Customer-driven business model innovation

Re-designing the business model of the high-tech start-up Sorama

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Management Summary

Sorama, founded in 2009, is a high-tech (university) spin-off and a small player in the market of sound and noise control. Besides consultancy services, Sorama offers high resolution sound cameras – for a low initial investment – which are able to visualise noise and vibrations in products for R&D and consultancy activities. Sorama credits can be purchased by customers with either a yearly subscription or prepaid bundles that enables customers to analyse measurement data via Sorama’s online platform.

Sorama applies a relatively new business model, i.e. offering a high-tech innovation for a low initial investment with a subscription or prepaid bundle. This enables Sorama to serve a broad range of customers. These customers differ in organizational strategy, industry and size, and relative position in the supply chain and therefore use different organisational structures, procurement processes, R&D activities etc. These differences are challenging with respect to implementing customer characteristics into Sorama’s business model. In order to achieve alignment between customer characteristics and Sorama’s business model, (potential) customers were analysed, and the perspective of business model innovation was taken to find out how Sorama could serve and attract a broad range of different customers.

Theoretical Background

Technology by itself has no economic value, this remains latent until it is commercialised in some way via a business model (Chesbrough, 2010; Magretta, 2002; Teece, 2010), which describes the rationale how a firm creates, delivers and captures value (Osterwalder & Pigneur, 2010). The ideal business model rarely appears in the early stages of an emerging firm due to changing customers’ needs and expectations (Christensen, 1997), hence successfully commercialising new ideas and technologies require firms to improve, adopt and morph their business models over time (Andries & Debackere, 2007; Amit & Zott, 2010; Chesbrough, 2010; Günzel & Wilker, 2009; Magretta, 2002; Teece, 2010).

However, the problem in many cases is the lack of knowledge about the customers (Pynnönen et al., 2012), on top of that traditional market research may not be enough to identify hidden latent needs (Johnson et al., 2008; Osterwalder & Pigneur, 2010). Therefore firms need to develop customer-driven business models (Thomke & Von Hippel, 2002; Pynnönen et al., 2012), i.e. business model innovation with a deep understanding of customer’s needs and preferences (Chung et al., 2004; Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 2010). Current literature lacks an empirically validated, practitioner-oriented approach for customer-driven business model innovation in industries without dynamic customer needs (Pynnönen et al., 2012). Therefore this research validates the customer-driven business model innovation process in another industry and proposes a method that focuses on customer needs and preferences.
Methodology

The perspective of customer-driven business model innovation was taken to find out how a firm could serve a broad range of customers. The data collection was of qualitative nature and combined multiple data collection methods. The primary sources were semi-structured recorded interviews with customers, potential customers, and cold leads. Other sources of information were internal company documents, as well as information obtained by attending sales meetings. An inductive, bottom-up approach was used to analyse the large amount of unstructured data. First Mind Maps® enabled to semi-structure the data to gain a deep understanding of a customer’s needs and preferences in terms of organisational structure, procedures, R&D activities and procurement processes. Accordingly, these specific observations were analysed following a cross-case analysis in order to detect patterns and regulations in order to derive developing general conclusions. Based on the outcome of the data analysis several solutions for the business problem were synthesized and developed. These findings were developed into different business model alternatives. Following an iterative process of collecting data and developing business models alternatives ensured the findings could be validated during the data collection process. This resulted in a business model redesign that is recommended to Sorama.

Findings

In order to manage customer-driven business model innovation it is important to get a deeper understanding of customers’ needs and preferences. The findings revealed customer organisational R&D activities and procurement processes are two important drivers for business model innovation.

Concerning the organisational R&D activities this study revealed two types of firms, research-driven and development-driven firms. The former are firms with dedicated resources available to perform research in New Product Development (NPD), resulting in more radical innovations. The latter develop solutions specifically for customer problems, resulting in incremental innovations. Additionally the analysis exposed, that firms with a high product complexity perform a modular NPD process, whereas firms with medium complexity prefer a Stage-gate® NPD method, and lastly, firms with a low product complexity use a more general project approach.

Concerning the procurement process for high-tech innovations for R&D purposes follows four phases: Firstly, become familiar with the products and technology. Secondly, discover the added value for the firm. Thirdly, execute a service project by Sorama to examine the results of the analyses and added value. And finally, the actual procurement. The costs of the service project and/or procurement of the system were allocated in four ways: (1) all costs to department overhead, (2) hardware costs to department overhead and usage costs to projects, (3) hardware to one project and usage costs to several projects, and (4) servicing costs to product development.
Redesign

Sorama’s business model was innovatively redesigned in order to serve a broad range of different firms with respect to size, industry, R&D activities, and internal processes. First with segment customers according to their R&D activities, which results in four segments: (1) servicing customers, (2) customers with own system, (3) consultancy firms and (4) co-development firms. Next, strengthen the value proposition by mentioning the marketing capabilities of the Sorama brand and products, and offering off-line possibilities. Then, enhance customer relationship with an online community, enable customer to influence the development roadmap and provide use-cases to get potential customers familiar with the technology. At last, a modular pricing mechanism is designed to give customers regardless their size, structure or cost allocation method, all freedom to select the best suitable credit package for their situation, and increase or decrease if necessary. This redesign encourages a low entry level for a high-tech innovation.

Conclusion & Discussion

The main research question was to determine how a firm could innovate their business model to serve and attract a broad range of customers. The perspective of customer-driven business model innovation was taken, resulting in a business model innovation process for companies offering a product and service for R&D and consultancy applications to a broad variety of customers. This process consists of three steps. First, with segment customers into groups specified by organisational structures and R&D activities. Then, concentrate on the procurement process and cost allocation method for measurement systems. Finally, develop a modular revenue mechanism with a low entry level and freedom to switch from module if required, suitable for every customer.

The results of this research also yields theoretical contributions. First, this research has validated the perspective of customer-driven business model innovation process suggested by Pynnönen et al. (2012). Second, this research provided another viewpoint to an existing framework with regard to customer needs and preferences. Furthermore, this research created more insights by analysing the business model innovation process in a high-tech start-up with a high technological product/service combination.

The results of the study also provides practical implications. Firstly, it provides a practical and meaningful approach for customer-driven business model innovation based on customer needs and preferences. Secondly, this study shows how firms could employ a modular revenue stream that is suitable to serve a wide variety of customers. Finally, this study gives marketing managers and practitioners another practical approach to customer segmentation based on organisational R&D activities.
Pre-face

Na bijna 7,5 jaar studeren, 4 jaar hbo en 3,5 TU/e waarvan 6 maanden in Valencia, is de tijd nu rijp om het studeren en het bijbehorende leven af te sluiten met deze master thesis: het KROONSTUK van de afgelopen jaren. Het resultaat mag er zijn (al zeg ik het zelf). In de afgelopen 7,5 jaar heb ik enorm veel dingen geleerd, over mezelf, van anderen, het bedrijfsleven, een onderzoek doen (alleen), en veel meer, teveel om te benoemen, maar zeker niet te vergeten. Kortom in de afgelopen jaren heb mijn rugzak met behoorlijk veel kennis, kunde en wijsheid mogen en kunnen vullen. Ik kijk er dan ook enorm naar uit om met deze goed gevulde rugzak op pad te gaan, een ontdekkingstocht te maken en nieuwe wegen te wandelen.

Deze master thesis was nooit tot stand gekomen zonder de onderstaande mensen. Allereerst, wil ik het Sorama team en in het bijzonder Rick bedanken voor de mogelijkheid een passende afstudeeropdracht te formuleren. Dat ik “een vreemde eend in de bijt” was, vond ik het geweldige ervaring om ruim 8 maanden onderdeel te zijn van een start-up. Ondanks dat we niet altijd op één lijn zaten, koester ik zeer goede herinneringen aan onze discussies en evaluaties. Daarnaast wil ik je ook bedanken voor het vertrouwen en mogelijkheden tot zelfontplooiing.

Ten tweede, wil ik mijn begeleidsters Néomie en Isabelle bedanken. Isabelle, ik ben je zeer dankbaar dat je me wilde begeleiden, en voor het vertrouwen en de steun die je geboden hebt. Af en toe was het een moeizaam proces, maar tijdens onze meetings kreeg ik altijd weer enorm veel energie en input. Als we een uur hadden ingepland, hadden we vaak ruim de tijd nodig om bij te praten over van alles en nog wat, hoe en wat na het afstuderen, vakanties en verhuizingen. Kortom ik wil je bedanken voor de adviezen en inzichten in zowel dit onderzoek, als voor de toekomst.

Tot slot, zijn er een aantal mensen die zeker niet aan dit rijtje mogen ontbreken. Allereerst wil ik mijn familie en vrienden bedanken, in het bijzonder mijn ouders, “vaders en moeders”. Als derde telg van vier, heb ik het jullie vast niet altijd even gemakkelijk gemaakt. Ik denk dat ik wel mag zeggen dat ik meest bravoure was? Maar jullie weten net als ik, in stapjes kan je veel bereiken en verstand komt met de jaren. In dit rijtje hoort ook een bijzondere vermelding voor mijn vrienden, bedankt voor de toffe momenten in de kroeg, tijdens groepswerk, en adviezen op allerlei vlakken, vooral afgelopen weken in de bieb waren intensief. Ik wil afsluiten met het bedanken van mijn schattie, Nathalie. Door het schrijven van deze thesis, verhuizen en klussen, en de verschillende aanbiedingen van bedrijven, bleef er weinig tijd over jou, terwijl jij mij enorm in de watten legde 😊. Ik kijk dan ook uit naar een toffe tijd in onze nieuwe villa en de vakantie naar Malaga!

Thijmen Braem
Eindhoven, 11 februari 2015
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1. Introduction

The commercialisation of new technologies, and especially technology developed at universities, is one of the major drivers of economic development by creating both economic and social value (Lockett et al., 2005; Shane, 2004; Siegel et al., 2003). One of the ways to commercialise technology into economic output is by establishing new firms, for example a university spin-off. These new firms are characterized by the commercialisation of leading-edge technology from a university department, and backed by venture capital (e.g. the university itself) (Drulhe & Garnsey, 2004). In particular these start-ups companies have a large economic and social impact (Shane, 2004).

Although its importance addressed in literature, technology commercialisation remains a challenging process, characterized by decision-making under uncertainty (Dew et al., 2009). More specifically, it may take years before a new technology or promising idea is developed in a viable product, on top of that, the failure rate of firms trying to commercialize a new technology is extensively high (Christensen, 1997; Song et al., 2008).

Besides, technology by itself has no single objective value. The economic value of a technology remains latent until it is commercialized in some way via a business model. The essence of a business model is defining the manner by which the firm delivers value to customers (e.g. by a new technology), and captures that value (Chesbrough, 2010; Magretta, 2002; Teece, 2010). It also outlines the activities, architecture of revenues, costs, and profits of the company delivering that value. Unless a suitable business model for a new technology is designed, the innovation will not reach its full potential and will gain less value for the company. However, business models are not static and need to improve, adopt and morph their over-time to stay ahead of competition and adjust to market changes (Andries & Debackere, 2007; Günzl & Wilker, 2009; Teece, 2010). Many examples exist of companies who have managed to develop innovative business models distinctive from industry rivals, which created additional value for their customers and partners (Chesbrough & Rosenbloom; 2002; Johnson et al., 2008; Teece, 2010). These examples, as well as academic literature (section 2.3), demonstrate the power of business model innovation.

This chapter gives an introduction into this research. Started with a general background in technology commercialisation in high-tech start-ups. Subsequently, the creation of business models and the importance for innovate new business model was introduced. The next section will present the setting for this research. Then, this chapter will address the research objective complemented with the main research questions and sub-questions. The last section of this chapter will present the outline of this thesis.
1.1 Research Setting

The specific setting of this research is formed by Sorama, a high-tech start-up from the University of Technology Eindhoven and founded in 2009. Sorama is a small player in the market for sound and noise control and developed and patented a high resolution sound camera that visualises sound and vibrations using near-field acoustical holography. In the near-field technology Sorama is the only company in the world that turned the holography technology into a product application.

Due to the emerging threat of noise for human beings\(^1\), it is very likely that in the coming ten to fifteen years noise become the number one threat for human beings, hence noise control becomes more and more important. As a result of stringent noise requirements, this has a direct impact on products developed today and in the future. In particular, Sorama developed a sound camera which is able to analyse noise and vibrations in products and machines in order to gain more insight and understanding of a product’s sound design and improve the product as a whole.

The sound cameras are offered in combination with an online portal, which is subsequently needed to compute measurement data and perform analyses. In order to use the camera, customers need a subscription or prepaid bundle, whether best fits their needs. In more detail, first customers select one of the four front-ends (Scan A, Scan B, Scan M or Cam) which is bought directly from Sorama. Then customers select one of the three prepaid bundles or yearly subscription types (basic, normal or premium) with the right amount of credits, depending on the expected usage. These credits are awarded monthly and used as (Sorama) currency to compute measurement data and prepare results (e.g. holographical sound images). Depending on the profile (i.e. continuous or incidental) customers can choose four different awarding profiles. If preferred or needed, the customer can add at all time prepaid bundles, i.e. one time buy of a certain amount of credits, or add expert tokens, i.e. package with consultancy hours to help analyse the sound image remotely, assist in on-site measurement or for training. Basically it is like a mobile phone subscription model, choose a smartphone, the amount of minutes expect to need, and add additional bundles, e.g. internet, extra messages. Besides offering the cameras in combination with a subscription or prepaid, Sorama offers also consultancy services; a Sound Image Expert analyse a problem in a customer’s product and advice and assist the customer in solving noise and vibrations issues. See a complete definition of the business model in appendix A.

After almost six years the company gained experience in their business and grew in terms of sales and customers, and is on the point of outgrowing their start-up jacket. Therefore

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\(^1\) ACCORDING TO A STUDY OF WORLD HEALTH ORGANIZATION (WHO) IN 2011, LONG-TERM EFFECTS OF NOISE OVERLOAD COULD CAUSE CARDIOVASCULAR DISEASE, COGNITIVE AND SLEEP DISORDERS, TINNITUS, AND ANNOYANCE OF AMBIENT SOUND.
validating, improving and adapting Sorama’s business model is essential to ensure success for the coming years and develop itself to an important player in the acoustic measurement market.

1.2 Research Objective

Sorama’s business model (Figure 1) is quite new in the acoustic measurement market in the first place, and second for high-tech innovations. Offering a high-tech product for a low initial investment with a subscription, enables to reach a broad range of customers, from the high-end to the low-end, from small firms to large (corporate) firms, from product companies to consultancy firms and from research driven companies to product and development driven companies. In a context where a company developed a technology for a broad range of customers and also aims to target them all, it may be highly complicated to reach all the different customers with the same business model. In addition, how does a firm need to segment these customers, in terms of size, turnover, organisational structures or other matters. Therefore, the objective of this research is to find out how a firm could segment all these different customers and innovate their business model to serve and attract all these customers. Or to address it more specifically, how to design and develop a business model for Sorama that is capable to serve all their different customers with different (latent) needs and different organisational structures and procedures. Hence, the result of this research is an advice for Sorama whereby semi-structured interviews with customers and potential customers form the main source of information to develop and design an improved business model.

In the recent years the importance for customer influence in business model innovation is increasing, therefore the existing literature propose a process for customer-driven business model innovation (Pynnönen et al., 2012). However due to the specific setting of the proposed method was researched in, a validation of the model is required in order to research the applicability of the model in other industries. Therefore, this research setting covers the problem of a company dealing with a broad range of customer with different characteristics and (latent) needs. More specifically, the process business model innovation with respect to customer needs and preferences will be executed in order to develop and redesign an existing business model.

In order to specify the study in terms of an academic as well as practical picture this research started by formulating a research question (Yin, 2011):

\[ \text{RQ: How could a firm innovate their business model to serve and attract a broad range of customers?} \]

Sub-questions were designed help to solve the main research question and to give guidance. When the research sub-questions are answered, it should also be possible to define an
answer the main research question. In addition, these sub-questions will provide as guidance for this thesis and every sub-questions will be answered chronologically in the chapters. Sub-questions that are related to the research question and problem are:

- **SQ1:** What is the relation between business model innovation and customer needs?
- **SQ2:** What are the needs and preferences of Sorama’s customers?
- **SQ3:** What is the current state of the business model of Sorama?
- **SQ4:** What business model can be designed for Sorama to serve the broad range of customers?

The first sub-question is developed in order to find out what is known in the existing literature concerning business model innovation and customer needs. Due to this research setting whereby a firm need to develop a novel business model suitable for a broad range of customers, it could be highly valuable to find out if specific business model innovation processes are suggested by academics and scholars. The second sub-question need to reveal the needs and preferences of Sorama’s customers. In addition, the current state of Sorama’s business model and the fit with the needs and preferences of the customers and potential customers is analysed, accordingly answering sub-question three. Sub-question one to three combined will guide the answer for sub-question 4. That is, the findings of the previous sub-question will provide information to develop and design a business model to a broad range different customers. How this process of developing an innovated business model for Sorama will evaluate, will be presented in the next section.

### 1.3 Thesis Outline

In order to answer the main research question in chapter 6, this thesis follows a chronological path that narrows down toward the solution. First the theoretical background and backbone of this research will be presented in chapter 2, as well as the answer for the first sub-question. This section presents the current state of literature regarding high-tech start-ups, business models, business model innovation, followed by the process of customer-driven business model innovation. Moreover, this section also addresses a literature gap in the existing literature and how this research could possibly close this gap. The third chapter will outline the research methodology, concerning the research framework, sources of information, data analysis method, and ending with the business model redesign process. The analysis chapter (chapter 4) comprises the heart of this research and will answer sub-question two and three. First two cross-case analysis of the selected cases will be explored, namely an analysis of (1) the organisational R&D activities and (2) of the procurement process. The chapter will end with a reflection of the research findings to the current business model. Chapter 5 will represent the redesigned business model for Sorama. Based
on the findings in the previous chapter, the redesign will concentrate on the customers segments, value proposition, customer relationship and channels, and revenue streams. At last, the relations between the different business model components will be discussed. This thesis ends with answering the main research question in the discussion and conclusion in chapter 6. Whereas from chapter 1 to 5, the research was converged and narrowed down towards a firm specific solution, chapter 6 in contrast, will broaden and diverge by reflecting the findings to the current literature (found in chapter 2) and thus building theoretical implications. Besides, more general practical implications for managers and practitioners are presented. Lastly, this chapter ends with the research limitations and subsequently proposals for future research.
This figure has been removed because it contained confidential information.
2. Theoretical Background

This chapter will focus on the theoretical background of this research and tries to find out what is known in the existing literature about the relation between business model innovation and customer needs. Starting with an introduction in technology commercialisation via high-tech start-ups, and the importance to develop the right business model in doing so, this section continues with the concept of business models and the dispersion of the business model definition. Also in this section one business model definition will be selected to be used throughout this thesis. Then, the importance to develop an agile business model as well as the importance to innovate a firm’s business model over time, follows in the next section. In order to find out how customer needs are involved in the process of business model innovation, the second last section will present a customer-driven business model innovation process and the state of the existing literature regarding this method. The last section will conclude this chapter and will give an answer on the first research sub-question: what is the relation between business model innovation and customer needs. Furthermore, this systematic literature review is performed to reveal a literature gap, this will also be discussed in the concluding section.

2.1 High-Tech Start-ups

For many entrepreneurs of high-tech start-ups the process of launching a company begins with the light-bulb moment when they conceive of a breakthrough idea for a new product or service. Very often, these entrepreneurs are so passionate about their invented breakthrough idea, they believe the innovation is so obviously superior that is sell itself (Onyeman, Pequera, & Ali, 2013). However, although an idea for a good product or service is important, a start-up’s viability and survival depend on its business model; it explains how the start-up will make money (Magretta, 2002). In addition, the economic value of a technology or new innovation remains latent until it is commercialized in some way via a business model (Chesbrough, 2010; Magretta, 2002; Teece, 2010). Due to the high levels of uncertainty and ambiguity start-ups are confronted with, the feasible business model is often not foreseeable in advance (Andries & Debackere, 2007). This is especially true for technology-based new firms (i.e. high-tech start-ups) that are coping with high degrees of both technical and market newness (Morris et al., 1999; Shane & Stuart, 2002). On top of that, the costs for developing new technologies is increasing and together with the shorter product life cycle of products, means new technologies may not fully reimburse all the costs necessary in the development of the product (Zott, Amit & Massa, 2011).
Thus, it is clear that choosing the right timing and the right business model for technology commercialisation is of vital importance (Trimi & Berbegal-Miabent, 2012). Though, the ideal business model rarely appears in the early stages of emerging a firm (Teece, 2010). Start-ups are more likely to succeed when using a flexible business model, leaving room for changes and adjustments (Shirky, 2008). The design of a start-up’s business model requires a deep understanding of customer needs (Teece, 2010) and entrepreneurs should concentrate on the relationship with key customers (Brettel et al., 2012). Nevertheless, many start-ups invest a great deal of time in developing and perfecting the product they are going to offer without ever showing it to potential customers (Blank, 2006). Therefore, Blank (2006) propose the customer development process: a group of early customers with a repeatable sales process corroborates the business model, verifying the existence of customers, the perceived value of the product, and the appropriateness of pricing and channel strategies (Trimi & Berbegal-Miabent, 2012). These drivers are key in understanding whether the firm has a viable business model and a value proposition (i.e. product or service) that customers want to buy (Blank, 2006; Moore, 2014). It is likely that several business model iterations and adaptations are needed before the most appropriate model is developed (Andries & Debackere, 2007; Blank, 2006; Moore, 2014). More specifically, business models should be adjusted in parallel to the firm’s life cycle evolution (Andries & Debackere, 2007).

The previous section highlight the importance for high-tech start-ups to develop an appropriate business model, whereby leaving room for improvement and adjustments of the model is essential. In doing so, a deep understanding of customers and potential customers could reveal essential information in order to improve the existing business model. Therefore the remainder of this chapter will deeper analyse the current state of business model literature as well as the business model innovation literature.

2.2 Business Models

As mentioned before, technology by itself has no economic value, this remains latent until it is commercialized in some way via a business model (Chesbrough, 2010; Magretta, 2002; Teece, 2010). Almost every company employs some sort of business model, some companies it is explicitly designed and written down in order to propagate as a unique selling point (Teece, 2010). In other companies, the model is not particularly described on paper, but is the manner in which the company is doing business and is able to receive money or some sort of value for the product or service offered (Chesbrough & Rosenbloom, 2002). Sometimes, business models are created more by accident than by well-thought process of design (Magretta, 2002). Although business models are developed before a product or service is brought to the market, when or how a business model
is designed, a business model has, and will always be a very important element of a company (Magretta, 2002; Wirtz, Schilke & Ullrich, 2010).

The remainder of this section will address the concept of business models as well as the several business model definitions. For the sake of consistently and clarity one business model definition will be selected and used throughout. In the last part of this section business model frameworks will be introduced.

### 2.2.1. The Concept of Business Models

Before the mid-1990s the business model concept did not really exist (Zott, Amit & Massa, 2011). It was during the period where the Internet and World Wide Web had rewritten the basic rules of commerce (Kotha, 1998; Suarez, 2004), the business model concept began to emerge (Amit & Zott, 2001; Demil & Lecocq, 2010; Ghaziani and Ventresca, 2005). Although the term business model is much used by practitioners such as entrepreneurs, technologists and venture capitalists, it is not yet clearly defined in academic literature (Chesbrough and Rosenbloom, 2002). Many authors (Table 1) has defined the business model concept in various ways. This lack of definitional consistency and clarity represents a potential source of confusion, inducing dispersion and restrict further research on business models (Zott, Amit, & Massa, 2011).

<table>
<thead>
<tr>
<th>Business model purpose</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>“An operating business model is the firm’s core logic for creating value”</td>
<td>Linder &amp; Cantrell (2000)</td>
</tr>
<tr>
<td>“A template how a firm links factor and product markets to deliver value to stakeholders.”</td>
<td>Amit &amp; Zott (2001)</td>
</tr>
<tr>
<td>“The business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs”</td>
<td>Chesbrough &amp; Rosenbloom (2002)</td>
</tr>
<tr>
<td>“A business model is representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network.”</td>
<td>Shafer et al. (2005)</td>
</tr>
<tr>
<td>“A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets”</td>
<td>Morris et al. (2005)</td>
</tr>
<tr>
<td>“The business model consist of out four interlocking components that, taken together, creates and delivers value.”</td>
<td>Johnson et al. (2008)</td>
</tr>
<tr>
<td>“A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers.”</td>
<td>Teece (2010)</td>
</tr>
</tbody>
</table>
“A business model describes the rationale of how a firm creates, delivers, and captures value.”

Table 1: Various business model definitions

According to Calvacante et al. (2011), a business model serves two interlinked purposes for a company. First, by providing some stability for the development of activities, secondly, to be flexible enough to allow modifications (Calvacante et al., 2011). Other definitions used throughout the business model literature that describe the purpose of business models are shown in Table 1. The definitions are aligned chronologically to show the development of the business model concept over the years. When observing the different definitions, the word value seems to be a recurring term. Notice the words prior to value explain the manner how the value is achieved, created, captured and delivered. Although there seems to be no consensus on the definition of business models in the research field, there seems to be some agreement on the purpose of business models (Zott, Amit & Massa, 2010). That is, creating and capturing value or some synonym tend to be a recurring concept in all definitions, and is widely accepted and used in literature (e.g. Johnson et al., 2008; Osterwalder & Pigneur, 2010; Teece, 2010; Shafer et al., 2005). Therefore and for the sake of consistency, in this study the definition of Osterwalder & Pigneur (2010, p. 14) is used to define a business model: “a business model describes the rationale of how a firm creates, delivers and captures value”.

Although other frameworks by other authors exist, it is safe to assume the associated framework of Osterwalder & Pigneur (2010) could be used to define a business model framework. Indeed, this definition takes all the important attributes of a business model definition addressed in literature into account. Therefore the following section will look closer at the business model components founded to be important and other existing business model frameworks.

2.2.2. Business Model Frameworks

Choosing the right business model is essential, however the ideal business model rarely appears in the early stages of an emerging firm (Teece, 2010). Finding and developing a new business model starts with choosing a framework. Notice, selecting a business model framework is not just a matter of selection the most straightforward option (Osterwalder & Pigneur, 2010). In the business model literature many authors have defined a business model framework, wherein they argue to capture all the aspects of a business model (e.g. Chesbrough & Rosenbloom, 2002; Johnson et al., 2008; Morris et al., 2005; Osterwalder & Pigneur, 2010). It seems to be none of the authors was (or is) able to capture all the parts that a successful business model should have. This may also be the reason no one dominant business model framework exist; for every situation, in every industry,
for every type of company, another business model framework will outperform another. According to Morris et al. (2005) the basis of most business model frameworks consist of different components, which are related to several elements of the model. Most authors (e.g. Johnson et al., 2008; Morris et al., 2005; Osterwalder & Pigneur, 2010) defined a business model framework should consist out of a set of basic components which broadly covers four important pillars of a business: customer, value proposition, economic structure and internal activities and resources.

In line with the basic components of a business model framework and with the adopted definition previously, the framework of Osterwalder & Pigneur (2010) is adopted as business model framework for this research (Figure 2). This framework is described trough nine building blocks that show the logic of how a company intends to make money. The nine components, also called building blocks are: (1) Customer segments, (2) Value propositions, (3) Channels, (4) Customer relationships, (5) Revenue streams, (6) Key resources, (7) Key activities, (8) Key partnerships and (9) Cost structure. The business model canvas also illustrates the interrelations between the different building blocks, as well as the interactions between the four main areas of the framework. More specifically, the block coloured in blue represents the offer, the blocks in orange mark the customer, the green coloured block represent the infrastructure and the remaining blocks in purple, show the finance insights.

Concluding, a firm’s business model is broad concept that needs to be understandable and should have elements of flexibility and agility to change over time and adapt to changing environmental conditions. This ability to change is part of the business model innovation concept, which will discussed in the next section.

Figure 2: Business model framework of Osterwalder & Pigneur (2010)

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2 A MORE ELABORATE EXPLANATION CAN BE FOUND IN APPENDIX E
2.3 Business Model Innovation

In order to successfully commercialize new ideas and technologies, it might be necessary to develop new, innovative business models (Chesbrough, 2010; Magretta, 2002; Teece, 2010). Business model innovation refers to the process of transforming, or completely reinventing, key elements of an organisation to new ways of doing business (Teece, 2010). Chesbrough (2010, p. 355) even states: “... it is probably true that a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model.” This indicates the importance of business model innovation for companies to be successful. Moreover, business model innovation has become a key trigger for differentiation and competitive advantage, value creation, initiating new markets and even entire industries (Amit & Zott, 2010; Chesbrough, 2010; Osterwalder & Pigneur, 2010; Magretta, 2002; Teece, 2010). Although the importance for business model innovation is widely supported amongst academics as well as practitioners, many (high-tech) firms have difficulties to innovate their business model (Teece, 2010). The reason for this, could be, business model innovation is not written down in a book or paper with structured guidelines, but is a complex art of selecting, adjusting and/or improving in an iterative way (Teece, 2010). Teece (2010) continues, innovating an established business model requires significant amount of creativity, insight, and information and intelligence of customers, competitors and suppliers. Therefore, the following section will address the concept of business model innovation.

2.3.1 The Concept of Business Model Innovation

A growing group of scholars (e.g. Demil & Lecocq, 2010; Johnson et al., 2008; Teece, 2010; Zott, Amit & Massa, 2011) agree the business model itself could also be a source of innovation, in other words, improving a firm’s business model through innovation. In the previous chapter, concerning the “concept of business models” it was noticed that the term business models is not clearly defined. This also seems to be with the concept of business model innovation. Although less scattered, there a ruling definition for business model innovation is lacking. Some researchers have suggested very broad domains for business model innovation, in line with the corresponding definitions of the business model concept (Table 1). Amit & Zott (2010, p. 2) refer to business model innovation as a process of designing new, or modifying the firm’s extant activity system (i.e. a firm’s business model). According to Mitchel & Coles (2003) business model innovation involves modifications in the who, what, when, where, or how much of delivering value to customers and getting paid for it. They also state that the most top performances review their business model every two to four years, in order to stay ahead of competition. Broadly in line with this is the view
of Johnson et al. (2008), stating business model innovation involves the firm’s value proposition, target customers, resources, processes, revenue model, cost structure, and rules and norms. Osterwalder & Pigneur (2010) address the importance to understand business model innovation and claim business model innovation is about creating value, for companies, customers and society by changing one or more dimensions of the business model (Sawhney et al. 2011). The most straightforward definition is opposed by Gambardella & McGahan (2010, p. 263) “business model innovation occurs when a firm adopts a novel approach to commercialising its underlying assets”.

According to Demil & Lecoq (2010) the first signs of business model innovation could be recognized as structural changes in costs and/or revenues (e.g. using a new kind of resource or developing a new source of revenues). Although no ruling view on business model innovation exist, it seems to be most authors agree on the point of modifying, improving or developing new ways of a firm’s activity system (Teece, 2010). More precisely, most authors agree business model innovation is about the how of doing business in a novel way with an emphasis on delivering value for customers (Amit & Zott, 2010). In order to do so, a deep understanding of customer’s need and preferences is required (Chung et al., 2004). The following section will narrow down towards this topic and will introduce a customer-driven business model innovation approach.

### 2.4 Customer-driven Business Model Innovation

The costs for developing new technologies is increasing combined with the shorter product life cycle of products means new technologies may not fully reimburse all the costs necessary in the development of the product (Amit, Zott & Massa, 2011). On top of that, the development of new technologies and innovations, as well as the changing customers’ needs and expectations, require firms to constantly innovate their business model (Christensen, 1997). In addition, the problem in many cases is the lack of knowledge about a firm customers (Magretta, 2002; Thomke & Von Hippel, 2002), and traditional market research may not be enough to identify hidden latent needs or emerging markets (Johnson et al., 2008; Osterwalder & Pigneur, 2010). Therefore firms need to develop customer-driven business models (Pynnönen et al., 2012; Thomke & Von Hippel, 2002), or in other words, successful business model innovation requires a deep understanding of customers (Chung et al., 2004; Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 2010).

Building a business model on customer insights comes with two challenges (Osterwalder & Pigneur, 2010). First, a company need a deeper understanding of customers rather than just asking them what they want, second, knowing which customers to heed and which to ignore (Magretta, 2002; Osterwalder & Pigneur, 2010). Therefore, it is essential to avoid focusing exclusively on existing customers and try to satisfy unmet needs of new customers (Blank, 2006;
Johnson et al., 2008; Osterwalder & Pigneur, 2010). Nonetheless, especially in the start-up phase of a company, existing customers are still important, because they provide essential information regarding the value proposition offered and existing business model (Blank, 2006). This implies, to innovate a firm’s business model, a company need to listen to existing customers (Lee et al., 2012) as well as seduce potential customers to review the offering and business model.

Even though the issue of managing the alignment of the business model with customer insights is considered important in general, the current literature lacks an empirically validated, practitioner-oriented, holistic approach to managing customer-driven business model innovation (Pynnönen et al., 2012). Therefore, Pynnönen et al. (2012) propose a four-stage framework for customer-driven business model innovation, and the tools with which to implement and manage it. The process follows four stages³: (1) how customer needs and preferences align with value proposition; (2) business model innovation based on customer needs; (3) customer survey to validate new business model; (4) fitting the customer model to customer needs (Pynnönen et al., 2012). The model should thus give insights into how customer preferences could be better integrated into the firm’s technology and service offerings, and subsequently its business models (Pynnönen et al., 2012). Involving customers in the continuous innovation of the firm’s business model provides a complementary viewpoint on traditional technology management, which all too often puts technology before customer value (Thomke and Von Hippel, 2002). Subsequently, often one of the failures of high-tech start-ups.

Nevertheless, the proposed business model innovation framework by Pynnönen et al. (2012) is conducted in the highly turbulent and evolving ICT industry. Although the authors suggest the framework should apply in other kinds industries, yet a meaningful validation of the model in other industries tend to be unperformed. In addition, the relative importance of the phases as well as the content and setup of the phases may vary (Pynnönen et al., 2012). Moreover, they only focused on customer demand based change, implying the framework focused on changing customer needs instead of customer’s preferences regarding the current value proposition. Therefore the authors propose further research in the underlying resources of the framework.

2.5 Conclusion
Recapping to the introduction of this literature review, the aim was to find out what is known about business model innovation and different customer needs. Although the use of business models is quite new and scattered throughout the existing literature, and a ruling view is still lacking, most academics and scholar have agreed on the purpose of a business model. Namely, the creating value

³ SEE APPENDIX F FOR A REPRESENTATION OF THE PROCESS
and capturing that value in doing so (Teece, 2010). Furthermore, a large group of scholars and academics admit business models need to be agile and improve, adapt and morph over time in order to respond to (changing) customer needs (Teece, 2010). Therefore, a customer-driven business model innovation process is addressed (Pynnönen et al., 2012; Thomke & Von Hippel, 2002). That is, creating a deep understanding a firm customer needs and preferences and innovate a business model with respect to these needs (Chung et al., 2004; Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 201). Thus, to answer the first sub-question, what is the relation between business model innovation and customer needs, in order to successfully innovate a firm’s business model, a firm need to create a deep understanding of customer needs and preferences.

Because in this research setting whereby a company developed a technology for a broad range of customers and also aims to target them all, it may be highly complicated to serve and attract all the different customers. According to Van Strien (1997) a research gap exists between the design knowledge described in the literature and the actual problems in business. Hence, this literature review revealed a literature gap between business model innovation and customer preferences, i.e. an empirically validated, practitioner-oriented approach for customer-driven business model innovation (Pynnönen et al., 2012). As mentioned before, little attention is addressed to this topic in existing literature, although the importance of customer involvement is discussed widely (Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 201). Furthermore, existing customer-driven business model frameworks lack generalizability and consistency (Pynnönen et al., 2012).

Concluding, Pynnönen et al. (2012) presented a four-stage process framework required for customer-driven business model innovation. Complemented with the view of scholars such as Doz & Kosonen (2010), Osterwalder & Pigneur (201) and Teece (2010) regarding the importance of customer insights, highlighted the importance of customer involvement during the business model innovation process. However, little research is presented regarding business model innovation and the integration of customer preferences (Pynnönen et al., 2012). In order to find the best practices in terms of reducing the previously mentioned research gap, the aim of this study is to validate an existing framework for customer-driven business model innovation, and to provide another viewpoint to this framework with regard to customer needs and preferences. This should thus give more insights how customer needs and preferences could be better integrated into a firm’s business model.
3. Research Methodology

This chapter covers the research methodology of this study. In order to perform an academic research as well as creating a solution for a practical business problem a research framework is required. Therefore in the first section of this chapter, a framework for research design is presented. Furthermore, this section include more details concerning the practical and theoretical goal of this research. Thereafter, the data collection method is given. Presenting the technique of selecting multiple information sources, which include semi-structured interviews, company documents, and informal conversations. Extra attention will be given to the selection of the interview cases and the structure of the interviews. In the next section the data analysis methodology will be addressed, following the general guidelines of inductive qualitative studies. How a redesign of the current business model of Sorama could be executed based on the data analysis is presented in the second last section. And lastly, this chapter will end with a concluding section.

3.1 Research framework

The object of this research project is twofold, it has both an academic theoretical and a practical goal. Academically by contributing to the existing literature on business model innovation and customer insights, practically, by solving a business problem for a company. Both goals complement each other and form the main subject of this research project. A visualisation of the project process is created to simplify the research project (Figure 3). By using a basic representation of the research it gives a better overview of the phenomenon being researched compared to only a narrative explanation (Miles, Huberman & Saldaña, 2014).

![Figure 3: Framework for research design](image)

Following the framework described in Figure 3, the perspective of business model innovation is taken and tried to find out how business model innovation could help to serve and attract different customers with respect to their characteristics. The research design represents a process of several iterations during the innovation process. Notice the process is endless, because according to
several researchers, a business model is not a static construct, but should adapt morph and change with time (Amit & Zott, 2010; Teece, 2010). Further it is likely to think, seen the different perspectives and characteristics among customers, they also have different needs, strategies, organisational process and buying behaviour. This research tried to find out how a company can differentiate their business model towards a business model that best suits the needs of different customers.

The academic framework for this research project is based upon the reflective cycle of Van Aken et al. (2012) (Figure 4). The reflective cycle incorporates the regulative cycle of Van Strien (1997) that is used to reflect the current academic literature and for business problem solving. According to this cycle, a gap exists between the design knowledge described in the literature and the actual problems in business. At the time of writing, no research was conducted on the influence of customer characteristics on business model innovation. Since there is a lack of knowledge how a company can differentiate their business model for different types of customers with regard to their needs, additional research in this topics has to be conducted. For this reason, a gap occurred between the current literature of business model innovation and how this process is influenced by the characteristics of customers.

In order to close the gap between the actual design knowledge and business problems, a research can be conducted to contribute to the design knowledge as well as to reduce the business problems. Since it is almost impossible to solve the problems for all companies in general, a specific case study was selected. Within this case study, the regulative problem solving cycle of Van Strien (1997) forms the basis. After executing all the steps in the regulative model cycle, the analysis and
experiences can be reflected and codified into academic research and thereby contribute to the general design knowledge. Due to the research scope and time-frame of this research the evaluation phase is not performed.

The selected case of this research is the high-tech start-up Sorama. The research is conducted after the firm has gain some experience in the business and is now evaluating towards a more mature company. In order to guarantee success for the coming years and to makes sure the value proposition offered reach all their customers and potential customers in the right way, the current business model need to be updated and validated. The research is performed by means of an internship at the company. This provided thorough access to company documents and insight information in Sorama’s existing business model, as well as the opportunity to research Sorama’s customers, resulting in a unique dataset. More details concerning the dataset and data collection methods will be detailed in the following section.

3.2 Data Collection

This research combined multiple data collections methods: interviews, observations, and archival sources. By triangulating data obtained from different sources and employing different methods, a stronger substantiation of research constructs is assured (Yin, 2009). Because little research has been done on the phenomenon researched, the data collection was of qualitative nature. Qualitative research is exploratory and is useful when the researcher does not know the important variables to examine (Creswell, 2003).

The first sources of information included in-depth, semi-structured (recorded) interviews with customers, potential customers and cold leads. The respondents were from different professional areas, different levels of responsibility and seniority in order to collect and integrate a variety of perspectives. Company histories, documents from internal archives, catalogues, consultant reports and interviews, augmented by media articles represented the secondary sources of information. The last source of information was provided due to the unique opportunity of an internship at Sorama, presenting a large amount of additional information and insights in the Sorama’s structures and processes. This information was also useful to approach and select interesting respondents for interviews (detailed in the following section). The information was obtained through informal conversations, observations, and non-recorded interviews with employees from Sorama and external advisors (e.g. consultants) or high-management members (e.g. CTO, CEO, HR-director) from various industries, as well as participation to several sales meetings and tradeshows.
The sample was multi-case, meaning that interviews were carried out with existing customers, potential customers and cold leads between October and December 2014. The cases were selected through Sorama’s CRM system and informal conversations with Sorama’s employees. This system contained a large set of firms, from the high-end to the low-end, small to large, active in all kinds of industries. Concerning the selection process, as it does not immediately become clear the right person within the company is approached and in a way to convince the person to participate, a context description helped the potential interviewee to guide his or her decision to accept the invitation for the interview. Since the needs of existing customers and potential customers were researched, the right distribution between existing and potential customers was tried to found. That is, when the point of saturation was reached, new data and their sorting only confirmed the themes and conclusions reached already, therefore more sampling was not needed (Miles, Huberman & Saldaña, 2014). Moreover, cases who tended to be uninteresting were not selected. This resulted in a multi-case sample of nineteen cases. The first group, with six respondents, were existing customers using the hardware and software of Sorama and are familiar with the business model and pricing models. The second group, potentials (seven respondents), were customers that previously used services of Sorama and/or have serious interest to buy a camera. Most of these customers already acquainted with Sorama, the technology and products offered and may have heard of the business model. The last group are cold leads or cold calls consist out six respondents. These companies are not (yet) customers and do not acquainted with Sorama, they may have seen Sorama on a tradeshow or may have heard about Sorama in the past, but a representative of Sorama never had serious direct contact with the company. In particular, these company do not know the technology, products and business model of Sorama.

Regarding the interviews structure\textsuperscript{4}, the interviews were in-depth semi-structured and contain open-ended questions. During the interviews the aim was to uncover the needs and latent needs of the company interviewed and to see how the value proposition of Sorama could serve these needs. Questions like, how is the new product development process designed (e.g. modular, stage-gate), what is on average the product life cycle, in what matter does sound and vibration play an important role in firm’s products as well as in the industry operating or for you customers, and does a better (sound) design could benefit the company. Along, it was tried to uncover the structure of the originations and how the company performed their development and/or research activities. Then the focus of the interview moved to procurement policy or process for research

\textsuperscript{4} SEE APPENDIX G FOR MORE INFORMATION
and development tools (e.g. measurement systems). Questions such as, who is involved in the decision making process, how costs of the tool (e.g. depreciation, maintenance contracts) are included in product development costs, or did the firm used other allocation methods. This data collection method caused a unique dataset occurred, the procedure to analyse this large amount of data will be presented in more detail in the following section.

3.3 Data Analysis

Analysing data is the heart of extending theoretical insights from case studies, but it is both the most difficult and the least codified part of the process (Eisenhardt, 1989). Miles and colleagues (2014) suggest data analysis as the process of selecting, focusing, simplifying, abstracting, and transforming all the data that is being collected through all inputs. The cases studied are drawn from nineteen established companies in The Netherlands and Belgium, ranging from very small companies (e.g. 3 to 5 employees) to very large agglomerates, different industries (e.g HVAC, automotive, maritime) and product or service, see Table 2 in Chapter 4 for the main case characteristics. The analysis started at the beginning of the project, as interviews were being prepared. This revealed some primary findings which revealed the subjects of the cross-case analysis. In addition, these subjects were found to be important drivers for to create a customer-driven business model for Sorama. During the project input from the executed interviews were transcribed and briefly analysed. Following Yin's (2009) 24-hour rule, the interviews were transcribed within a day, this resulted in a large set of unstructured data. Next, the data analysis of this study followed the general guidelines of inductive qualitative studies (Miles, Huberman & Saldaña, 2014; Yin 2009).

First, each individual interview transcript was carefully reviewed and summarised on its most important findings. Mind Maps® were designed and helped to semi-structure the data and made it possible to reveal associations and to generate new ideas. In this way a deep understanding was achieved of the respondent’s firm characteristics in terms of research and development activities and respondent’s view on the current business model. This also enabled to compare key findings of the other interview transcripts and Mind Maps®, resulting in a cross-case analysis.

Next, the large amount of unstructured data from the interviews and semi-structured data from the Mind Maps® has been categorised using an inductive, bottom-up approach (Miles, Huberman & Saldana, 2014). Accordingly, the specific observations were analysed in order to detect patterns and regulations, and finally ending developing general conclusions and theories.
Following the research framework presented in the first section of this chapter, data collection and analysis were performed simultaneously through an iterative process. More insights and new findings resulted from prior data analysis were included in the further data collection process to find additional validation, for example through asking additional probing questions. This also solved some uncertainty issues related to contradicting findings; differences that were identified during interpretation of the data were given more clarity by collection additional evidence through interviews or informal conversations at the respondent’s’ company. This iterative process of collecting and analysing data increased the validity of the results.

The cross-case analysis described in this section enabled a thorough understanding of Sorama’s customers and their characteristics was created. Moreover, besides the process described above, the current business model of Sorama was analysed in the beginning of the research project. This ensured a deep understanding of the business model was build, and several business model alternatives could be developed and designed with input of the data analysis. This process is described in the following section.

3.4 Redesign

The redesign phase of this research project was not a one-time task, but is more like an iterative process that goes on whenever customer preferences, enabling technologies, and infrastructures change. Throughout the design phase\(^5\), several solutions for the business problem were synthesized and developed. Most of the ideas and solutions were identified during the interviews, or after a first quick-and-dirty analysis of the interview within one or two hours after the interview. This pre-analysis of the data caused some early findings could be validated in the next interview, resulting in a validation of the pre-developed findings and business model updates. Finally, these solutions were synthesised into different business model alternatives. Because the research focusses on the customer need and preferences of Sorama’s customer, only the right-hand side of the Osterwalder Business Model Canvas (Osterwalder & Pigneur, 2010) will be improved. The iterative process of developing new business models was continued until the business model was found that best fine-tunes Sorama’s current business model towards a design that is capable to serve and attract a broad range of different customers. Moreover, this redesign is recommended to Sorama and is also the practical outcome of this study.

\(^5\) See Appendix G for a picture during the design phase
3.5 Conclusion

The chosen methodology was an explorative case study, given the aim to find insights into a previously underexplored field (Eisenhardt, 1989; Yin, 2009). Furthermore, in the data collection the principle of data triangulation was followed in order to find relevant evidence that would serve the research aim. More specifically, the study framework and design enables to research and explore how customer characteristics could be used to innovate a firm’s business model. By means of semi-structured interviews with customers, potential customers and cold leads, as well as other sources of information a dataset was created in order to explore patterns in the characteristics of Sorama’s customers.

Sorama’s current business model is quite new in the acoustic measurement tools market in the first place, and second for high-tech innovations. Offering a high-tech product for a low initial investment with a subscription, makes it possible to reach a broad range of customers. However, in a context where a company developed a technology for a wide range of customers and also aims to target them all, it may be highly complicated to reach all the different customers with the current business model. Therefore, a research among existing customers, potential customers and cold leads is proposed to find out how the firms are organised and structured. With the help of a cross-case analysis several patterns and regulations could be detected. Moreover, during the data collection and business model validation, it is tested whether the current business model is suitable to serve this wide range of different customers and whether the business model need to updated or fine-tuned. Based on the outcome of the data analysis a redesign of the current business model could be created.
4. Analysis

The previous chapter presented a framework for customer-driven business model innovation (Pynnönen et al., 2012), hence this approached is taken to find out how Sorama could innovate their business model for a broad range of customers. In order to do so, literature suggests (Chung et al., 2004; Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 2010) to create a deep understanding of customer needs preferences. Therefore, a comprehensive cross-case data analysis is executed. Accordingly, this also answer the second sub-question: what are the needs and preferences of Sorama’s customers?

The starting point of the study was to map initial customer needs and preferences. The first step in this process was to obtain a basic understanding of the current products and services, Sorama’s business model and the industry. This was obtained by attending to fairs and exhibitions, informal conversations with employees of Sorama and information form company documents. This enabled to map the initial business case.

The next step was to find important drivers to understand the customer needs and preferences. Because the Sorama products and technology is developed for research and development purposes, obviously, the needs lie in his particular field. Therefore, a cross-case analysis is conducted on the research and development activities. Moreover, this should explain if the products and services of Sorama actually satisfy a need. The second important driver revealed in the early stages of the data analysis, is the procurement process firms are following when buying Sorama’s measurement tool. This could inform how Sorama need to offer their products or structure their customer relations, channels and revenue streams. The characteristics of the nineteen cases studied in this research are presented in Table 2.

The last phase of this analysis was to reflect the current business model to the findings revealed in both cross-cases analyses. In addition, this should solve the third sub-question: what is the current state of the business model of Sorama?

The chapter is structured as following, first a cross-case analysis of the organisational R&D activities is presented. Including an analysis of the new product development process of the cases, an understanding of the R&D composition and ending with a concluding section. Then, the second cross-case analysis is given, containing the subjects procurement process phases and cost allocation methods, and also an concluding section. In the last section the findings of the analysis are reflected to the current business model of Sorama, this lays down the basis for the redesign in the next chapter.
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<td></td>
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<tr>
<td>Firm 12</td>
<td></td>
<td>Industry</td>
<td>Consultancy</td>
<td></td>
<td></td>
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<td>150</td>
</tr>
</tbody>
</table>

Table 2: Case characteristics
<table>
<thead>
<tr>
<th>Firm 13</th>
<th>HVAC</th>
<th>Central heating systems</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 14</td>
<td>Industrial</td>
<td>Rescue equipment</td>
<td>35</td>
</tr>
<tr>
<td>Firm 15</td>
<td>Buildings</td>
<td>Consultancy</td>
<td>7000</td>
</tr>
<tr>
<td>Firm 16</td>
<td>Maritime</td>
<td>Consultancy</td>
<td>10</td>
</tr>
<tr>
<td>Firm 17</td>
<td>Industrial</td>
<td>Large conveyer systems</td>
<td>2000</td>
</tr>
<tr>
<td>Firm 18</td>
<td>HVAC</td>
<td>Ventilations systems</td>
<td>250</td>
</tr>
<tr>
<td>Firm 19</td>
<td>Industrial</td>
<td>Printers and presses</td>
<td>340</td>
</tr>
</tbody>
</table>

1. See appendix K for list of firm names.
2. Of researched unit.

Table 2: Case characteristics (continued)
4.1 Cross-case analysis of organisational R&D activities

The first aim of the interviews was to find out how the value proposition of Sorama could solve a problem or satisfy a need. This was established by focussing on the structure of the research activities and product development, because the product application lies in this field. Accordingly, it was found that product companies differ from servicing firms in this regard. Related to the R&D activities, is a firm’s new product development process. In fact, most firm execute R&D to explore new innovations and markets. At last, the composition of the R&D team or team solving noise and vibrations issues tend to be interesting. That is, because the service and product firms differ in team composition as well as academic background and profession.

4.1.1 Research and/or Development Activities

The first thing that was quite interesting, were the differences in preforming research and/or development activities. Whether a firm performs any research activities depends on the industry and type of product in terms of size, production quantity and complexity (i.e. integration of various techniques and expertise fields). Out of nineteen researched companies, six companies were characterized to perform R&D, five have primarily development activities and carry out some research activities (see Table 3 for more details), but this is not full-time or like a senior R&D expert of a large maritime company said:

“We say we have a research department and perform research, but in practice we only do development. Our products are nine out of ten developed for customers specifically, and along we perform some research for that particular customer problem.”

At last nine companies only perform specific product development or improvement. Off course, some research is done during this development process, but specifically exploring new technologies is not executed. A reason for this could be the distinction between companies developing incremental innovation versus radical innovations. According to Abernathy & Utterback (1978) an incremental innovation is built upon existing knowledge and resources, furthermore based on minor technological changes where products in the market are still competitive. Thus, less research activities are needed. In contrary, a radical innovation is based on completely new knowledge and resources (Abernathy & Utterback, 1978), hence, intensive research is needed to uncover these innovations. Notice, consultancy firms do not perform any research at all and only solve specific problems for their customers.

Concluding, based on the cross-case analysis of this research, in the studied companies where radical innovations are developed more resources are available to perform research than in
firms where incremental innovations are developed. Moreover, to stay ahead of competition and explore new markets, it is inevitable for research-driven firms to perform research and develop radical new product. Therefore, they pay more attention to a better product and sound design. On the other hand, in development-driven firms, where products are developed to solve a specific customer problem, the customer pays for the development costs exclusively (i.e. hourly rate plus margin). In this situation, no room exist for additional costs such as high-tech measurement tools, due to higher development costs for the end-customer. In addition, most of the end-customers would not like to pay for extra services, their problem need to be solved as cheap as possible.

4.1.2 New Product Development Process

Taking a closer look into research and/or development activities is to see how this is carried out. In this study all companies were project structured. That is, developing products in projects with project teams, having multiple projects running at the same time, ranging from 1 projects to more than 10. In addition some of the firms have an organisational project structure, where the development process is divided in several projects, all with their own (tight) budget and team working only on that specific project. Whereas others, use projects to define a certain development process, or product improvement. Thus, a general pattern could not be remarked.

Another field of interest was the new product development (NPD) process. Of the nineteen cases, six companies has a NPD process using a Stage-Gate® approach, which start with an idea or solution for a specific problem and is transformed over time into a viable market product. During this process, the idea survived several Stage-Gate® go/kill decisions and undergo several prototype tests, until a ready to launch product is developed. In the dataset of this study (Table 3), especially in firms where smaller and/or less complex products are designed (e.g. heating and ventilation systems, transmissions), this NPD method is seen frequently. In five other companies a modular method is chosen for product development. These companies typically have large, highly complex products or systems with a lot of integration of different fields of expertise, such as ships, digital presses or baggage handling systems. These products are modular designed by several teams, all working on a specific part and in the last phase of the NPD process integrated into one market product. Specifically in these large, complex machines or products, prototyping is too expensive and takes too much time. Moreover, a firm could lose substantial competitive advantage due to an expired window of opportunity. Or like a senior mechanical designer stated:

“We develop first shot right, if we develop prototypes, who are 10 times more expensive than series and on top of that, takes 9
months to a year to develop them. In that case our time to market is way too long and window of opportunity expired.”

Lastly, three respondents stated not to follow a certain method or approach to develop new products. They start a NPD project with setting a goal, budget and time frame, and where required adjustments are made, or else, after a certain time a new product is developed.

Notice, in the servicing field new product development is not executed. Consultancy firms offer services for their customers and may deliver additional services in terms of material supply, thus a NPD process is not applicable in this group (Table 3).

Concluding, the NPD process, depending on the complexity of the products developed four types of firms could be remarked, (1) using a Stage-Gate® go/kill method, (2) perform NPD modularly, (3) a general project NPD approach and (4), not performing NPD due to offering services. Thus all the companies in this research are project oriented, depending on the structure of the company and cost structure, firms differ in the way how project costs and additional costs for projects are allocated. This will be dwelled on in the next section (4.3). First, a closer look is taken at the R&D team composition.

4.1.3 R&D Team Composition

By looking more closely at the composition of the R&D-teams or department dealing with noise and vibration issues, it revealed a difference between product companies and servicing companies. First, concentrate on the latter.

In service or consultancy companies an acoustic specialist or acoustic team has the highest educational level, expertise and experience in the field, therefore they gained significant power and status within the company. In addition, often others within the company have any or very little acoustic knowledge, like a quality advisor of a large construction and services company said:

“... in the land of the blind, the one-eyed man is king ...”

Meaning, where none can do something, the one who has even a little knowledge, has the power. Or in other words, because nobody has expertise and know-how to solve a particular sound or vibration problem, the one who can, has the power. The technology of Sorama makes it possible for non-experts (e.g. lower level engineers, management members) to draw the same general conclusions as the expert. Where the expert previously spend 80 percent of time to carry out a measurement in the right way and spend 20 percent in solving the problem and drawing conclusions. Sorama’s technology reduces the time to carry out a measurement (approximately 20 percent), thus more time remains for drawing thorough conclusions and developing radical solutions. Because the acoustic specialist needs other skills and competencies, the experts in the
acoustic field feel themselves threatened and resists to use the hardware and software, even though they admit the technology is great and give them more insights in a particular problem.

In product companies instead (Table 3), teams or employees solving noise and vibration issues are not full-time working on solving these problems. In addition, most of these engineers do not have the same expertise and acoustic background as the noise experts in service companies. Thus they are not typical experts in the field, they work with rather general design rules and technical instinct, like a mechanical development engineer said:

“... we all have a gut feeling of do’s and don’ts in the development of new drivers, but we are not an expert in the field of noise and vibration ...”

The engineer is referring to the fact that noise and vibrations issues occur so now and then, and if they occur a quick solution is required. Or in product development, measuring the acoustic radiation of the new developed product, as part of the Stage-Gate® go/kill decision. In short, product development firms need a trouble-shooter as well as analysis tool. Like the mechanical development engineer continued:

“... if a noise problem occur, we come together as a noise team and try to solve the problem as good as possible, however, any decent analysis of the problem is not happening yet. Due to lacking an appropriate tool, but we would like to build up this competence.”

On the contrary, because consultancy firms solve problems specifically for customers, they only have applications for the Sorama tool in troubleshooting and extra service to their customers. Thus, they do not perform any type of NPD and they are only active in servicing.

Looking at the composition of noise and vibration teams or background of the employee solving noise issues, all have a higher education level in engineering. Depending on the industry, some have more expertise then others. This is mainly related to the frequency of issues, if this is high, these companies has a noise and vibrations team, if this is rather low, these issues are solved by a more general engineering department (e.g. R&D, pre-development, mechanics and physics).

Concluding this section, servicing companies employ high educated, high skilled noise and vibrations experts in order to solve customer specific problems. In doing so, they are using measurement tools as trouble-shooter, i.e. to gain more insights in a certain problem, rather than using it as analysis tool. In product companies instead, an analysis tool and trouble-shooter is required. Because these firms often lack a noise and or vibrations specialist, more insights in a certain problem are required as well as building up general knowledge about noise and vibrations.
4.1.4 Conclusion
Concluding the cross-case analysis of the organisational R&D activities (summarized in Table 3), two types of customers could be revealed. Research-driven and development-driven firms. Whereas the former firms perform research and/or development activities to some extent, they often have more resources available to perform research, hence, developing more radical innovations and paying more attention to a better product and sound design. The latter, are firms developing solutions specifically for customers, resulting in more incremental solutions. In general these two types of firms could be divided in firms offering consultancy services (development driven) and firms developing and manufacturing new products (research-driven).

Concerning the servicing firms, they solve customer specific problems, therefore requiring a trouble-shooting tool. In addition, service firms employ highly educated noise and vibrations experts with a lots of field experience, who might resist to new technologies that require to change their daily way of working. At last, NPD is not performed in these firms, due to the customer specific problem solving.

Concerning product companies, they require an analysis and trouble-shooter tool for designing, developing and manufacturing products, from small consumer goods, to large machines, from the low-end to the high-end, and from low complexity to high complexity. Regarding their NPD process, all firms use projects to develop new product, depending on the product complexity they either use a Stage-Gate®, modular or more general project method to manage NPD.

Lastly, because these firms have different purposes for using the Sorama measurement tool, i.e. for trouble-shooting and analysing versus solely trouble-shooting. Approaching these firms in the same way is impossible. Furthermore, product companies may have planned to execute analyses on their products with respect to noise and vibrations, whereas in servicing firms, customer problems occur unforeseeable and need to be solved immediately. In addition, in servicing firms, the end-consumer pays for the services and hours spend by the specialist. In product companies, the costs are allocated to the development costs of a product. In order to better understand how the firms allocate costs to customers or products, the next section will take a closer look into the cost allocation methods used. But first the procurement process for high-tech products will be addressed.

4.2 Cross-case analysis of the buying behaviour and cost allocation
In the previous section research and development activities of the respondents company were discussed. In order to give a comprehensive advice for Sorama, the second subject of interest was to find out what procurement processes and cost allocation methods the firm’s researched follows.
<table>
<thead>
<tr>
<th>Firm</th>
<th>Type</th>
<th>Product or service</th>
<th>Product complexity</th>
<th>R&amp;D</th>
<th>No NPD projects</th>
<th>NPD process</th>
<th>Dept. or person solving NVH issues</th>
<th>Size of dept.</th>
<th>Application in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1</td>
<td>Product</td>
<td>Acoustical components for industry</td>
<td>Low</td>
<td>D</td>
<td>2-5</td>
<td>Project</td>
<td>Acoustic expert</td>
<td>10</td>
<td>Troubleshooting</td>
</tr>
<tr>
<td>Firm 2</td>
<td>Product</td>
<td>Heating ventilation (in-house)</td>
<td>Low</td>
<td>D</td>
<td>1</td>
<td>Project</td>
<td>Engineering</td>
<td>1</td>
<td>Development</td>
</tr>
<tr>
<td>Firm 3</td>
<td>Product</td>
<td>Ventilation systems</td>
<td>Medium</td>
<td>D (+R)</td>
<td>1</td>
<td>Project</td>
<td>Development</td>
<td>2</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Firm 4</td>
<td>Product</td>
<td>Yacht building</td>
<td>High</td>
<td>D+R</td>
<td>3-4</td>
<td>Modular</td>
<td>Naval Architect + Engineering</td>
<td>15</td>
<td>Troubleshooting and development</td>
</tr>
<tr>
<td>Firm 5</td>
<td>Product</td>
<td>Compressors and blowers</td>
<td>Medium</td>
<td>R&amp;D</td>
<td>many</td>
<td>Stage-gate®</td>
<td>NVH-team</td>
<td>8</td>
<td>Troubleshooting and R&amp;D</td>
</tr>
<tr>
<td>Firm 6</td>
<td>Product</td>
<td>Transmissions</td>
<td>Medium</td>
<td>R&amp;D</td>
<td>10</td>
<td>Stage-gate®</td>
<td>NVH-team</td>
<td>4</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>Firm 7</td>
<td>Product</td>
<td>Vehicle modifications</td>
<td>Medium</td>
<td>D+R</td>
<td>3-5</td>
<td>Stage-gate®</td>
<td>Engineering</td>
<td>5</td>
<td>Troubleshooting and acquisition of more knowledge</td>
</tr>
<tr>
<td>Firm 8</td>
<td>Product</td>
<td>Trucks</td>
<td>High</td>
<td>R&amp;D</td>
<td>1</td>
<td>Modular</td>
<td>NVH-team</td>
<td>2</td>
<td>Troubleshooting and R&amp;D</td>
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<td>Firm 9</td>
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<td>Ships building</td>
<td>High</td>
<td>R&amp;D</td>
<td>many</td>
<td>Modular</td>
<td>NVH-team</td>
<td>2</td>
<td>Troubleshooting and R&amp;D</td>
</tr>
<tr>
<td>Firm 10</td>
<td>Product</td>
<td>Central heating systems</td>
<td>Medium</td>
<td>R&amp;D</td>
<td>5</td>
<td>Stage-gate®</td>
<td>Pre-development</td>
<td>8</td>
<td>Troubleshooting and development</td>
</tr>
<tr>
<td>Firm 11</td>
<td>Product</td>
<td>Rescue equipment</td>
<td>Medium</td>
<td>D+R</td>
<td>8-10</td>
<td>Stage-gate®</td>
<td>R&amp;D department</td>
<td>3</td>
<td>Troubleshooting and development</td>
</tr>
</tbody>
</table>

Table 3: Cross-case analysis of organisational R&D activities
| Firm 17 | Product      | Large conveyer systems | High  | D+R | 10 | Modular | Noise-team | 4 | Troubleshooting and possibly R&D |
| Firm 18 | Product      | Ventilation systems     | Medium | D+R | 8-10 | Stage-gate® | R&D department | 20 | Development |
| Firm 19 | Product      | Printers and presses    | High  | R&D | 10 | Modular | Mechanics / Physics department | 5 | Troubleshooting and R&D |
| Firm 6  | Service      | Consultancy             | n/a   | D   | n/a | n/a | Acoustic expert | 1 | Troubleshooting |
| Firm 11 | Service      | Consultancy             | n/a   | D   | many | n/a | Acoustic expert | 1 | Troubleshooting |
| Firm 12 | Service      | Consultancy             | n/a   | D   | 10 | n/a | Acoustic-team | 11 | Troubleshooting |
| Firm 15 | Service      | Consultancy             | n/a   | D   | many | n/a | Acoustic-team | 10 | Troubleshooting |
| Firm 16 | Service      | Consultancy             | n/a   | D   | 2-5 | n/a | Acoustic-team | 2 | Troubleshooting |

1 Number of NPD projects running simultaneously (on average).
2 Noise, vibrations and harshness. General used term in the field.

Table 3: Cross-case analysis of organisational R&D activities (continued)
One of the main findings are the phases how firms procure measurement tools in general and especially in this study with a hardware/software combination. Another field of interest is how the costs need to be allocated, for instance by project, product or by issues. The importance was already addressed in the previous section. First, the follow section details the procurement phases.

4.2.1 Procurement process phases

Some of the companies were entirely not familiar with low hardware costs and subscription based software. They were used to large investments for measurement tools (> 100,000 EUR) with yearly recurring software licences costs (> 5,000 EUR), depreciating over five to ten years, depending on the lifetime of the product within the company. Due to the high initial investments for both small and large financially strong firms, making a business case was somehow impossible. Basically, only the high-end, research-driven companies are willing to investment in such measurement tools, because they may need such a system to develop radical new innovations. Because Sorama’s philosophy is to enable every firm to solve noise and vibration issues, Sorama offers a measurement tool for a low initial investment combined with a monthly subscription fee, starting from 1,400 EUR in the first year\(^6\). As a result, a low entry level is created which allow to serve a broad target market, ranging from the low-end to the high-end, small to large, research-driven to product-driven, servicing firms to product companies, and more. (More details regarding the Sorama philosophy and intentions with the business model in Section 4.4).

In addition to the unfamiliarity of firms to procure particular measurement tools with a subscription-based pricing model, managers and engineers are also not familiar with the new sound imaging technology and how much value it offers to the company. Whereas proven tools such as accelerometers, decibel meters, spectrogram meters and even stethoscopes are favoured by engineers and specialist because their functionality, capabilities and possibilities are known beforehand. Working with the new Sorama technology demands to develop new skills and competencies. A R&D engineer of a shipbuilding firm stated:

“...although the Sorama technology sounds very promising, using the traditional approaches has our preference, it is faster, results are familiar and know exactly how it works.”

Furthermore, the results of the Sorama tool are presented in a way that also less technical management members could understand the images. Although the images speak for itself, managers and engineers do not directly foresee an application for the technology or how they could use it in their company. More specifically, almost all potentials and cold lead respondents

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\(^6\) IN THE FOLLOWING YEARS ONLY THE SUBSCRIPTION NEED TO BE EXTENDED, COSTS RANGING FROM 100 EUR TO 1,000 EUR A MONTH.
stated they would like to experience the usage, functionality and capabilities of the hardware and software beforehand by themselves or in close cooperation with Sorama (e.g. by means of a training and/or service project). Basically, due to the unfamiliarity and novelty of the system, each respondent argued that proof points are needed first. Thus, the first phase before firms procure one of Sorama’s measurement tools, is to convince managers and engineers that the technology could satisfy a need or solve a problem and has added value for the company.

After the engineers and higher management are convinced of the added value for the firm, the process enters the next phase. In the first place, firms ask for a free-of-charge demonstration of the product and sound imaging technology on one of the firm’s product (nine out of ten times a product with a noise and/or vibration issue). However, Sorama has a policy not to do free demos, due to giving away all the value for free and solving a problem without getting paid. Nonetheless, most times the potential customers have an urgent noise and/or vibrations problem that needs to be solved. Therefore a potential customer has the possibility to make use of a servicing project. This gives the unique possibility to get the urgent problem solved and to see how the Sorama product and technology is working during measurements and analysis. Table 4 shows, before the existing customers procured a Sorama product, they first made use of a service project. Most of the potential customers prefer to also have a service project first, in case a noise and or vibration problem occurs. The cold leads argued it was impossible to state whether they prefer to have a service project first, or to procure a measurement tool without proof points, because they first needed to analyse the applicability of the technology within the company. Concluding, after becoming familiar with the new technology in the first phase, firms would like to examine the usage of the product, the results of the analyses and added value, with a servicing project.

The last phase of the process is the actual purchase of the measurement tool. A distinction exists among the cases when firms have the possibility to procure a system. This research revealed that one of the three criteria, or a more, needed to be satisfied: (1) when the system is required in order to solve a specific problem or a need occurred, (2) the business case is viable, so more money will be gained with the system, and (3) budget is available on the (yearly) department. The next section will take a closer look in the cost allocation methods used. In fact, firms differ in the way how they allocate hardware costs (i.e. camera) and usage costs (i.e. subscription or prepaid fees) to products, projects or department overhead.

4.2.2 Cost allocation of measurement tools
The last field of interest, is the way how R&D teams or engineers need to allocate costs, such as working hours, usage of additional test or measuring tools to projects. Some companies are very
rigorous in accounting every penny to projects, whereas others define a more global cost accounting method. Although every firms in this research had its own way of allocating costs to products of projects, in general five approaches are remarked. But first, the following parts will more closely consider the way how firms prefer to procure the credits.

Table 4 shows that firms differ in the way how they prefer to procure the credits to perform analyses. One remarkable fact is that large, existing firms tend to prefer yearly licenses or packages with some sort of maintenance contract. In addition, they would like to be spared of all sorts of little payments and want their budget prepared and approved at the beginning of the year. A R&D engineer stated:

“In November this year we need to estimate the budget for next year, including all costs for our department. That is, travel costs, secretary, measurement tools maintenance and more.”

Taking a closer look at Table 4 also shows that the other large firm in this study prefers to buy a yearly license. Although it was quite difficult for the potential customers and cold leads to state their preferences, because they were lacking experience. This aspect is at the same time the second finding with regard to procurement preferences for credits. Namely, for potential customers and cold leads, due to their lack of knowledge about the credit-system and pricing model, they were cautions in making statements. Several respondents stated:

“I think it is better to start low level, with prepaid bundles, because it is quite difficult to forecast how many credits we will need...”

This highlights the importance to maintain the low entry level, but also, to try keeping the pricing model as clear as possible and obvious to understand. A misunderstanding in this regard could entail suspicion by customers and potential customers (section 4.3.3. explores this in more detail).

The second topic in the cost allocation subject was to see how firms account a product which is divided into a hardware part (i.e. camera) and the usage costs to operate the hardware and analyse the data. In general four different ways are addressed (Table 4). First, all costs, hardware and usage, were allocated to (yearly) overhead budget of the department. The second method was to buy the hardware on the department overhead and usage costs, such as subscription fees, prepaid bundles and token packages to the project specifically. Thirdly, several firms allocate the hardware costs to the department overhead and usage costs to projects. In more detail, a project dealing with a noise and vibration problem, should procure the hardware on their project budget and allocate the usage costs also to that specific project. Later, other projects are allowed to use the hardware as well (for “free”), but need to procure their own credits and allocate this to the project budget. The last method remarked is allocation of the service project costs to
specific product development projects. In this case a firm has a (urgent) noise and/or vibrations problem that needs to be solved quickly.

4.2.3 Conclusion
This thorough cross-case analysis of the procurement process and cost allocation methods of the companies researched in this study (summarized Table 4), developed an understanding the organisational structures and procedures with respect to procurement and accounting. This section revealed the procurement process for measurement tools follows three steps. The first phase is become familiar with the products and technology. For instance in the sales process by discovering where the technology could gain added value. If both the engineer or specialist and management are convinced the products of Sorama serves a need or solves a problem, nine out ten times, firms prefer to execute a service project. In this case they has the possibility to explore the usage of the camera, to get experienced with the online portal and pricing model, and to examine the results of the analyses of their problem. Moreover, a firm could even better examine added value if the results are promising.

Concerning the cost allocation approaches, four different methods are remarked. Depending on the organisational structure these are: (1) all costs to department overhead, (2) hardware costs to department overhead and usage costs to projects, (3) hardware to one project and usage costs to several projects, and (4) servicing costs to product development.

4.3 Reflection of the analysis to current business model Sorama
In order to give a comprehensive advice to Sorama and to redesign the current business model in the following chapter, first the current business model is analysed. Therefore in this section the analysis concentrates on the business model of Sorama and how this is perceived by customers and potential customers and cold leads. In fact, literature suggests (e.g. Pynnönnen et al., 2012) to develop customer-driven business model. In doing so, a deep understanding of customer needs and preferences is required. In the previous two sections (4.2 and 4.3), the needs are revealed, and hence this section will more closely consider the preferences of Sorama’s broad range of target customers.

The characteristics found in the previous sections are reflected on the current business model of Sorama, this enables to develop a customer-driven business model. Though, first a deep understanding of the preferences is created concerning Sorama’s value proposition, customer relationships activities and channels, and last but not least, the revenue model. Moreover, special attention is given to the perception of the latter, because it is together with the value proposition the heart of Sorama business model. Furthermore, due to the subscription-based pricing model,
<table>
<thead>
<tr>
<th>Firm</th>
<th>Size¹</th>
<th>Type of customer</th>
<th>Service project²</th>
<th>Decision maker(s)</th>
<th>Possibilities to procure tool</th>
<th>Preferred to procure credits as</th>
<th>Allocation of costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 7</td>
<td>Large</td>
<td>Existing</td>
<td>Yes</td>
<td>NVH-team + manager R&amp;D</td>
<td>When required</td>
<td>Yearly license / package: maintenance contract</td>
<td>Hardware to overhead department Usage costs to projects</td>
</tr>
<tr>
<td>Firm 9</td>
<td>Large</td>
<td>Existing</td>
<td>Yes</td>
<td>Engineer + management team</td>
<td>Yearly department budget</td>
<td>Yearly license / package: maintenance contract</td>
<td>Hardware to overhead department Usage costs to projects</td>
</tr>
<tr>
<td>Firm 10</td>
<td>Large</td>
<td>Existing</td>
<td>Yes</td>
<td>R&amp;D-team with CTO</td>
<td>Yearly department budget</td>
<td>Yearly license / package</td>
<td>Overhead of department</td>
</tr>
<tr>
<td>Firm 11</td>
<td>Medium</td>
<td>Existing</td>
<td>Yes</td>
<td>Manager business development + management team</td>
<td>Yearly department budget</td>
<td>Monthly subscription</td>
<td>Overhead of department</td>
</tr>
<tr>
<td>Firm 13</td>
<td>Medium</td>
<td>Existing</td>
<td>Yes</td>
<td>Manager innovation and pre-development</td>
<td>When required</td>
<td>Per usage (prepaid)</td>
<td>Hardware to one project Usage costs to several projects</td>
</tr>
<tr>
<td>Firm 18</td>
<td>Medium</td>
<td>Existing</td>
<td>Yes</td>
<td>R&amp;D manager</td>
<td>When required</td>
<td>License for &gt;5 years (one-time sale) with hardware included</td>
<td>Overhead of department</td>
</tr>
<tr>
<td>Firm 2</td>
<td>Small</td>
<td>Potential</td>
<td>Yes</td>
<td>Engineer + founder</td>
<td>When required</td>
<td>Per usage (prepaid) or rent a system</td>
<td>Servicing costs to product development</td>
</tr>
<tr>
<td>Firm 5</td>
<td>Large</td>
<td>Potential</td>
<td>Yes</td>
<td>NVH-team</td>
<td>Department budget several per year and business case is viable</td>
<td>License with large bucket of credits and divide credits among divisions themselves</td>
<td>Overhead of department</td>
</tr>
<tr>
<td>Firm 6</td>
<td>Large</td>
<td>Potential</td>
<td>No</td>
<td>Acoustic expert + management team</td>
<td>Yearly general budget</td>
<td>Consultancy hours or buy usage afterwards</td>
<td>Overhead of department, recalculated in hourly rate to customer</td>
</tr>
</tbody>
</table>

Table 4: Cross-case analysis of accounting measurement tools
<table>
<thead>
<tr>
<th>Firm 12</th>
<th>Medium</th>
<th>Potential</th>
<th>No</th>
<th>Higher management team</th>
<th>When required</th>
<th>License for &gt;5 years (one-time sale) with hardware included</th>
<th>Overhead of department, recalculated in hourly rate to customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 14</td>
<td>Small</td>
<td>Potential</td>
<td>Yes</td>
<td>Product manager + management team</td>
<td>Yearly department budget or when required</td>
<td>First with prepaid, then yearly license / package</td>
<td>Hardware to overhead department Usage costs to projects</td>
</tr>
<tr>
<td>Firm 15</td>
<td>Large</td>
<td>Potential</td>
<td>No, but preferred</td>
<td>Consultant + management team</td>
<td>When business case is viable</td>
<td>Per usage (prepaid)</td>
<td>Overhead of department, recalculated in hourly rate to customer</td>
</tr>
<tr>
<td>Firm 17</td>
<td>Large</td>
<td>Potential</td>
<td>Yes</td>
<td>CTO + noise team</td>
<td>Higher management approval</td>
<td>Per usage (prepaid)</td>
<td>Hardware to overhead department Usage costs to projects</td>
</tr>
<tr>
<td>Firm 1</td>
<td>Medium</td>
<td>Cold lead</td>
<td>No, but preferred</td>
<td>Management team</td>
<td>When required</td>
<td>Consultancy hours</td>
<td>Servicing costs to product development</td>
</tr>
<tr>
<td>Firm 3</td>
<td>Small</td>
<td>Cold lead</td>
<td>No</td>
<td>Engineer + founder</td>
<td>When required</td>
<td>Consultancy hours</td>
<td>Servicing costs to product development</td>
</tr>
<tr>
<td>Firm 4</td>
<td>Medium</td>
<td>Cold lead</td>
<td>No</td>
<td>Higher management</td>
<td>Yearly general budget</td>
<td>By usage afterwards</td>
<td>Hardware to overhead department Usage costs to projects</td>
</tr>
<tr>
<td>Firm 8</td>
<td>Medium</td>
<td>Cold lead</td>
<td>No, but preferred</td>
<td>Technical manager + management team</td>
<td>Yearly department budget or when required and business case is visible</td>
<td>First with prepaid, then yearly license / package</td>
<td>Overhead department</td>
</tr>
<tr>
<td>Firm 16</td>
<td>Small</td>
<td>Cold lead</td>
<td>No, but preferred</td>
<td>Management team</td>
<td>When required</td>
<td>Per usage (prepaid)</td>
<td>Overhead of department, recalculated in hourly rate to customer</td>
</tr>
<tr>
<td>Firm 19</td>
<td>Large</td>
<td>Cold lead</td>
<td>No, but preferred</td>
<td>R&amp;D manager + mechanical designer</td>
<td>When required</td>
<td>Yearly license / package</td>
<td>Overhead of department</td>
</tr>
</tbody>
</table>

1. Size of company (not of researched unit, but of entire business).
2. Servicing project performed in the past.

Table 4: Cross-case analysis of accounting measurement tools (continued)
which is quite new in the measurement tool industry and for high-tech innovations, developing a fair-use pricing model that suits customer’s preferences is essential.

4.3.1 Value Proposition

The value proposition is the reason why customers buy from one company over the other, it solves a problem or satisfies a need (Osterwalder & Pigneur, 2010). Therefore knowing how customers perceive the value offered is essential, in the first place to check whether it really satisfies a need or solves a customer problem, and secondly, is the developed product or service used in the way as it was designed for. In this particular situation, where the offered value proposition is developed to support research and development activities of a customer, the value proposition will be closely examined by R&D managers and engineers. Especially questions like, “what’s in it for us” tend to be requiring, or has this new measurement tool all the capabilities to solve current problems and what are the advantages over traditional measurement tools. All respondents stated that the Sorama hardware and software is better than the products offered by competitors. A noise and vibration engineer of a truck manufacturer stated:

“... we compared all the acoustic camera’s and other noise and vibration measurement tools and bought the Sorama system. It has more capabilities, functionalities and is cheaper than all the rest.”

Also all the respondents were very positive about the sound images. Due to its intuitively understandable presentation, thirteen of the respondents admit the images could be used as a marketing tool to gain more business. In addition, three already used the Sorama sound images and Sorama brand for marketing purposes. Moreover, this is strongly related with the presence of a unique selling point (USP) for sound and vibrations. In some industries and firms, noise is surely important and a better sound design of a product enhances more business due to an USP in noise and vibrations. A product manager of rescue equipment motivated:

“In our industry, noise is a stress factor, for sure. Our end-users (fire-men, rescue workers) are working in an extreme stressful environment, where life and death are lying very close to each other. For example, if medics are able to communicate calm with the injured patient and with the firemen due to lower ambient noise, this will reassure the wounded and could save lives in the first place. Therefore we try to develop products that has the lowest sound radiation possible and use this surely a USP.”
On the contrary, some of the respondents were very critical concerning the value offered. Most of the critique was caused due to the online computing of the data, especially consultancy firms had difficulties with this. They perform measurements on customer’s sites (e.g. offshore) where a decent internet connection is not always assured. For product companies this is less of an issues, because they normally execute measurements in their lab or test facilities. On the other hand, all respondents were aware of the advantages of the cloud-based computing: always staying up to date of the latest features, fast bugs fixing, possible to enter the portal and perform measurements from every computer or device with internet connection at every location worldwide.

Concluding, the value proposition offered by Sorama is in broad lines appreciated by customers. Although small bugs and problems occur so now and then, customers appreciate the way Sorama is dealing with these problems in a fast and agile manner. In addition, the customers also understand that the cameras and the online portal are still improving and are being developed to a more mature and stable platform in the long term.

### 4.3.2 Customer Relationship & Channels

A strong value proposition is essential, reaching customers through a strong relationship with the right channels, deeply influence the overall customer experience. However, one way or the other, every customer would like to feel themselves special and prefers some sort of attention. Therefore, a good customer relationship is from utmost importance to entice them to pay for the value offered. Although Sorama is a product supplier and software as a service supplier, most of the potential customers and cold leads thought Sorama is a servicing firm. A R&D manager asked during a sales pitch by a Sorama sales representative:

“... are you a servicing company, who a firm can call in case a noise and/or vibrations problem occur? Or are you product distributors? Because this is not really clear for me...”

Another interesting finding was to see how customers and potentials think how far the technology was developed. More specifically, the technology and product are constantly being developed. So potentials who have seen the technology and products on an exhibition or a tradeshow, or customers who have been serviced by Sorama in the past, may have seen a less developed product than it is nowadays. This was clearly stated by a NVH-engineer:

“I didn’t knew the technology was in already in this state, the last time one of Sorama’s consultants did a service project with us, it
was somehow a band-aid solution, though very accurate and precise, but you really improved your product.”

Also other respondents in interviews responded they did not know the technology was already that far developed and new front-ends were launched the past years. In addition, all respondents argued they were really interested, but somehow the launch of the latest features, front-ends and developments never reached their attention.

4.3.3 Revenue Streams

If customers comprise the heart of a business model, revenue streams are its arteries (Osterwalder & Pigneur, 2010). Meaning the revenue streams represent the cash a company generates from each customer, and ensure a firm can survive, pay bills, loans, taxes and more. It is essential to know for what value customers are really willing to pay and how much. In this regard, Sorama adheres a fear-use policy, i.e. if the proposition delivers lots of added value for the customer, they pay more than if it delivers less value. This strategy is appreciated by all respondents, like an experimental testing engineer of a large automotive company stated:

“... the Sorama philosophy is quite nice: offering hardware and software for a low entry level and paying roughly when a customer gains a lots of added value with it ... “

Together with the new (sound imaging) technology, also the pricing scheme, by means of a prepaid bundle or a subscription type, is quite new for the industry. As mentioned before, firms are used to procure particular measurement tools for a high initial investment. Instead, Sorama offers their measurement tool for a low initial investment together with a subscription ranging from approximately 100 EUR tot 1,000 EUR a year7. In this way a high-tech technology becomes affordable for a large group of firms. Also, due to the subscription based model, customers become locked-in to the system and portal, which makes it possible for Sorama to perform big-data analysis for advising customers and to improve the product itself in the long-term. An R&D manager motivated:

“... you want to turn away from the concept: a customer buys your tool and meaning the end of the relation, unless the customer would like to buy a new device or upgrade ... “

The latter statement highlights that customers and potentials appreciate the way how Sorama is trying to build up a relationship with their customer, instead of earning a lots of money in an often long-shot, one time-sale. Although firms are often careful with subscription-based models or

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7 MORE DETAILS CAN BE FOUND IN THE PRICING LIST IN APPENDIX B
locking-in into a company and becoming depend, all respondents in this research appreciated how Sorama tries to establish close relationships with their customers.

The philosophy of Sorama is to charge customers who gain more added value than customers those who gain less added value. However, the current pricing model has some drawbacks and mismatches with the organisational structure and procedures of Sorama’s existing and potential customers. The following section will consider the mismatches more closely.

4.3.3.1 Complexity

A pitfall of the subscription based pricing scheme, is its complexity. First, there are four different front-ends a customer can choose, then the customer selects one out of three subscription types, and at last the customer can add additional token packages, i.e. support. On top of that, depending on the profile of the customer, four different profiles exist. These profiles differ in monthly credit raise and buffer size. All the different terms, profiles and constructions tend to be complicated to understand for customers\(^8\). A R&D manager of a HVAC company said:

“Don’t make the subscription constructions and possibilities too complicated, our financial guys need to understand this as well.”

Or like an experimental test engineer of a large automotive company stated:

“... maybe the term subscription could cause some issues with our financial department. If you offer something recognizable, for example licenses with maintenance and support, our purchaser is familiar with this, because other firms also use these terms.”

Remarkable to say, these statements were given by existing customers, they have experienced the pricing model and still it is somehow complicated and fuzzy for them. Moreover, also potential customers and cold leads argued that the model was fuzzy and complicated. During the interviews and sales process, several times potential customers asked for more insight information because they did not fully understand the pricing. In addition, also for the sales representatives it was quite harsh to convince the (potential) customer of the pricing in detail, due to all the variation and flavours possible.

4.3.3.2 Monthly payment and rewarding

Another complaint that was recurring, is the monthly payment and rewarding of credits. In almost all the companies in this research, monthly paying a bill was out of question. Moreover, all companies had yearly budgets, just like the department that makes use of the measurement tools.

\(^8\) SEE APPENDIX B FOR THE PRICING LIST AND APPENDIX L FOR THE USER PROFILE OPTIONS
For example, at the end of the year, the research or engineering department has to give an overview of the expected costs for next year, depending on the company this includes software licenses, measurement tools, secretary and more. If the budget is accepted, requests during the year for more budget are out of the question, only in very urgent and important cases, some money could become available.

In line with this are the ambiguities of the monthly credit rewarding and four different buffer sizes. In more detail, customers receive a monthly credit raise and have the possibility to save unused credits with a maximum buffer. Depending on the expected usage profile, four different types of buffers can be selected. These buffers were created after a R&D manager of a HVAC company stated:

“... thus, if I don’t use the tool often and not spend credits monthly, I dump them in the Maas”

Nonetheless, the creation of four different buffer types, cause ambiguity about the crediting system, pricing model and more. During sales pitches often the analogy with phone subscriptions is taken as a simple example, but also this caused ambiguity and misunderstanding. This was clearly stated by an engineer of a maritime company:

“... do you work with the same principle as a telecom firm? If you don’t use all your minutes that month, you lost them? Or can you save your credits for the other months?

The reason why the naval architect asked these questions and the frustration of the HVAC R&D manager situated before, has a deeper underlying uncertainty. Mainly, firms do not exactly know beforehand when they are going to need the measurement tool. Because analysing products by means of sound and vibrations during development, differ from time to time and from company to company. For example, in one month a company has a critical problem which needs lots of measurements and analyses to solve the problem. If a firm runs out of credit due to this problem in that particular month and has to wait until the next month for new credits, this will induce annoyance and frustration. Off course companies have planned measurement weeks, but this can deflect a week or two weeks. In addition, they never know how many credits they need to solve a particular problem beforehand. A R&D engineer of maritime company stated:

“The last thing you want, is running out of credits. Off course you can notice this beforehand, but sometimes not ...”

The R&D engineer continued:

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9 FOR MORE INFORMATION SEE APPENDIX L

10 THE HVAC FIRM IS CLOSELY LOCATED AT THE MAAS, ONE OF THE THREE LARGESTS RIVERS IN THE NETHERLANDS.
“... in the situation really a lot measurement are performed running out of credits becomes unforeseeable.”

Furthermore, especially for potentials and cold leads it was quite unclear how often they would use the measurement tool. Therefore, advising them in the right subscription type, with a proper monthly credit raise and buffer size is somehow impractical. On top of that, firms do not like to pay for something they will never use, like the R&D manager of HVAC firm stated above.

In addition to the above, prepaid packages are rewarded immediately after payment with an expiration time of three months. Hereafter, the prepaid credits are lost as well as the access to the Sorama portal. An experimental testing engineer argued:

“It is not really nice we lose our access and data after three months, after all we paid for the credits, added value to our project and Sorama received their money, we didn’t even used all our credits...”

This statement also clarifies firms have difficulties with some constrains regarding the pricing model, and subsequently with the business model.

4.4 Conclusion of Analysis

Literature suggest firms need to develop customer-driven business models (Thomke & Von Hippel, 2002; Pynnönen et al., 2012), i.e. business model innovation with a deep understanding of customer’s needs and preferences (Chung et al., 2004; Doz & Kosonen, 2010; Teece, 2010; Osterwalder & Pigneur, 2010). Therefore, the aim of this chapter was to identify characteristics of Sorma’s customers and to analyse the current business model of Sorama. The subsequent aim was to find out what are mismatches between the initial business model and the customer needs and preferences (Table 5). In addition, this chapter also answered the sub-question two and three.

Concerning the second sub-question, what are the needs and preferences of Sorama’s customers, the cross-case analysis revealed the firms researched could be categorised according their organisational R&D activities (section 4.1Table 3). Resulting in two types of firms, research-driven and development-driven firms. Whereas the former are firms with dedicated research available to perform research in NPD, resulting in more radical innovations. The latter develop solutions specifically for customer problems, resulting in incremental innovations. Furthermore, the analysis exposed the procurement process for Sorama’s products and services follow several phases (section 4.2). In addition, four cost allocation methods for the procurement and usage were remarked (section 4.2.2).

Concerning the third sub-question, gaining thorough knowledge of the initial business model of Sorama was the starting point of the analysis. Next, the findings of the cross-case analysis
were reflected to the current business model (section 4.3), resulting in a deep understanding of the current state of the business model. That is, the current business model is not fully in line with preferences and needs of Sorama’s customers. Moreover, it uncovered several mismatches (Table 5), which are the breeding ground for the redesign in the next chapter.

Table 5: Mismatches between the current business model and customer characteristics.

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\[\text{Simplified representation of the business model}\]
5. Redesign

Sorama’s initial business model is quite radical in the measurement tool market in the first place, and second for high-tech radical innovations, i.e. offering a high-tech product for a low initial price with a subscription-based pricing model. The data analysis revealed several mismatches (Table 5) exist between the current business model and Sorama’s customer needs and preferences. This chapter is the heart of the advice for Sorama and comprise all the gained knowledge of the cross-case analysis, detected patterns and regulations, and pre-developed business model alternatives into a redesign of Sorama’s business model. Moreover, this section present the answer to the last sub-question, what business model can be designed for Soroma to serve the broad range of different customers. Resulting in a customer-driven business model.

The starting point of the redesign was to develop solutions for the mismatches (section 4.4) per building block, i.e. customer segments, revenue streams, customer relationship and channels. Finally in the last section, these different alternatives are compromised and translated into a customer-driven business model design (Figure 6).

5.1 Customer Segmentation

Sorama did not clearly segmented their customers into specific segments, due to the start-up phase of the firm and ongoing development of the product, a large customer base did not exist to reflect on. After creating a deep understanding of the customer characteristics in the previous chapter, it is now possible to categorise the customers and also potential customers and cold leads into four segments: (1) servicing customers, (2) customers with own Sorama system, (3) consultancy firms, and (4) co-development partners (see Figure 6). The first segment, are customers that make use of the Sorama services, the have a urgent noise and/or vibration problem that needs to be solved quickly. The second segment, are firms having their own Sorama system to perform noise and/or vibrations analysis themselves, and if needed order token packages to get assistance from one of Sorama’s consultants. The next segment, consultancy firms, have also a measurement system to perform noise and/or vibrations analysis, however these consultancy firms carry out measurement for their customers, i.e. Sorama’s third-party customers. The last segment are co-development partners, these firms improve their products by inserting the Sorama technology, or customers that help to develop new applications and features. This last customer segment group was not in the scope of this research.
5.2 Value Proposition

The data analysis revealed the value proposition offered by Sorama satisfies a customer need and/or solve a customer problem. The current value proposition could be described as a new for detecting sound and vibrations via cloud computing. Nonetheless, few complaints regarding the current value proposition were revealed after the cross-case analysis (see Table 5 in Section 4.4). Therefore Sorama should develop offline possibilities and mention the marketing capabilities of the Sorama tools more specifically.

Concerning the offline possibilities, it was remarked that users and potential customers have few complaints with regard to the online computing of the measurement data. However, without the online computing and online platform, supplementary advantages such as being always up-to-date, fast bug fixing, access from every device with internet connection and more, are impossible. Furthermore, customers value the supplementary advantages over the constraints of the online computing. Nonetheless, in order to serve their customers better, Sorama’s development team should develop a possibility to have some sort of offline computing or offline measurement possibilities.

Concerning the marketing capabilities of the Sorama tool, they were not mentioned in the initial business model, hence, it is specified in the redesign. In the data analysis it became clear for consultancy firms in particular, and other firms where noise reduction is highly important (e.g. rescue industry, HVAC industry), using Sorma’s sound images for marketing purposes tend to be a powerful tool to gain more business. However, only after mentioning the possibilities and presenting an example, the respondents became aware of the powerfulness and usefulness. Therefore Sorama should mention the marketing capabilities more explicitly, with as end result to add more value to the proposition of Sorama’s customers.

In addition to the above, this clarifies Sorama’s customers are not fully aware of all possibilities and capabilities of the value proposition. Therefore, the next section will present the redesign for the customer relationship and channels block.

5.3 Customer Relationship & Channels

In addition to the above, the interviews revealed current customer relationships and channels of Sorama’s business model were not fully developed in order to reach all the broad variety of (potential) customers. First, this section concentrate on the relationship. The existing online community and influence on the roadmap and are highly preferred by the current customers. However, as mentioned above, Sorama’s customers are not fully aware of all the capabilities of the sound imaging technology. In addition, due to the high-tech technology, it was frequently
asked if the technology will be difficult to work with. In addition, the possibilities and functions of the front-ends were often misunderstood. In order to obviate this, Sorama should develop online case-studies. These are published measurement examples to help potentials and customers to create a feeling of what is possible and impossible with the technology and sound cameras. More specifically, for customers it could be used as an instruction manual to perform measurements and to get the better results. For potentials it could be seen as an introduction in the Sorama sound imaging technology. Furthermore, a sales representative could give an exiting potential customer a one month access to the portal in order practice with some of the case studies and to get familiar with sound imaging technology. Moreover, this could become an argument in the sales process to entice the customer to buy the product after one month of practicing.

Another mechanism to build a strong relationship with customer is the online community, by means of a forum. Customers can post comments, remarks, difficulties and one of Sorama’s consultants will answer these posts. A supplementary mechanism would be an expert panel, with (as the name implies) a group of specialist and experts in the field who are invited by Sorama. They congregate every two to three months to discuss new features and to discover new capabilities of the technology and products. Yet another tool to lock-in customers, could be personal settings and personal company profiles in the portal. Hereafter, a platform is created which enhances the customer and the uses experience.

5.4 Revenue Streams

The revenue streams, that is the subscription-based pricing model, are the arteries of the business model of Sorama, it creates a cash flow to pay bills, loans, taxes and more. Furthermore, for a start-up is essential to grow-out the start-up phase and become mature, for example with capital realised by sales. Therefore a well-thought pricing-mechanism is important. One of the findings of the interviews was the aversion to the monthly payment and the monthly rewarding of credits, due to yearly budget and account management, monthly payment was out of question. In addition, firms did not really had structured time schedules and moments to perform measurement, and lose credits if they do not use the system enough. At last, the pricing model was found very complex and difficult to understand by customers and potentials. Therefore, the redesign propose a more understandable modular pricing model, which enables the customer to select the best subscription package that corresponds to their needs and preferences.

Although the heart of the pricing model remains the same, i.e. a subscription based model, the structure is slightly different. As shown in Figure 5 the sales process is remained quite the same. First, a customer select one of the four front-ends. Then the customer choose a membership
depending on the expected amount of credits needed. Next, a firm add one or multiple credit package(s) which fit within the buffer size of the membership. At last, a firm can select any support package. For a complete overview of the revenue stream model see appendix M.

With respect to the characteristics explored in the cross-case analysis of this study, it was remarked that customers and potentials were struggling with the monthly rewarding and monthly payment structure. Therefore the redesign of the pricing model was renewed according to these characteristics. Resulting in a modular pricing model. This will enables every customer, small to large, research-driven to development driven, consultancy firms to product companies, to select a subscription model that fits their needs and preferences. In addition, the modular set-up also allow customers to increase or decrease their membership type for a longer period, or to add an extra credit package if necessary. Remarkable to say, due to the development of an easy to understand pricing model the prepaid omitted. Moreover, these bundles caused the most ambiguity in the initial model. At last, several package deals are created to entice customers to select one of these

![Figure 5: Redesign of Sorama's pricing model](image)

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5.5 Proposed Renewed Business Model

The final result of this study was to propose a renewed business model to Sorama (shown in Figure 6) with respect to the customer needs and preferences. Besides, this renewed business model it is also the answer to the last sub-question. Because the focus of this research was on Sorama’s customer needs and preferences, only the right-hand side of the Osterwalder business model canvas (Osterwalder & Pigneur, 2010) is improved. Whereas the previous sections detailed the improvements per building block separately, this section will examine the relations between the building blocks customer, proposition, channels and relationships, and revenue streams.

Starting with customer segmentation, grouping Sorama’s customer based on their needs and preferences regarding their R&D activities, enables to target customers more specifically to satisfy a need and to solve a problem. In order to reveal the value proposition satisfies a need or solves a problem, Sorama need to constantly monitor how customers perceive the proposition offered. If Sorama’s development team is able to translate these preferences and needs into viable applications for the product and service, this enhances the customer experience, creating more pleased customers. In order to monitor customers, Sorama’s sales representatives need to talk closely with customers to build up strong relations and after-sales with excellent services are inevitable. In addition, an expert panel and customers influence on the development roadmap could help to reveal more applications of the technology. Reaching customers will be a matter of direct sales, supplemented with Sorama website and portal. Attending to exhibitions and tradeshow is still of major importance to create awareness among potential customers. Lastly, Sorama has several revenue streams: hardware sales, subscription fees, expert token, training fees, contracted research and consultancy services with high margins (e.g. no-cure / no-pay). The latter is specifically for the first customer segment, these customers has an urgent noise and vibration issue that need to be solved quickly. Due urgency of the problem, Sorama should ask high consultancy prices, in fact, lots of added value is created for the customer. The revenues from the hardware, subscription and expert tokens are settled in the redesign of the pricing model. Which allows every customer to select their own package, based on their needs and preferences.

Concluding, the outcome of this study was to develop a business model for Sorama in order to serve a broad range of customers with different needs and preferences. Resulting in a customer-driven business model. Besides, this result is also the practical aim of this project, as well as the answer for the last sub-question. After answering all the sub-questions, it should now be possible to answer the main research question, which will be considered more closely in the next chapter.
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6. Discussion & Conclusion

This chapter presents the conclusions of this research project. Firstly, the main research question will be answered. Secondly, the theoretical contributions of the research results will be discussed. Thirdly, the managerial implications will be outlined. And finally, limitations of this research will be presented in combination with suggestions for future research.

6.1 Research Question

The objective of this research was to answer the main research question: how could a firm innovate their business model to serve and to attract a broad range of customers? In order to answer this question, four sub-questions have been posed. These sub-questions were all answered in the corresponding chapters of this thesis. Based on the findings of these sub-question the main research question will be answered. The findings of this research that have contributed to the existing literature and managerial implications will be considered more closely in the following sections.

Comprising all the information and insights gained from the previous sub-questions, this research pinpoints how a firm could innovate their business model to serve and attract a broad range of customers. The result is a customer-driven business model innovation process for companies offering a product and service for R&D and consultancy applications to a broad range of customers. The process consists out of the following three steps.

The three-step process starts by creating a deep understanding of the customer characteristics in two ways: 1) customer needs and preferences, 2) procurement process and cost allocation method. First, creating a deep understanding in the customer needs and preferences will explore in which way the high-tech innovation satisfies a need or solves a problem, and how much value could be gained by the customer in doing so. Moreover, the deep understanding enables a firm to segment customers into groups specified by their needs, organisational structures and R&D activities. Because value is perceived subjectively by customers, and customers are not homogeneous, different customer segments perceive different values within the same product and service which need to be approached differently. Therefore, specified customer relationships and channel mechanisms per segment are required.

Secondly, a firm needs to concentrate on the customer’s procurement process and cost allocation method for their (measurement) systems. These two subjects will explore how customers are organised in terms of their financial and buying structure, processes and procedures. It also enables a firm to develop a well-thought revenue mechanism considering all
the different customer characteristics. This is essential to reach a broad range of customers. In fact, besides attracting customers with an excellent value proposition, a company needs to serve customers as best as possible in order to entice customers to pay for that value.

Thereafter, the last step in developing a customer-driven business model is to create a modular revenue mechanism that consists out of several modules ranging in price, functionalities and capabilities. For example by creating a low-priced module with basic functionalities, a high-priced module with extensive functionalities and something in between. This resulted in a small initial investment and low entry level for customers. Moreover, it enables every customer to select a module suitable to serve their needs, preferences and wallet. In addition, this takes away risks at the customer side caused by the unknowingness of the added value for the customer. This unknowingness lies in the fact that the added value of the product or service needs to be validated first by means of proof-points. For example this could be prevented by publishing online use-cases, followed by offering a service project at the customer’s side.

6.2 Theoretical Implications
The contribution that this research offers to the existing literature lies in business model innovation. More specifically, this research adds to the existing high-tech start-up and technology commercialisation theory. Although business model innovation and technology commercialisation both are widely discussed and well-written down in many books and scientific articles (e.g. Blank, 2006; Christensen, 1997; Shane, 2004; Song et al., 2008), this research created more insights due to analysing the process of business model innovation in a high-tech start-up with a high technological product and service. This resulted in a process for business model innovation concentrating on customer’s organisational R&D activities and procurement processes. Thus, this research contributed by validating the current customer-driven business model innovation process initiated by Pynnönen et al. (2012) in another industry and revealed three extensions to the current process: (1) to concentrate on R&D activities and procurement processes, (2) a process for business model innovation with respect to the customer R&D activities, processes and procedures, and (3) to suggest a modular revenue model.

Concerning the validation of the existing framework, this research contributes to the existing literature by validating the initial customer-driven business model innovation process in another, more stable industry, without constantly changing customer needs. The initial process focused on customer demand based change in the turbulent and evolving ICT-industry (Pynnönen et al., 2012). Which could be characterized by constantly changing customer needs and preferences due to the short product-life-cycle and fast development of new technologies.
Moreover, the framework was developed by means of a case study in an ICT-service provider company. This research concentrated on a case study with more stable customer’s needs and preferences regarding a product (i.e. measurement tool) in a high-tech start-up industry.

In addition, this research contributes to existing customer-driven business model innovation process with three extensions. The initial process follows four stages: (1) how customer needs and preferences align with value proposition; (2) business model innovation based on customer needs; (3) customer survey to validate new business model; (4) fitting the business model to customer needs. The current process lacks a clearly specification of the important customer needs and preferences drivers, hence, this researched better specified the first two stages. In the first stage by suggesting to concentrate on organisational R&D activities and procurement processes. Sebsequently, in the second stage to describe a process of business model innovation with respect to the customer R&D activities, procurement processes and costs allocation methods revealed in the first stage. Lastly, this research also extended the current process by suggesting a modular revenue model to enhance a better business model fit with regard to the customer needs and preferences (stage 4). Resulting in a customer-driven business model suitable for every customer.

6.3 Practical Implications

The results of this study have important practical implications for technology and innovation managers. More specifically, this research has several practical recommendations for Sorama.

Sorama developed a high-tech innovation that could have added value for a broad range of customers, from the low-end to the high-end, in different industries and with different sizes. However, the initial model had some mismatches with the needs and preferences of the customers (more information in section 4.4). Therefore, based on the studied customer needs and preferences, an improved business model is developed and recommended to Sorama. The first and most important advantage for Sorama is that the renewed business model could serve the broad range of customers. Because customers were not clearly defined at the start of emerging the company, the initial business model lacked a thorough understanding of the customer needs, hence, the redesign is developed specifically towards the customer needs and preferences. Secondly, the revenue model has become much more simple and easy to understand than the initial revenue model. Moreover the set-up of the revenue model is agile and leaves room for future improvements. At last, the renewed model is developed to lock-in customers to some extent by close customer relationships (such as expert panel and user cases). Thus, the first recommendation for Sorama is to adopt the new business model.
A subject that was not addressed is the commercial feasibility and profitability of the redesign. Although these values could only be researched over-time, specific recommendations could help to enhance the long-term success and profitability of the redesign. Therefore, it is of utmost importance to clearly state the ground rules of the business model as well as the revenue model very specifically. Managers and engineers will try to seek the loopholes to benefit themselves. Rules such as switching costs or constraints to a higher or lower membership need to be very clear from the beginning. Therefore, this research suggests to imply the new pricing with a FAQ, so customers and potentials can read the ground rules and find answers.

Moreover, sales representatives should constantly monitor if the new pricing mechanism is developed in the right way. That is, tracking if the current prices fit in the market. Although (in)direct competitors of similar measurement tools operate with different pricing models (i.e. high premium prices) it is quite difficult to uncover the market fit of the model. However, constantly monitoring the pricing model should reveal if the overall prices are set too low or too high, and adapt the pricing model if required.

Furthermore, Sorama should think about how to let sales representatives work with the new business model. In fact, they are the persons that talk with customers and build up relations. Moreover, they need to uncover when customer needs and preferences are changing. In fact, this researched developed a customer-driven business model for Sorama, hence, the business model will probably benefit if Sorama stays in close contact with (potential) customers and tries to uncover their (latent) needs. Accordingly, they also need to report this back to management and the development team, and finally, adapt the business model if major changes are revealed.

The last recommendation is to develop a simplified representation of the business model and present this to customers and potential customers. For example to shown on trade shows or during sales pitches. Sorama should make a video wherein they describe the product and service, applications of the technology, and show examples wherein the Sorama technology solved an urgent problem or created a lot of added value for a customer. Furthermore, a video which creates a visual of Sorama’s philosophy, how customers started with a service project became successful customers with their own measurement system, and an explanation of the revenue model (with practical examples). Lastly, Sorama should ask if customers would like to cooperate to publish success stories online to build up references in different industries.

Besides, this research has also more general practical implications for technology and business managers in the field. First of all, by providing a practical and meaningful approach for
customer-driven business model innovation based on customer needs and preferences. Moreover high-tech start-ups or technology entrepreneurs should pay more attention to the proposed process. Accordingly, the suggested process described in this research may also help other entrepreneurs to sell a high-tech R&D product to a broad range of customers. In fact, other start-ups with the same kind of products or other high-tech innovations could benefit by using the same approach described in this research, i.e. concentrating on customer needs and preferences and developing a business model that is specified towards the customers. Thus, the proposed process may help entrepreneurs commercialising a technology by giving extra guidelines for finding a proper business model with customer influence, and maybe enhance success on the long-term.

6.4 Limitations and Future Research

The current research effort should be interpreted with some limitations in mind. These limitations result in suggestions for future research.

First of all, the proposed process of creating a customer-driven business model is developed by means of data collected in a high-tech start-up. Particularly, the research setting was formed by Sorama that offers a high-tech product for R&D and consultancy applications, hence, this makes this results of this research firm-specific. However, other start-ups with a high technological product will probably have similar struggles to commercialise a high-tech innovation and to find a proper business model, they could benefit from this research by following the same approach. Although it has to keep in mind that a case-study approach was used, this research aimed to generalize the findings of this researched. In fact, this study researched a broad range of customers which differ in organizational strategy, industry and size, and therefore use different organisational structures, procurement processes, R&D activities, ect. Nonetheless, it would be worthwhile to validate and test the process in other industries and firms. For example future research should be conducted in other industries with less specific characteristics, or corresponding research in other not high-tech firms.

Secondly, the proposed process is developed by means of thorough theoretical support, but is not tested in practice. In order to establish the functioning of the process, the suggested customer-driven business model should be implemented and monitored. Since this monitoring should be done over the longer-time to measure its long-term effect on business success, the validation of the framework could not be performed within the scope of this research. Future research could be directed at examination of the process by means of long-term performance tracking. For example by concentrating on the long-term effects by means of more sales, higher revenues, and profits. In addition, it could also be worthwhile to measure the long-term effects
with the help of customer inputs. For example by validating the new business model with an
analysis of customer experiences. This could be done in focus groups or with questioners among
customers. Remarkable to say, this should also be one of the tasks of the sales representatives, i.e.
reviewing if the current business model is still suitable to serve the broad range of customers, and
improve and adapt the business model if required.

Thirdly, it would be interesting to research other variables that have some kind of influence
on the business model. For example, this study did not researched how sales representatives
should work with a business model that is developed so nimble towards the customers. Future
research could be conducted to reveal how sales employees experiences such a business model.
In addition, researching the best practices how to communicate a customer-driven business model
to the customer, could reveal more insights in doing so.

Another variable that could be interesting to research more closely, are the price points of
the subscription-based revenue model. In redesign the prices are set based on the costs plus
margin. However, this research did not studied what the value of this margin should be. For
example, this could be measured by a large quantitative study whereby the tipping-point (i.e. the
point at which a customer buys a product or not) of customers are researched. Moreover, this
quantitative study could also take a closer look in the customer differences in strategy, size and
procedures linked to the tipping-points. At last, a large quantitative study among customer could
give more insights on the perception of a subscription-based revenue model. Thus, future research
should study how much customer are willing to pay for a high-tech product/service and uncover if
setting higher or lower prices for a subscription based pricing model could bring more revenues
and profitability in the long-term.

Lastly, this research concentrated at a firm that tries to serve a broad range of customers
and is not active in a specific market segment or niche market. However, literature suggest to
segment the market in specific groups and target the highest profitable segments. In addition,
customer segmentation refers to the process of dividing customers into groups by their values,
needs, preferences and other factors in the circumstances of clear organisation strategies and
business models (see for example Kotler, 1996). The approach of Sorama and associated new
business model is to serve a broad range of customers. Therefore, tracking the business success of
Sorama over a longer-time should expose if the approach of not segmenting customers and trying
serve and attract a broad range of customers is profitable.
7. References


Appendixes

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A similar technology is a heating-camera, this technology shows where heat is emitted. The Sorama technology offers the same insights for sound and vibrations.
PREPAID BUNDLES EXPIRE AFTER 3 MONTHS

SEE APPENDIX B FOR PRICING LIST

This section has been removed because it contained confidential information.
This section has been removed because it contained confidential information.
Appendix B: Pricing list 2014

This section has been removed because it contained confidential information.
## Appendix C: Key words used for literature research

<table>
<thead>
<tr>
<th>Key word(s)</th>
<th>Web of Science # of articles</th>
<th>Science Direct # of articles</th>
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<td></td>
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<td>896,812</td>
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<td>High tech start up</td>
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<td>255,016</td>
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<td>Business model transformation</td>
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<td>New business model</td>
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<td>239,872</td>
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</table>

Table 6: Search Strings used for literature research (due date: July 2014)

Trying to find the highest-quality articles available, some selection criteria were set up front. First, to ensure the latest articles were selected and due to recent attention in research for business model innovation the search field is narrowed with a timespan between 1994 and 2014. Within every search lead, the first 50 articles results were scanned. Following the approach of Randolph (2009), to separate the potentially relevant from the obviously irrelevant studies, the title was read. After the title draw attention and seems to be interesting, the abstract was read. This resulted in a large set of useful articles at first glance. Then, these articles were pre-scanned by reading the introduction, viewing the general content and conclusion and/or discussion. When the obviously irrelevant have been identified and discarded, it was possible to determine which remaining articles will be included. By means of snowballing technique, additional articles could be gathered that provided more insight into the subjects of interest. By means of snowballing-technique additional articles could be gathered that provided more insight into the subjects of interest.
# Appendix D: Selected literature and quality ranking

<table>
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<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Journal</th>
<th>Impact factor(^{16})</th>
<th>ABS ranking(^{17})</th>
</tr>
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<tr>
<td>Andries &amp; Debackere</td>
<td>2007</td>
<td>Adaption and performance in new businesses: understanding the ...</td>
<td>Small Business Economics</td>
<td>1.641</td>
<td>3</td>
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<tr>
<td>Amit &amp; Zott</td>
<td>2001</td>
<td>Value creation in e-business</td>
<td>Strategic Management Journal</td>
<td>2.993</td>
<td>4</td>
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<tr>
<td>Amit &amp; Zott</td>
<td>2010</td>
<td>Business model innovation: creating value in times of change</td>
<td>Working paper</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Blank</td>
<td>2006</td>
<td>The four steps to epiphany – successful strategies for products that win</td>
<td><em>Book</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cavalcante, Kesting &amp; Ulhoi</td>
<td>2011</td>
<td>Business model dynamics and innovation: (re)establishing the ...</td>
<td>Management Decision</td>
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<td>1</td>
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<tr>
<td>Casadesus-Masanell &amp; Ricart</td>
<td>2010</td>
<td>From strategy to business models and onto tactics</td>
<td>Long Range Planning</td>
<td>2.111</td>
<td>3</td>
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<tr>
<td>Chesbrough &amp; Rosenbloom</td>
<td>2002</td>
<td>The role of the business model in capturing value from innovation</td>
<td>Industrial and Corporate Change</td>
<td>1.330</td>
<td>3</td>
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<tr>
<td>Chesbrough</td>
<td>2007</td>
<td>Business model innovation: it’s not just about technology anymore</td>
<td>Strategy and Leadership</td>
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<tr>
<td>Chesbrough</td>
<td>2010</td>
<td>Business model innovation: opportunities and barriers</td>
<td>Long Range Planning</td>
<td>2.111</td>
<td>3</td>
</tr>
<tr>
<td>Demil &amp; Lecocq</td>
<td>2010</td>
<td>Business model evolution: in search of dynamic consistency</td>
<td>Long Range Planning</td>
<td>2.111</td>
<td>3</td>
</tr>
<tr>
<td>Doz &amp; Kosonen</td>
<td>2010</td>
<td>Embedding strategic agility: a leadership agenda for accelerating business model renewal</td>
<td>Long Range Planning</td>
<td>2.111</td>
<td>3</td>
</tr>
</tbody>
</table>

\(^{16}\) ISI Web of Knowledge

\(^{17}\) ABS Ranking:

- 1 - Recognized standard;
- 2 - Well-regarded journal;
- 3 - Highly regarded journal;
- 4 - Top journal.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Journal/Media</th>
<th>Score</th>
<th>Rank</th>
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</thead>
<tbody>
<tr>
<td>Giesen, Berman Bell &amp; Blitz</td>
<td>2007</td>
<td>Three ways to successfully innovate your business model</td>
<td>Strategy and Leadership</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Johnson, Christensen &amp; Kagermann</td>
<td>2008</td>
<td>Reinventing your business model</td>
<td>Harvard Business Review</td>
<td>1.831</td>
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<tr>
<td>Markides &amp; Oyon</td>
<td>2010</td>
<td>What to do against disruptive business models</td>
<td>MIT Sloan Management Review</td>
<td>1.803</td>
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<tr>
<td>Mitchell &amp; Coles</td>
<td>2003</td>
<td>The ultimate competitive advantage of continuing business model innovation</td>
<td>Journal of Business Strategy</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Moore</td>
<td>2014</td>
<td>Crossing the Chasm: Marketing and selling disruptive products to mainstream customers (3rd. ed.)</td>
<td><em>Book</em></td>
<td></td>
<td></td>
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<tr>
<td>Osterwalder &amp; Pigneur</td>
<td>2010</td>
<td>Business model generation</td>
<td><em>Book</em></td>
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<td>Pohle &amp; Chapman</td>
<td>2006</td>
<td>IBM’s global CEO report 2006: business model innovation matters</td>
<td>Strategy and Leadership</td>
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<td>Richardson</td>
<td>2008</td>
<td>The business model: an integrative framework for strategy execution</td>
<td>Strategic Change</td>
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<td>Sosna, Trevinyo-Rodríguez &amp; Velamuri</td>
<td>2010</td>
<td>Business model innovation through trial-and-error learning</td>
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<td>3.807</td>
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</table>

Table 7: Selected literature and quality ranking
Appendix E: Business model canvas definition

The Osterwalder Business Model Canvas, as presented in Figure 7 is used in this study to represent a business model framework. This model is described through nine building blocks that show the logic of how a company intends to make money. In the next section, each segment will be briefly described based on the book of Osterwalder & Pigneur (2010).

The **customer segments** block defines the different groups of people or organisations a company aims to reach and serve. Customers form the most important block of the business model; without profitable customers no company will survive for long. In order to better satisfy customers, first by grouping them in segments with common needs, behaviours or other equal attributes. Then a company choose which segment to serve and which segment to ignore. Another possibility is to serve multiple customer segments, sometimes with very different needs and problems. At least, after carefully deciding with segment or segments to serve, the company can design the business model around a strong understanding of the specific customer needs.

The **value propositions** block describes the bundle of products and services that create value for a specific customer segment. Basically, it is the reason why customers buy for that company over another, it solves customer problem or satisfies a customer need. The delivered value consists out of bundle of products and/or services that fits the needs of the customer segment targeted. A value proposition creates value for a customer segment through a distinct mix of elements catering to that segment’s needs.

The **channels** forms the link between the value proposition delivered and the customer segments. Communication, distribution and sales channels compromise a company’s interface with customers.

The **customer relationship** block describes the types of relationships a company establishes with specific customer segments. A company could choose for several categories which could be employed simultaneously, for example co-creation, personal assistance and self-service.

The **revenue streams** represents the cash a company generates from each customer segments. It is the price customers would like to pay for the value delivered. A business model can involve two different types of revenue streams, transaction revenues from one-time customer payments or recurring revenues from ongoing payments. A company can use several ways to generate revenue, e.g. asset sale, subscription fees, licensing.

Every business model requires **key resources** which describes the most important assets required to make a business model work.
The **key activities** of company use these assets and allow a company to create and offer a value proposition, reach markets, maintain relationships with customer segments and earn revenues. The resources can be physical, financial, intellectual or human.

The network of suppliers and partners that make the business model work, are described in the **key partnerships** block. At least, the **cost structure** describes the most important cost incurred while operating under a particular business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs. Such costs can be calculated relatively easily after defining key resources, key activities and key partnerships.

Figure 7: Business Model Canvas (Osterwalder & Pigneur, 2010)
Appendix F: Four-stage framework for customer-driven business model innovation

Figure 8: The process of developing and managing a customer-driven business model (derived from Pynnönen et al., 2012)
Appendix G: Business model innovation process during design phase

This figure has been removed because it contained confidential information.
Appendix H: Interview protocol (in Dutch)

Hebt u er bezwaar tegen dat ik het gesprek opneem? De zaken die tijdens dit gesprek besproken worden zullen vertrouwelijk gerapporteerd worden.

Introductie interviewer

Mijn naam is Thijmen Braem, master student Innovation Management aan de TU/e, en op dit moment afstudeerder bij de vakgroep ITEM (Innovation, Technology Entrepreneurship & Marketing). Hiervoor heb ik een HBO werktuigbouwkunde gestudeerd, daar merkte ik dat meer affiniteit had met de commerciële aspecten van technologie dan de keiharde techniek zelf.


Introductie onderzoek

In master project bij Sorama ga ik onderzoeken hoe een bedrijf zijn businessmodel kan innoveren door te kijken naar verschillen en overeenkomsten tussen customersegmenten. Met het product en de technologie van Sorama is het mogelijk om grote, high-end bedrijven te bereiken, maar ook kleine (MKB) bedrijven en alles wat er tussenin zit. Echter, al deze verschillende customers hebben verschillende bedrijfsstructuren, strategieën en processen om dergelijke meetapparatuur in te kopen.

Om een breed spectrum aan customers te kunnen bedienen, wil ik onderzoeken hoe een bedrijf (in dit geval Sorama) hierop in kan spelen.

Introductie interviewde:

Na een introductie van de interviewer en het onderzoek, wordt begonnen met het stellen van vragen. Allereerst worden er persoonlijke vragen aan de interviewde gesteld:

- Wat is uw rol binnen het bedrijf?
- Wat is uw achtergrond?
- Wat is uw historie binnen het bedrijf, welke andere functies heeft binnen het bedrijf vervuld?
“IJsbreuk” vragen over perceptie van product en Sorama:
- Vanwaar interesse in technologie en product van Sorama?
- Kunt u een inschatting maken over de functionaliteit van het product?
- Ziet u hierin voor- en nadelen?

Desk research bedrijf X:
- Hoe ziet de geschiedenis van het bedrijf eruit?
- Wat doet het bedrijf? Is het serviceverlener of maakt het producten?
- Hoe groot is het bedrijf? Hoeveel werknemers? Internationaal? Meerder locaties?
- Wat is de structuur van het bedrijf? Platte structuur? Ge(de)centraliseert?
- Wat zijn de belangrijkste inkomsten van het bedrijf?
- In wat voor markt speelt het bedrijf? Een gestabiliseerde of opkomende markt?
- Op dit moment klant van Sorama?
- Wat voor soort front-end + abonnement + support packagge?
- Hoe in contact gekomen met Sorama, pilot-cam? Out of the blue?
- Wat voor meetsystemen ze gebruiken ze op dit moment?

--------------------------- Start real interview questions ---------------------------

R&D: Geluid & Trillingen
- In welke mate speelt geluid en trillingen een rol in uw producten?
- Hoe wordt dit gemeten en geanalyseerd? Door welke personen / afdelingen?
- Welke meetsystemen heeft u op dit moment in gebruik?
- Bevallen deze systemen welke inzichten geven deze systemen?

- Hoe zou een reductie in geluid en trillingen een USP kunnen zijn t.o.v. concurrenten?
- Hoeveel waarde wordt er gecreëerd als geluid en trillingen eenvoudiger worden opgelost?
  kunnen worden? Sterkere marketing positie? Beter product?
- Welke afdelingen / personen houden zich bezig met geluid en trillingen en hoe worden deze
  ingezet in de organisatie? Bijv. projectmatig, op inhuur basis, ect.
- Hoe vaak zijn geluid en/of trilling problemen aan de orde?
- Wat is de gemiddelde doorlooptijd van een project of ontwerp en hoe is de verdeling van tijd
  over verschillende werkzaamheden?
- Hoe moeten zij hun gemaakte kosten, uren verantwoorden, declareren?
Beschikken deze mensen / afdelingen over eigen budgetten die ze zelf mogen besteden? (ordegrootte?)

Vanaf welke ordegrootte moeten aanbestedingen aangevraagd en goedgekeurd worden?

Wanneer en hoe vaak kunnen budgetteringen aangevraagd worden?

**Inkoop**
- Welke meetsystemen worden op dit moment gebruikt?
- Hoe worden deze ingekocht / betaald?
- Wat voor soort en welke software licenties worden op dit moment gebruikt?
- Hoe worden deze ingekocht / betaald? Is dit per maand, half jaar, jaar, meerdere jaren?
- Zijn er service- of onderhoudscontracten voor deze systemen?
- Hoe worden op dit moment systemen / apparatuur icm licenties ingekocht / betaald?
- Zijn er begrotingen / budgetteringen om meetsystemen in te kopen?
- Hoe worden deze begrotingen opgesteld? Wordt dit over de lange termijn (5 jaar of meer) gepland of meer over de korte termijn gepland (1 jaar vooruit)?

**Ideaal business model**
- Proberen te achterhalen wat voor het bedrijf de meest ideale methode zou zijn om bijv. een camera te kopen. Hoe zij dat het liefst zouden doen, wat het beste past bij hun organisatie.
- Hoe zou de camera ingezet worden? Voor troubleshooting als de eindgeluidswaarden bekend zijn? Of op fumo/prototypes tijdens het ontwerpproces? Maandelijks of op projectbasis?
- Hoe zou u meerdere camera’s willen gebruiken? Op één of meerdere locaties / afdelingen?
- Wat zou de ideaalste manier zijn om meetsystemen of dergelijke apparatuur aan te schaffen?
- In welke vorm, licenties / abonnement / one-time sale?
- Hoe inkopen / betalen? Maandelijks / per kwartaal / halfjaar / jaar.
- Vooruit credits kopen of achteraf gebruikte credits betalen? Verschil in prijs.
- Wat zouden hierin de voordelen zijn van een abonnement vorm?
- En de nadelen?

**Testen verschillende business modellen**
- Het pre-designed business model testen. Aan het eind met behulp van een tool kijken of dit voldoet aan klant zijn wensen.
- Zou een lease-constructie een optie zijn?
- Full-flex model: achteraf betalen per credit en een lage abonnement kosten? (een soort van prepaid model, maar hogere kosten per use)
- Corporate model: meerdere systemen, multi-user/location, één grote credit-pot? Jaarlijks betaling
- Unlimited: 1 systeem, 1 user/location, onbeperkte credits. Veel voordeel bij veel gebruik.
- Andere opties......

Afsluiting

- Introductie van mini-Cam
- Wat zou hiervoor een prijs zijn?
- Bij serieuze interesse, mogen jullie dan aanmelden voor de nieuwsbrief?
## Appendix K: List of firm names

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Appendix L: User profile credit options

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Appendix M: Redesign of pricing model

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