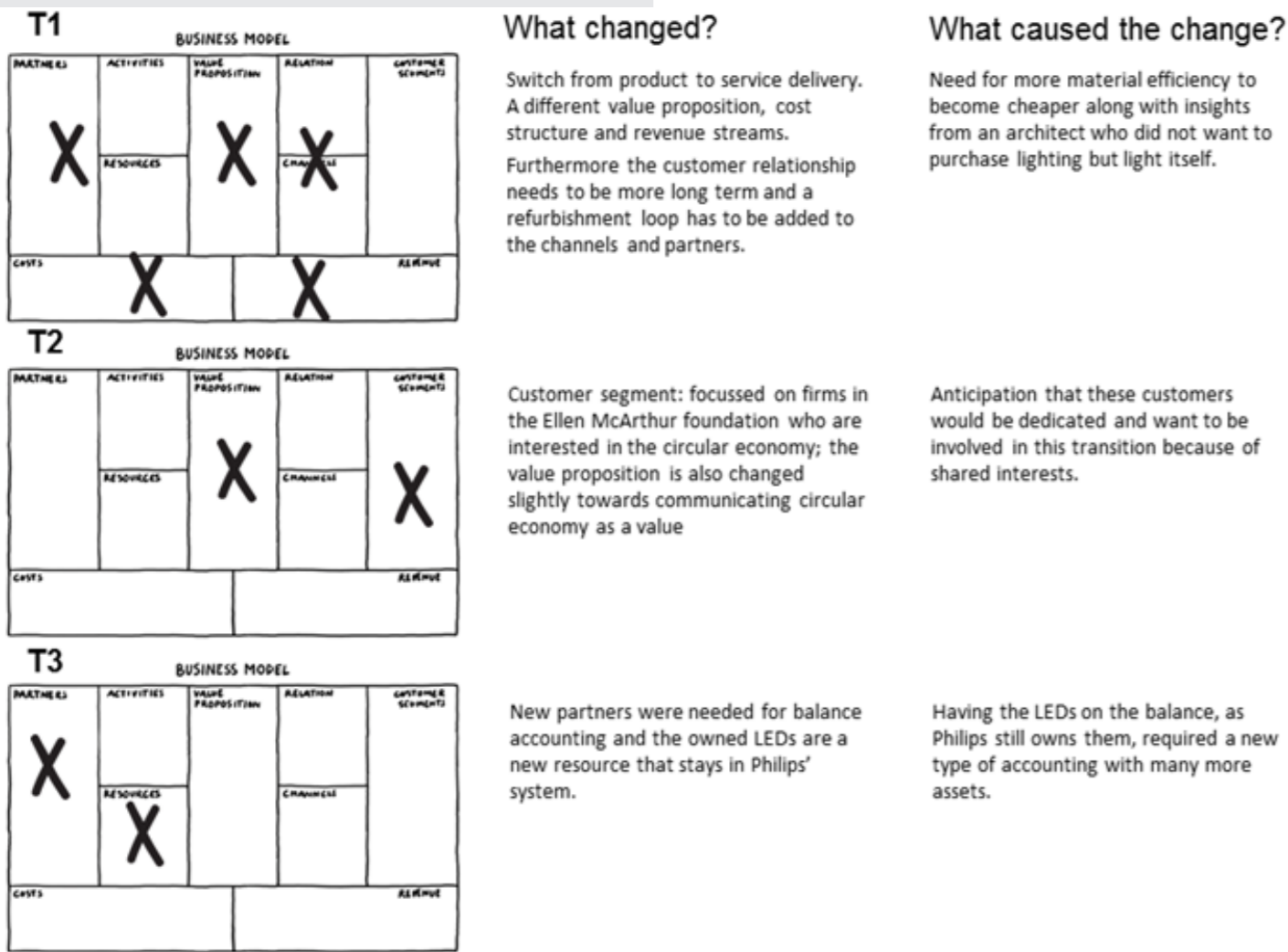


Figure 31: the Entrepreneurial Journey of Philips.

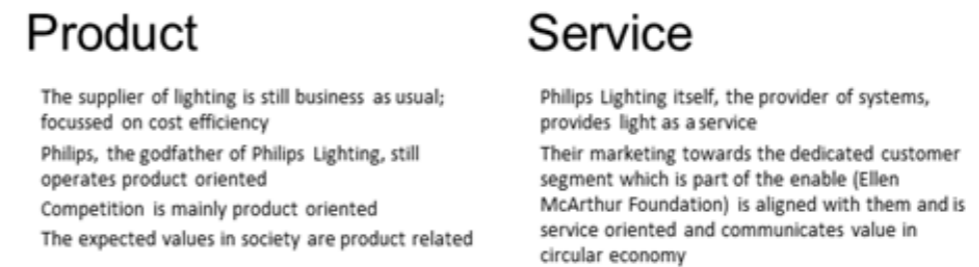


Figure 32: where do Philips and its stakeholders stand in the paradigm shift from product to services?

The story of LED Design Holland

Meet Joeri Schalk, a young entrepreneur who, together with his associate Norrick van der Vlist, managed to set up his own LED lighting company. As of 2014 the two entrepreneurs in their early twenties took a leap of faith and invested their savings in the newly founded business. Since then they completed over 55 energy efficient lighting projects at industrial sites, offices, retail stores and outdoor sites. To their satisfaction LED Design Holland can provide the two enough work and a decent living. Growth of the firm is not their main ambition; "We would like some growth, but keep an overview at the same time. In my experience communication simply suffers in larger firms" (Interview LED Design Holland, 2015).

LED Design Holland can be considered a LED specialist that offers complete lighting solutions. Their process starts with cold acquisition, door-to-door, after which they try to convince firms of the environmental and financial benefits of LED lighting. If successful the project plan is made and costs and benefits for the project are calculated. Based on the wishes of the client help is offered for subsidy requests, financing and service contracts. All of these steps are taken by the two entrepreneurs at LED Design Holland, as Joeri Schalk puts it: "everything that you carry out yourself, you can generate income from in the first place" (Interview LED Design Holland, 2015).

The firm operates on the basis of a vision that focusses on personal attention, process control and performance. The focus in the firm is on delivering a decent product rather than on services. However, LED Design Holland does provide some add-on services and aims to be more reliable than their competitors whom they refer to as 'LED cowboys'. Joeri Schalk explains that they hope that establishing a decent reputation will help them to expand their customer base.

This vision is reflected in the value proposition that LED Design Holland delivers to their customers. The value proposition is focussed on reducing the fixed costs of a firm through energy efficient lighting while keeping a comfortable and beautiful lighting situation. Furthermore, they aim to deliver additional value as they make creative and personal solutions for each customer. The vision of the entrepreneur himself also has a more idealistic component. As a firm they try to be sustainable and also make people more environmentally aware. This 'green' component to their vision is however not reflected as much in the communicated value.

There are few stakeholders involved besides the firm itself as the entrepreneurs aim to do as much as possible themselves. Their key-partners thus consist of technology suppliers and technology fairs that help them to keep up to date with the rapid developments in the market.



Besides those, LED Design has partnered with a financial institute to enable long term payments and loans. This helps them to give additional service and personalize the lighting solution. The capability to orchestrate different partners in the network is however not top of mind and likely to be relatively undeveloped.

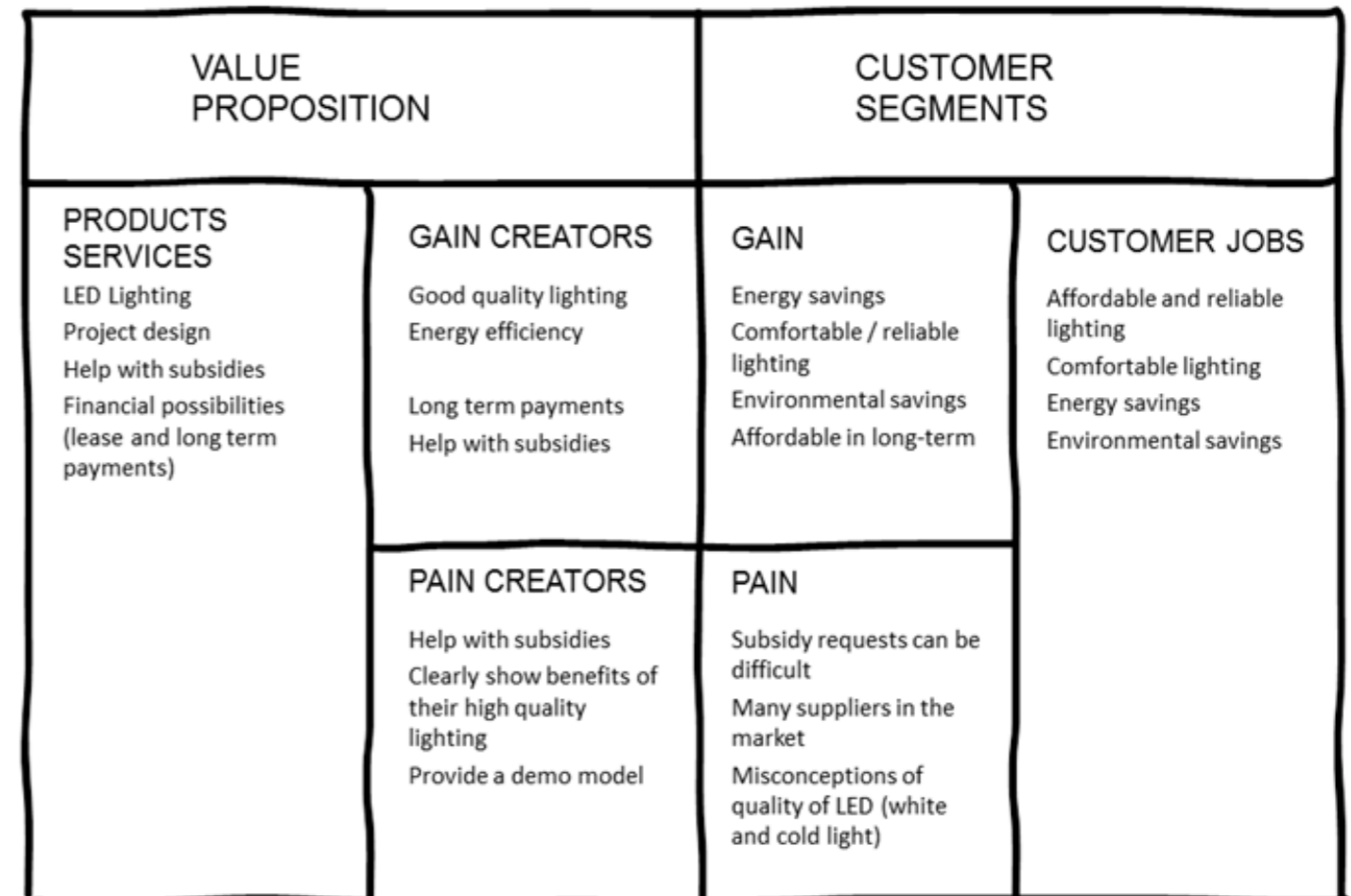
As LED Design Holland takes responsibility from start to implementation, the revenue model and cost structure are relatively straightforward. On the basis of the costs that are made (material, human capital and a revenue part) the charges for the customer are calculated. Revenues are thus built up from the generated income from projects and for instance advice that is given on subsidies.

Sensing user needs

LED Design Holland creates a personal, but short term relationship with their customers. This relationship starts with face-to-face conversation where the customer is directly involved and explains the needs and problems. In this design phase of the project the entrepreneurs have the opportunity to learn about their customer. 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).

In the first months learning took place in a more personal setting: the entrepreneurs experimented in their own shop and had family and friends to provide feedback. This gradually shifted to receiving feedback from their customer. Sensing the needs of the user was important; a shift in focus and language resulted from noticing and alleviating user pains. This was an important factor that differentiates the firm from its competitors who focus more on low cost lighting.

Often the lessons led to incremental changes to the business model, often based on clarity of the value proposition and efficiency. The entrepreneurs 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). Besides that, the customer needs to be told that LED lighting is no longer cold white light and that people get used to the new lighting situation within days. On the other hand it was confirmed that the extra services that are provided do generate additional value for the customer. It turned out that the entrepreneurs' capability to sense user needs was at an appropriate level for the relatively product oriented market they are in.



Conclusions

To actually generate a change towards the much needed more user-centered energy efficiency services we need to learn from and experiment with business models that challenge the existing framework conditions, learn to deal with the constantly changing and inherently complex and uncertain framework conditions, and to overcome internal organisation barriers (Smith and Raven, 2012; Chesbrough, 2010; McGrath, 2010).

In the cases this was visible as different firms struggled to design a well-developed and coherent business model. For instance, Reimarkt is increasing the involvement of the user in the business model to quickly gain market feedback, but also tries to automate the customer relation through big data or data mining at other points of the process. Other firms such as NI and Woonconnect try to work with similar contradictions in the business model.

However, not only is this internal business model alignment important. Within the stakeholder network of the firm differences are seen in terms of business model logic. The Dutch business models we analysed demonstrate a great variety of doing business, and we have analysed the different strategies. Four strategies can be discerned, which are discussed in much more detail in Deliverable 4 of IEA DSM Task 25: the international comparative analysis of energy efficiency business models and services. The four strategies are not clearly separated but more 4 positions on the continuum from product to service orientation. As such the business models can be at the crossroad between strategies.

The intuitive change

An interesting learning from the cases is that most companies seem to have experienced some sort of first -blockade- in the uptake of their business. When this is experienced, entrepreneurs make some intuitive or sometimes even explicit adjustments towards a more service oriented business. These adjustments are efforts to stimulate the uptake of the Value propositions. However, at the point where we've had contact with the companies, some of them realized that the changes they've made are insufficient. In the section below we discuss the four strategies that the cases demonstrate.

1. The first pattern is built around a specific manner to try to boost sales (and thus aimed at pushing the same proposition harder): through resellers and referrals. The basic technology or product does not change, neither does the value proposition, market or client segment. The only elements that witness significant change are the partners, activities and resources. Partners are aligned to be supportive of the provider and the proposition and help deliver the service as a product (SAAP). Greeniant and NI can be categorised under this strategy. They both had a clear technology to start with, the value proposition did change a little to focus more on the process up to the transaction decision.

2. The second pattern we witnessed is that of reframing what is being proposed. In this type of pattern, the things that really change in the business model is a reframing of the value proposition, the understanding of the client, resources and client relationships. Besides that, the partners are now viewed as equal partners and are viewed as valuable resources. The rest of the business model building blocks remain the same. Partners are equal in service of the proposition. This strategy is a 'one off' business model, that is, a business that focuses on selling a proposition. Reimarkt and to some extent Philips and LED Design and BAS can be categorised under this strategy. Their proposition is sold once (even when the product is not sold (e.g. Philips). Users become more relevant as cocreators of the business model but the model is still generated from a technology push approach, whether insulation or light as a service focused on outcomes. Reimarkt is slowly moving towards the next pattern but not there yet.

3. The third pattern is a shift from pushing a solution to becoming problem solvers. These businesses are usually trying to pivot the company away from direct consumer sales towards a business-to-business partner relationship. They aim to partner with a larger company, often offering a larger and more complex value proposition to end consumers. Here all elements of the business model change to some extent, where the clients and the value proposition and partners change significantly. In this strategy the product is delivered as A Service (technology is enabling). This strategy is a hard one to follow; the shift to servitisation

is difficult mainly because key capabilities are naturally very underdeveloped by tech oriented companies. This raises the awareness that partners are essential and the client is more than a client but a valuable user and the use phase is a critical focus. Woonconnect and Eneco can be categorised under this strategy, although Eneco does not become part of a larger more complex value proposition proposed by another partner but is that partner.

4. The fourth pattern highlights businesses responding to needs from customers. Here the business model is designed around and even with the clients, having them even actively be part of the business model as resources and partners. Buurkracht can be categorised under this strategy.

Not all firms can be said to have chosen one of these strategies. Some are unaware of contextual influences on the business model and do not actually take a specific strategy, while in other cases the firm did not intend to make any changes, be they intuitive or not. Furthermore, the type of change that is made by the firm seems to strongly depend on the vision, insights and capabilities of the entrepreneur.

The change to more service oriented approaches was for instance made because of the skill to sense the needs of the user and conceptualize the necessary adaptations. Often such adaptations are made because of newly developed insights through the sensing of user needs or lessons learned from involvement and co-creation. More service oriented and user-centred business models create more abundant and more intense moments of interaction. Furthermore, different types of involvement are facilitated by these firms: not only do they interact with them (via online platforms or face-to-face), the user also tends to be involved as an asset in the business model and occasionally was the source of innovation in the business model.

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Appendices

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

Appendix A: overview of interviews, all interviews were held in 2015.

IEA Demand Side Management Energy Technology Initiative

The Demand-Side Management (DSM) Energy Technology Initiative is one of more than 40 Co-operative Energy Technology Initiatives within the framework of the International Energy Agency (IEA). The Demand-Side Management (DSM) Energy Technology Initiative, which was initiated in 1993, deals with a variety of strategies to reduce energy demand. The following member countries and sponsors have been working to identify and promote opportunities for DSM:

Austria	Norway
Belgium	Spain
Finland	Sweden
India	Switzerland
Italy	United Kingdom
Republic of Korea	United States
Netherlands	ECI (sponsor)
New Zealand	RAP (sponsor)

Programme Vision: Demand side activities should be active elements and the first choice in all energy policy decisions designed to create more reliable and more sustainable energy systems.

Programme Mission: Deliver to its stakeholders, materials that are readily applicable for them in crafting and implementing policies and measures. The Programme should also deliver technology and applications that either facilitate operations of energy systems or facilitate necessary market transformations

The DSM Energy Technology Initiative's work is organized into two clusters:
The load shape cluster, and
The load level cluster.

The 'load shape' cluster will include Tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods. Work within this cluster primarily increases the reliability of systems. The 'load level' will include Tasks that seek to shift the load curve to lower demand levels or shift between loads from one energy system to another. Work within this cluster primarily targets the reduction of emissions.

A total of 24 projects or "Tasks" have been initiated since the beginning of the DSM Programme. The overall program is monitored by an Executive Committee consisting of representatives from each contracting party to the DSM Energy Technology Initiative. The leadership and management of the individual Tasks are the responsibility of Operating Agents. These Tasks and their respective

Operating Agents are:

Task 1 International Database on Demand-Side Management & Evaluation Guidebook on the Impact of DSM and EE for Kyoto's GHG Targets - Completed
Harry Vreuls, NOVEM, the Netherlands

Task 2 Communications Technologies for Demand-Side Management - Completed
Richard Formby, EA Technology, United Kingdom

Task 3 Cooperative Procurement of Innovative Technologies for Demand-Side Management - Completed
Hans Westling, Promandat AB, Sweden

Task 4 Development of Improved Methods for Integrating Demand-Side Management into Resource Planning - Completed
Grayson Heffner, EPRI, United States

Task 5 Techniques for Implementation of Demand-Side Management Technology in the Marketplace - Completed
Juan Comas, FECSA, Spain

Task 6 DSM and Energy Efficiency in Changing Electricity Business Environments - Completed
David Crossley, Energy Futures, Australia Pty. Ltd., Australia

Task 7 International Collaboration on Market Transformation - Completed
Verney Ryan, BRE, United Kingdom

Task 8 Demand-Side Bidding in a Competitive Electricity Market - Completed
Linda Hull, EA Technology Ltd, United Kingdom

Task 9 The Role of Municipalities in a Liberalised System - Completed
Martin Cahn, Energie Cites, France

Task 10 Performance Contracting - Completed
Hans Westling, Promandat AB, Sweden

Task 11 Time of Use Pricing and Energy Use for Demand Management Delivery- Completed
Richard Formby, EA Technology Ltd, United Kingdom

Task 12 Energy Standards
To be determined

Task 13 Demand Response Resources - Completed
Ross Malme, RETX, United States

Task 14 White Certificates - Completed
Antonio Capozza, CESI, Italy

Task 15 Network-Driven DSM - Completed
David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 16 Competitive Energy Services
Jan W. Bleyl, Graz Energy Agency, Austria / Seppo Silvonen/Pertti Koski, Motiva, Finland

Task 17 Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages
Seppo Kärkkäinen, Elektraflex Oy, Finland

Task 18 Demand Side Management and Climate Change - Completed
David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 19 Micro Demand Response and Energy Saving - Completed
Linda Hull, EA Technology Ltd, United Kingdom

Task 20 Branding of Energy Efficiency - Completed
Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 21 Standardisation of Energy Savings Calculations - Completed
Harry Vreuls, SenterNovem, Netherlands

Task 22 Energy Efficiency Portfolio Standards - Completed
Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 23 The Role of Customers in Delivering Effective Smart Grids - Completed
Linda Hull, EA Technology Ltd, United Kingdom

Task 24 Closing the loop - Behaviour Change in DSM: From theory to policies and practice
Sea Rotmann, SEA, New Zealand and Ruth Mourik DuneWorks, Netherlands

Task 25 Business Models for a more Effective Market Uptake of DSM Energy Services
Ruth Mourik, DuneWorks, The Netherlands

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<http://www.ieadsm.org>

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Task 25 D2 report Netherlands

Operating Agents: Mourik, R.M.; Bouwknecht, R.;
National experts: Tolcamp, J.; Huijben, H.J.J.C.