NHH

Healthcare got smart:

The effect of smart technology on business models in the Norwegian healthcare industry

A qualitative exploration

Åse Mari Månum Hidem & Stine Wennberg Vintervoll

Supervisor: Tina Saebi

Master Thesis in Marketing and Brand Management & Strategy and Management

NORWGIAN SCHOOL OF ECONOMICS

Preface

This master thesis is one of a series of papers and reports published by the Centre for Service Innovation (CSI). Centre for Service Innovation (CSI) is a coordinated effort by NHH to focus on the innovation challenges facing the service sector and involves 15 business and academic partners. It aims to increase the quality, efficiency and commercial success of service innovations and to enhance the innovation capabilities of its business and academic partners. CSI is funded through a significant eight year grant from the Research Council of Norway and has recently obtained status as a Centre for Research-based Innovation (SFI).

Acknowledgements

Åse Mari Månum Hidem   Stine Wennberg Vintervoll

Abstract

The healthcare industry is faced with significant challenges such as urbanization, an aging and growing population and scarce labour resources. To comprehend with these challenges, companies are now providing *smart healthcare* solutions that take use of advanced technology to deliver higher quality services. Despite increased interest in this novel field from industry, scientific literature on smart health is limited. Furthermore, research on smart health from a business perspective remains unexplored. Thus, the question arises how technology affect business models in healthcare, and how mangers can design their business models to become smart. We aim to address this questions by a two-step approach. First, we categorize a sample of 52 smart health companies in the Norwegian market, according to the main features of their business model. Second, based on a multiple-case study with eight in depth-interviews, we generate archetypes of emerging business models. Further, we reveal the motivations, strengths and challenges related to each model.

We have generated four types of smart business models in the Norwegian healthcare industry: *The Inverted Razor-Blade*, *the One-time Payment*, *The Long-term Subscription*, and *The Platform*. Additionally, we generated two sub-models within the *Long-term Subscription* model and *the Platform model*. To successfully create and maintain a business model founded on smart technology, the thesis provides several important contributions: Companies must tailor value propositions to specific customers and deliver it through secure software channels. Further, managers should employ a structure for revenue and costs that ensures long-term profits and reflect plans for global scaling.

By using a business model framework, this thesis contributes to the emerging field of smart health, and we contribute to close the scientific gap on the intersection of smart health and business model literature. Further, we provide managers with a roadmap for making a company smart. The study also serves policy makers with novel insight on several key factors for decision making. We present a thorough and highly relevant literature on the effect of smart technology on business models, and the motivation, strengths and challenges of the emerging business models.

Keywords: business model, business model innovation, smart health, healthcare, e-health, m-health, smart city**,** value proposal, value delivery, value capturing, customer segment.

Contents

List of figures and tables

Figures

Tables

**"Up until recently, health and medicine was basically
a hit or miss affair (…) All of that has now changed,
and will dramatically change clinical practice by the early 2020s".**

Inventor and Futurist at Google, Ray Kurzweil (2013)

1   Introduction

1.1 Background

The aim of this thesis is twofold: First we aim to understand how smart technology has led to the emergence of new business models in healthcare, and second, to assess the motivations, strengths and challenges of these innovative models.

Businesses have always changed with time, but digitalization has accelerated the pace at which they reshape (Loebbecke & Picot, 2015). While some industries embrace the opportunities of digitalization and various advanced technology, others lag behind. One industry that is particularly struggling to incorporate smart technology, is the healthcare industry. Smart technology can be seen as technology that consists of advanced, intelligent, and tailored software that is enabled by the Internet of Things (IoT). Aue, Biesdorf, & Henke (2016) emphasize that healthcare companies do understand the necessity of smart technology such as IT-enabled services and digital platforms, but often struggle to unlock the full potential of technology. Aue et al (2016) further propose that this struggle is the result of top managers not knowing how to structure their business model in a way that incorporates the technology.

The inability to successfully incorporate smart technology into business models is an untimely challenge. Technology could very well be the potent medicine that the healthcare industry needs in order to maximise the use of scarce resources. According to Ray Kurzweil, an inventor and futurist at Google, the shift from classical to advanced technological healthcare enables the industry to double its capacity annually for the same cost (Kurzweil, 2013). This dramatic improvement could solve some of the largest operational challenges in healthcare today: An aging population, urbanization, shortage of workforce and rising medical costs (Farahani et al, 2017).

Even the resilient and highly developed welfare state of Norway is facing operational challenges. Norway must find novel ways of delivering high quality healthcare services for an aging and growing population in order to meet both present and future demands. Today, there are 650 000 Norwegians over 67 years of age, while the number is estimated to hit 1 million before 2030 (Visma, 2017). This forecast creates a pressing need to either increase the volume of healthcare workers, or change the business models in the industry. The time sensitive

situation is particularly challenging because the business models are traditionally dependent on professional workers who are required to complete years of education and training. The race against time and growing healthcare demands are highlighted by The Norwegian Minister of Health and Care Services, Bent Høie (2017):

"We are completely dependent on great ICT solutions if we are
to succeed in creating a health service for the future".
Bent Høie, Norwegian Minister of Health and Culture

Implementing digital or smart technology can have a positive impact on several stakeholders in the industry. For healthcare workers, technology can contribute to efficiency in the workplace. Simultaneously, patients can become more empowered and involved when it comes to taking care of personal health. Patient involvement can also increase the chances of staying in good shape and live longer at home. This benefit not only private citizens, but also the Norwegian economy which becomes more sustainable. If Norway adopts welfare technology that enables 15-25 % of individuals to stay at home instead of moving to an institution, the state can save 12-20 billion NOK in 2030 (Visma, 2017).

However, these benefits are only attainable if practitioners understand how take advantage of the possibilities that smart technology brings. Today, Norwegian managers do not seem to fully understand the constant need to stay updated on the latest technological innovations in order to understand the marketplace. A cross-industry survey completed by CEOs of 500 Norwegian companies in 2017 highlight this misconception. 88% of top management believe that the Norwegian society will face great challenges in the years to come as a result of the development in technology (Opinion, 2017). However, only 1% believe that lacking understanding of technology among top management is going to be a problem in that regard. The survey concludes that Norwegian leaders have mixed feelings about digitalization and a future heavily affected by technology.

Arguably, there are two main obstacles for providing smart healthcare: (1) There is a lack of a clear conceptualization of the emerging types of smart business models that managers can adopt, and (2) there is a knowledge gap when it comes to understanding the motivation, strengths and the challenges that characterises the different business models. To address these issues, we have identified emerging business models within the healthcare industry. The aim of

this thesis is to contribute to a better understanding of how companies can successfully provide healthcare services with the help from smart technology.

1.2 Gaps in literature

While there is an increasing interest in business models, Saebi, Lien & Foss (2016) point out that there is little knowledge on how firms adapt their business models in response to external threats and opportunities. Technology is an external factor that affects all industries, and it is problematic that we do not know how such a disruptive externality impact business models. This is especially evident in the healthcare industry, where technology can help to efficiently solve the mentioned challenges with innovative solutions. Consequently, it is important to gain knowledge about the different ways companies can incorporate novel technology to their advantage. Additionally, little is known about the motivations that triggers the creation of companies within smart health. We have therefore chosen to explore the effect of technology on business models, by identifying emerging business models in smart health.

There is limited research on several key aspects of business models and smart health: (1) the emergent types of business models within smart health and (2) how they create, capture and deliver value to customers. In addition, there are few scientific articles exploring the (3) strengths and challenges of the various models, and finally (4) the driving force and motivations of existing smart health companies.

In addressing these questions, we provide a comprehensive analysis of different business models for smart healthcare in Norway. First, we propose a typology of several business models designs, and describe how each of them create, deliver and capture value. This may be beneficial to incumbents as well as to companies wanting to become smarter, as it serves examples of what smart business models might look like. Second, we address the strengths and challenges related to each model. With this information, firms are better equipped to choose the right model based on their own resources. Furthermore, the framework may benefit policy makers. By creating awareness around smart business models and their motivational factors, policy makers can facilitate laws and regulations to encourage smarter healthcare. From a scientific point of view, the study contributes to the unexplored field of smart health, as it contributes to the body of knowledge within an emerging area. The thesis further contributes to

the stream of business model research that explores the impact of external factors on business models.

1.3 Research question and outline of the thesis

To address the gaps in the literature, we intend to answer the following research question:

**"How does smart technology affect the emergence of new business models
in Norwegian healthcare, and what are the motivations, strengths
and challenges of these models?"**

To address our research question, we will first start with an understanding of smart health, and how this novel field is shaping the healthcare industry. We will review the existing literature, going from classical to smart health. Next, we will examine the evolution of business model literature, and provide an overview of business model concepts and definitions.

The methodology section describes the research design and strategy for our analysis. Through an explorative and qualitative design, this part will explain the step-by-step sample and data collection process followed in this thesis. Additionally, it focuses on the ethical aspect and the credibility of the parties interviewed, and the research conducted in general.

LITERATURE REVIEW

Chapter 2:   Chapter 3:
Smart health   Business models

METHODOLOGY
Chapter 4:
Reviewing the literature.
Data collection and multiple-case study
with nine interviews.

ANALYSIS AND FINDINGS
Chapter 5:
Present emerging business models
in smart health

DISCUSSION AND CONCLUSION
Part 6:
Discussion of findings, theoretical
and managerial implications.
Present limitations and future research.

Figure 1: Outline of the thesis

Following, we will discuss the findings and the analysis resulted from the studies and interviews. First, we will provide four archetypes of business models designs, along with four additional sub-models. We further elaborate on the strengths and challenges related to each

model. Second, we present the managers' motivations and inspirations, backed by eight in-depth interviews with smart health companies. Additionally, we provide a general review of the challenges and obstacles for business models in smart health, based on insight provided by companies interviewed as well as from the one in-depth interview with Innovation Norway.

We will conclude our thesis with a discussion focused on the main findings of our study and the implications these findings may have for managers and policy makers. Further, we will highlight the theoretical contributions of our study to the existing literature. Finally, we will discuss the limitations of the thesis and recommendations for future research.

1.4 Boundaries of the thesis

We limit our thesis to the Norwegian healthcare industry, more specifically to the smart health segment. In our thesis, we define *the smart health segment* as the market for health care products and services that are built on advanced technology. By *advanced technology* we mean technology that incorporates the Internet of Things (IoT) and Information Communication Technologies (ICT). In addition, we are only considering the organizational aspects of business models, despite other aspects being equally important (e.g. economic effects).

2 Literature review – Smart health

To answer our research question "how does technology affect business models in healthcare", we will in this chapter give a brief overview of the evolution of technology in healthcare. First, we will clarify and define key concepts ranging from classical healthcare to electronic health and mobile health. Second, we define the concept of smart cities, which is the backdrop of smart healthcare services.
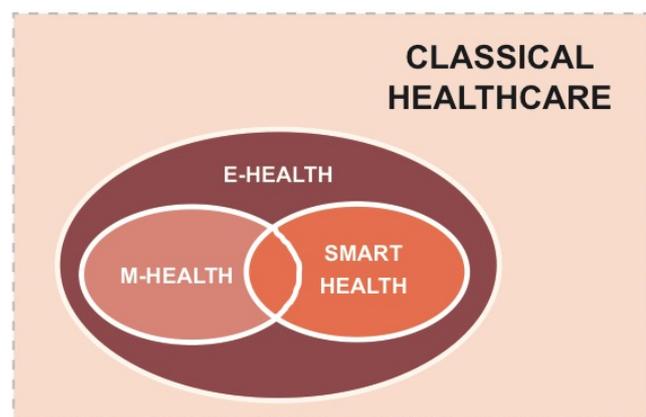
Figure 2: Key concepts of technology in healthcare. Solenas et al (2014)

2.1 Classical, electronic and mobile health

A classical healthcare service can be described as the process of a patient visiting a general practitioner's office, where the service provided involves traditional tools that do not engage in ICT (Solenas et al, 2014). As disruptive technologies, such as the Internet of things (IoT), started to impact on the health industry, an emerging field in the intersection of medical informatics, public health and business appeared. This field is known as *electronic health* (e-Health)(Pagliari et al, 2005). Unlike the traditional healthcare systems, e-health uses ICT, electronic health records (EHR) and databases to store medical information of patients (Solenas et. al, 2014). E-health is considered to be a silver bullet in the healthcare industry due to the reduced costs of using electronic equipment, its increase in efficiency and consequently better quality services for patients (Eysenbach, 2001).

Even though e-health as a concept has only been in use for a few years, there is already a broad range of variability of its definition, and there is a lack of consensus regarding the meaning of the term. The majority of the working definitions emphasize the use of networked information and communications technologies, in their conceptualization of e-health. Primarily this is concerned with the internet and digital data, hence differentiating e-health from the broader field of medical informatics that incorporates "harder" technologies. Pagliari et al. (2005) argues that most definitions of e-health conceptualize the term as a wide range of medical informatics applications for facilitating the delivery and management of healthcare. A broad definition is further given by Eysenbach (2001, p.2) who argues that e-health is "an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies". Mettler & Eurich (2012) indicate that e-health should not be confused with selling drugs on the internet, which is a rather good example for the era of digital commerce. It is not an (intangible) health service that is in focus, but the supply of a physical product. Eysenbach (2001) states:

"In a broader sense, the term e-health characterizes not only a technical development, but a way of thinking, an attitude, and a commitment for networked, global thinking to improve health care locally, regionally, and worldwide by using information and communication technology." (p.2)

In the last decade however, mobile health (m-health) has expanded as a part of e-health, becoming a revolution on its own. Two major achievements have contributed to the evolution of m-health in general. First, the launch of 3G led to great advancement of cellular networks and data services, and further led to improvements for the first m-health applications. Second, Apple's introduction of the iPhone in 2007 started a new era for the smartphone, thus paving the way for mobile applications (Istepanian &Woodward, 2003). Considered a branch of e-health, m-health is broadly defined as "the use of mobile computing and communication technologies in health care and public health" (Free et al, 2010). M-Health has enabled medical services to be delivered through mobile communication devices, which according to Solenas et al (2014) redefined health care by giving access to a number of services in a personalized way from anywhere at any time. An example is how a patient may renew his or her prescription from his or her mobile phone, or someone on vacation having a video conversation with their doctor at home through a smartphone.

Eysenbach (2013) argues that mobile technology has great potential for health care applications, because mobile applications have the potential to reach large audiences. Mobile applications can serve a variety of purposes, such as weight loss, physical activity, smoking cessation, and disease management. Eysenbach further emphasizes that the biggest advantages of using mobile devices for health, are that the devices are intelligent, connected, personalised and always with people. Therefore the devices can serve patients in different circumstances such as in recapitalization, during hospitalisation or in everyday life. Studies has also shown that the use of mobile technology can improve diagnosis as well as patient information, and improve administrative efficiency (Sherry & Raztan, 2012). For instance, text messaging reminders of e.g appointements to patients can improve service delivery. Even though the advances in m-health are significant, it is still in its early stages and is evolving in parallel to two other promising concept; smart cities and smart health.

2.2 Smart city – The origin of smart health

Like e-health and m-health, smart cites are also founded on ICT, and they include many automated systems that enable citizens to use different advanced services in order to manage cities, and enables a dialogue or direct feedback loops that improves the daily use of applications and the needs for citizens (Pramanik et al, 2017). Smart cites invest in ICT to equip the community with technological infrastructures able to support ambient intelligence,

and foster social responsibility for the environment (Solenas et al, 2014). Despite the increased interest in smart cities from both industry and academia, the concept lacks an established definition (Solanas et al, 2014). Still, definitions and descriptions are seemingly converging towards the same core elements in both business and academia. The government owned organisation for innovation in Norwegian enterprises, Innovation Norway, defines smart cities as "how urban life can be improved through the use of information and communication technologies with involvement, integration, good infrastructure, health, green urban planning, energy efficiency, transport and waste systems" (Innovation Norway,2017). Similarly, academia provides the definition by Caragliu (2009) which has been expanded in Pérez-Martínez et al. (2013, p.56).
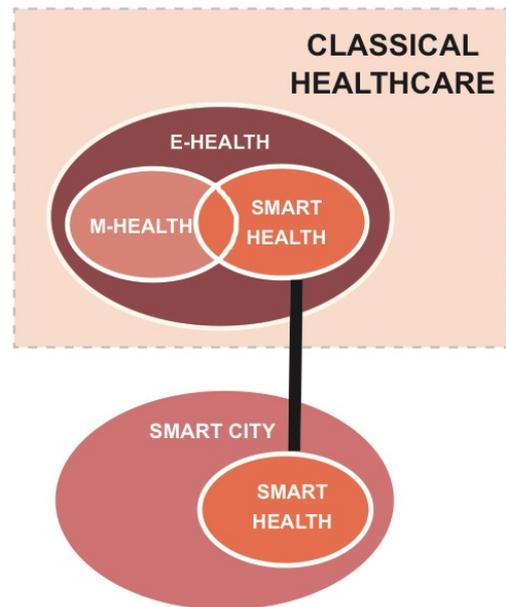
Figure 3: Key concepts of technology in healthcare seen in relation to smart city. Solenas et al (2014)

"Smart cities are cities strongly founded on information and communication technologies that invest in human and social capital to improve the quality of life of their citizens by fostering economic growth, participatory governance, wise management of resources, sustainability, and efficient mobility, whilst they guarantee the privacy and security of the citizens."

Pérez et al. (2013)

2.2.1 Smart health

In a paper by Pramanik et al (2017), smart health is recognized as one of ten important fields that will play a key role in making a city smart. Smart cities are helping the health industry to become smarter by increasing the usage of highly technological equipment. Pramanik et al (2017) believe that these systems can support the digital collection, processing, storage, transmission and sharing of citizen information. In addition to improving the management and communication in the health industry, ICT and intelligence plays an important role when it comes to creating preventive, predictive, personalized and participatory healthcare systems (Röcker, Ziefle, & Holzinger, 2013, p.1-17). In sum, the infrastructure and technology of smart

cities can be argued to be reconstructing the thinking behind the existing healthcare systems (e.g. m-health, e-health), creating a new concept called smart health (Pramanik et al, 2017). Smart health is a relatively new concept, and can be viewed as the natural synergy between m-health and smart cities (Solenas et al, 2014). Merely 107 scientific papers addressing this field was found when searching for 'smart health' or 'smart healthcare' on Scopus, one of the largest databases in the world for peer-reviewed literature (Scopus, 2017ab). So far, existing research has largely focused on describing and defining the novel concept, with varying degrees of precision. Since the new trends and disruptions in the healthcare industry are still in the early stages of becoming a research field, similar names and definitions co-exist to describe the overall change. The different names are being used interchangeably, and we aim to clarify their common meaning.

Among the more general descriptions, Pramanik, Lau, Demirkan & Azad (2017) believe that smart health is an intelligent healthcare service enabled by IoT), which operates in the intersection of business, public health and medical informatics. Clancy, as referred to in Pramanik (2017), offer another interesting remark concerning the overall concept of smart health: In addition to the technology element, here referred to as ICT (Information and Communication Technologies (Christensson, 2010), smart health involves a new mindset and approach to how connected entities and intelligent agents are used to improve the healthcare industry. Espelien &Dyrstad (2017) identifed that smart companies in the health and welfare sector can be characterized as firms developing IT-services for the health industry, or introducing technology that has not previously been used in any considerable degree in the sector before. In addition, they argue that products and services can consist of both general security solutions (e.g. smart house technology) and technology tailored to the needs of one individual (e.g. sensor-based warning systems). We consider Smart health to be healthcare systems that use ICT and IoT to improve the quality and efficiency of healthcare, and choose to use the definition given by Solenas et. al (2014)

"The main goal for smart health is to promote health to a higher position within society in a distributed, private, secure, efficient, and sustainable way by reusing the principles m-health and smart cities in a convergent new paradigm of ubiquitous health."

Solenas et al. (2014)

2.3 Gaps in literature on smart health

As the study of smart health is still evolving, existing scientific literature has primarily focused on clarifying fundamental aspects of the concept and defining the phenomena as a paradigm within smart cities. In the literature, we have not found any scientific articles combining the two concepts smart health and business models, indicating that the study of smart health from a business perspective remains unexplored. We found a few articles studying business models in e-health companies, but majority either explore this concept in a largely theoretical fashion, or consider the concept of smart health and business models that are not fully developed, as most of the research dates back to the beginning of year 2000. There are a few attempts to study the intersection of business models in e-health on a more analytical level (e.g. the design based approach for analysing e-health business models described by Mettler & Eurich, 2012), but the research does not study the effects of external factors, and looks at business models from a static view. Additionally, there is no research on the motivation driving smart health companies forward that we know of.

We believe that the scientific gap of a business perspective in smart health is important to address. The previously described challenges that the healthcare industry is facing, demands smarter solutions provided by companies, and laws and regulations that benefit these companies so that they can thrive. Hence, it is crucial that both managers and policy makers become aware of what smart business models in healthcare look like. As there is a vast variety in the services that smart healthcare companies provide, not all companies create, deliver and capture value in the same way. We therefore expect that there will be different types of business models in smart health. To examine this gap, we will study smart health from a business perspective. We will take use of a theoretical framework for business models, which we will develop in the next chapter.

3 Literature review - Business models

To further answer our research questions: *"How does technology affect business models in healthcare",* we will make use of a business model framework. In this section, we will first give a general overview of the business model concept, and second discuss different contributions and research streams. Due to the lack of a concerted definition of the concept "business model", we will lastly provide our own definition and framework. We will be use our definition and framework to analyse and compare different smart health models, and study how new technologies affects business models.

3.1 Business models

Business models have always been a core element of economic activities, but the concept has not gained significant attention as a research field until the last decade (Teece, 2010). During the 2008-2017, 3893 documents addressing 'business model' in their title have been published (Scopus, 2017c). This is a significant increase in popularity compared to the previous decade, when only 864 articles were published on the same subject (Scopus, 2017d). Business model research has gained greater significance with advancing technological development over time. This may be due to the creation of electronic businesses. Business models are no longer merely seen as operative plan for creating suitable information systems, but also as an integrated part of the company organization. This has benefitted and contributed to the successful management of decision-making (Wirtz, Pistoia, Ullrich, Göttel, 2016).

Despite an increased interest from both industry and academia with numerous publications on the topic, researchers have not been able to agree on a common definition of what business models are (Zott, Amit & Massa, 2011). Scholars even claim that the concept of a business model has no established theoretical grounding in economics or in business (Teece, 2010). In this section, we aim to clarify what business models are by presenting the different research streams and the leading definitions to date. We will further point of the gaps in the existing literature, and explain how the thesis will contribute to the research field of business models.

3.2 The four research streams on business model literature

The business model concept has served multiple purposes over the last decade. It can be viewed as a source of competitive advantage (Zott et al, 2011), as a classification tool (Lambert & Davidson, 2013), as an explanation to enterprise performance (Amit & Zott, 2010) and as a new way of innovating within the business itself (Teece, 2010). As a *Competitive advantage,* Teece (2010), among others, emphasize how business models can be a source of competitive advantage. Without a well-developed business model, innovators will struggle to either deliver - or capture- value from their innovations (Teece, 2010). As a *classification tool*, companies are divided into homogeneous groups based on their main business model features. This type of categorization has been largely employed due to the widespread of the internet. The internet has made it increasingly important to understand the value drivers of business models (Amit & Zott, 2001) as it has raised essential questions about value delivery to customers and how value is being captured by business (Teece, 2010). In our thesis, we will study business models as both a competitive advantage and a classification tool.

Recently there has been increasing consensus among scholars on the importance of *business model innovation* (Lambert & Davidson, 2013.). Business models can be viewed as a source of innovation that can improve the performance of companies (Lambert & Davidson, 2013). Teece (2010) is one of the researchers that has studied business models with regards to innovation. He emphasises that a well-developed business model needs to be adjustable to change. To be successful over time, companies must strive to continually develop their business models, as markets, technologies and structures change. For example, online healthcare services can be argued to be a form of business model innovation. By providing healthcare services online, these firms redefine the core logic of how medical clinics operate by changing the way medical workers can create, deliver and capture value (e.g. by using technological devices such as smart-phones to enable medical consultation through patient-doctor video calls). Value is created by being more convenient, less expensive and more preventative than traditional healthcare services (Duffy, 2015).

3.3 Deriving a definition and framework for business models

Despite the increased popularity in business models as a research field, the various concepts lack foundation in both business studies and economics (Teece, 2010). There is a prominent

void in theoretical work in the field, and business models are seldom defined with much precision (Foss & Saebi, 2017). However, researchers such as Wirtz et al (2016) point out there has been a converging view in the literature regarding the key elements included in a business model. We will in table 1 present selected definitions of the theoretical approaches to understanding business models.

Authors	Definition of business model
Shafer, Smith, and Linder (2005, p. 202)	"Business is fundamentally concerned with creating value and capturing returns from that value, and a model is simply a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network."
Osterwalder, Pigneur, and Tucci (2005, p. 17)	"A business model is a conceptual tool that contains a set of elements and their relationship and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams."
Chesbrough (2007, p. 12)	"The business model performs two important functions: value creation and value capture. First, it defines a series of activities, from procuring raw materials to satisfying the final consumer, which will yield a new product or service in such a way that there is net value created throughout the various activities. Second, a business model captures value from a portion of those activities for the firm developing and operating it."
Johnson, Christensen, and Kagermann (2008, p. 52)	"A business model consists of four interlocking elements (customer value proposition, profit formula, key resources, key processes) that taken together create and deliver value."
Osterwalder and Pigneur (2010, p. 14	"A business model describes the rationale of how an organization creates, delivers, and captures value."
Teece (2010, p. 191)	"The essence of a business model is the manner by which the enterprise delivers the value to customers, entices customers to pay for value, and converts those payments to profit through the proper design and operation of the various elements of the value chain."
Zott and Amit (2010, p. 219)	"We have defined the business model as depicting the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities."

Table 1: Selection of relevant business model definitions.

As table 1 illustrates, there are several definitions of the term business model. Although definitions vary across studies, Saebi, Lien & Foss (2016) show that despite using different terminology, the literature converges on the components that constitute a business model – namely the firm's value propositions, market segments, the value delivery and the mechanisms

of the value capture that the firm deploys, and lastly how these elements are linked together architecturally. We find that the essence of a business model can best be described by the way a firm creates, delivers and captures value and the customer segment they target.

<p style="text-align:center">A business model describes the value creation,
value delivery and value capture in an organisation.</p>

Based on these components, we propose a business model framework that allows us to analyse the different smart health companies along the dimensions illustrated in figure 4.

3.3.1 The business model framework

Value proposition

The firms value proposition can be understood as an articulation of the value created for users by the business model (Chesbrough & Rosenbloom, 2000). The most important attribute of a value proposition lies in its ability to precisely communicate the job-to-be-done for its target customer. The job is seen as the fundamental problem a customer has. (Johnson, Christensen & Kagerman 2008). For instance, a company delivering a medical service through video-chat proposes this value: *"You can easily can see a doctor trough video, whenever and wherever it suits you.*
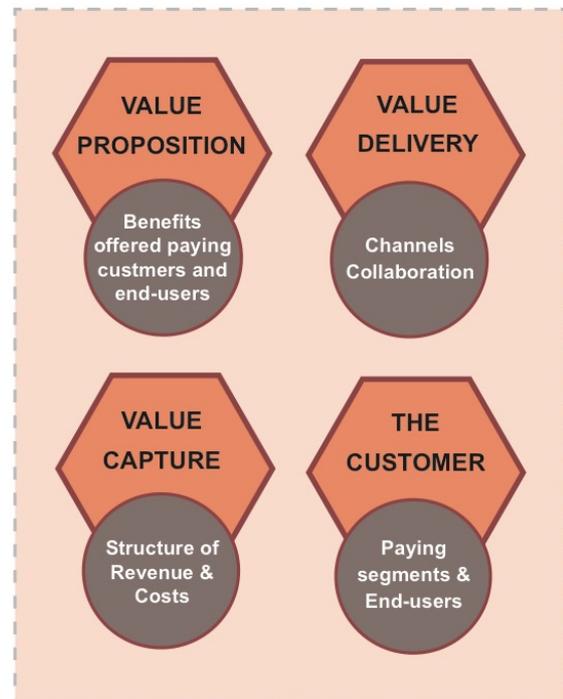
Figure 4: The business model framework

Value delivery

The pillar of the value delivery refers to how a company communicates and reaches its customers to deliver its value proposition, and furthermore, what resources it takes to be able to deliver that value (Perlacia, Duml & Saebi, 2015). For instance, a video-chat between a doctor and patient can be delivered through smart devices, such as a smartphone, over the

internet. To be able to deliver this value, the company must inhabit resources such as medical knowledge and software programs.

Value capture

The value capture describes the companies value capture mechanisms, such as the cost structure and revenue streams (Osterwalder & Pigneur, 2010). In other words, this explains how the company makes money to become financially viable (Frankenberger et al, 2013). The cost structure is driven by resources required to run the business, such as human capital, and the revenue stream depends on the pricing model the company has chosen. The cost structure of a company delivering e.g. a video-consultation for example, might be characterized by relatively high fixed cost due to salary, and relatively low variable costs because there are no costs related to production. They might have a pay-per-use pricing model, where the customer only pays a fee per consultation.

Customer segment

The costumer pillar describes the different segments of customers that a company wants to offer its value to (Osterwalder & Pigneur, 2010). For a company delivering the video consultation, its customer segments might be people with minor medical problems, people on vacation or people that want to save time. The customer segment also describes the target market the company is operating in.

3.4 Gaps in business model literature

Even though the literature on business models is extensive, most existing literature still focuses on relatively fundamental aspects of the topic. This includes e.g. the description of the concept, or deriving and comparing definitions. Most studies on business models are static in that they do not consider the drivers of emergent business models. The ones that do adopt a more dynamic view often treat drivers such as technology in very general terms (Foss & Saebi, 2017). Thus, it is not clear how a new technology such as smart health, can lead to the emergence of new business models within a new industry. Furthermore, most studies on business models focus on established firms, while the majority business model innovation comes from emerging companies (Markides, 2005).

We believe it is important to close the aforementioned gap in literature and study the effects that drivers, such as technology, have on business models. Successful business models must be able to adapt and change, which is why this thesis aim to uncover how technology affects the way companies create, deliver and capture value. Furthermore, we believe it is important to study smaller companies and businesses in the start-up phase, because they are often the source of emerging business models. We expect that the business models of start-ups and smaller companies differ greatly from business models of established enterprises, and hence we aim to uncover what impact technology has on companies in smart healthcare.

4 Methodology

In this chapter, we will first explain the purpose of the thesis and why we have chosen a qualitative approach with an exploratory design. Second, we will explain our strategy and the main steps of the thesis: The search for literature, the method of secondary data collection based on online research, and the method of primary data collection based on a multiple-case study with in-depth interviews. Finally, we evaluate the research method based on credibility, transferability and ethical aspects.

4.1 Purpose of the thesis and research design

The purpose of this empirical research is to identify emerging business models in the Norwegian healthcare industry that have arisen due to technology. This has been done by analysing and categorising relevant and emerging industry practises. Further, the aim is to uncover the strengths and weaknesses of the business models identified. Additionally, we also want to obtain knowledge about the motivation behind these companies, and the challenges they might be facing.

To be able to answer our research question, we needed to obtain a deeper understanding of business models, smart health, and business practises in smart health. Consequently, the choice of methodology was a qualitative approach. Qualitative research displayed in inductive approaches focus on specific situations or people, and emphasize on words rather than numbers (Saunders et al, 2015). This method suits our study well as it allows us to identify unclassified types of smart health companies and to investigate unidentified components to their business

models. Moreover, the nature of our research question implies that qualitative approach is preferable.

We opted for an exploratory design. Both the concept of smart health and business models are abstract, and research on the intersection of these concepts is relatively unexplored. An exploratory design which is flexible and adaptable, and can generate large amount of information with a broad focus (Saunders, Lewis, & Thornhill, 2015). By choosing an exploratory design, we have been able to clarify the understanding of these concepts, and gain deeper insight about industry practises for business models in smart health. Consequently, our findings can contribute to an increased understanding of other similar cases and contexts. Our types of business models in the healthcare industry, is a specific contribution to an increased general knowledge in this field.

4.2 Reviewing literature on smart health and business models

In reviewing the existing literature as seen in chapter 2, we searched the Scopus database for academic articles. Scopus is the largest abstract and citation database of peer-reviewed literature.We wanted to find literature on business models and smart health and the two concepts combined. To find relevant articles, we limited our search to certain years and then filtered on most cited. For instance, one of the searches were "business model" in title, from year 2008-2017 (See appendix 1). This search yielded in 3893 results, so to identify find the most relevant literature we filtered on most cited. We did the same search from year 1998-2007. We then examined the top 10 articles on both searches, and eliminated the ones that did not have significant development of the concept.

It was harder to find relevant articles on smart health than for business models. We also searched the Scopus database to find articles on Smart health, but because this is a more novel topic we searched for "Smart health" in title, abstract or keywords. This generated a result of only 109 articles, where we found only two to be of relevance. When searching for "business models" and "smart health" combined, we only generated a result of two articles, where neither was relevant. This led us to search on articles on E-health, where we found 824 articles on "e-health" anda total of four results on "business models" and "e-health" combined. By searching for articles, we found that these subjects are emerging research fields, as most of the articles

are published in recent years. For instance, "Smart health" appears in merely 6 articles published in 2002 on Scopus, whereas in 2017, 327 articles were published that included smart health in either the title, the abstract or in the keywords (See Appendix 1). By contrasting scholarly articles and discovering research streams, we could uncover gaps in the literature. For instance, one stream of business model research focuses on classification, while another has a broader and more conceptual approach.

4.3 Sample selection and data collection

4.3.1 Sample

To find a suitable sample size for our research, we did a thorough search online to find companies providing smart health services in Norway. In this search, an article written by Menon Economics (2017), and published by Innovation Norway, was particularly interesting. The article addresses the "key players and suppliers of smart communities". One of the key topics was smart health, and a brief analysis of the Norwegian smart health sector was presented, based on smart health companies operating in Norway at that time. By contacting Menon Economics, we got access to the company names of the 65 companies identified. To find relevant companies for our study, we screened each company and filtered out the ones that were not suitable candidates for our study. We filtered out 15 companies because they were either (1) no longer operating (2) not sufficiently focused on technological approaches (3) had too vague a connection to healthcare services, or (4) there was sufficient information about the company available online.

Additionally, we did a thorough online search to find out if there were any companies suitable for our study we should add to our sample. We found four companies that proved to be suitable, and as a result we ended up with a sample of n=52 companies to study. The companies are listed in figure 5 on the following page.
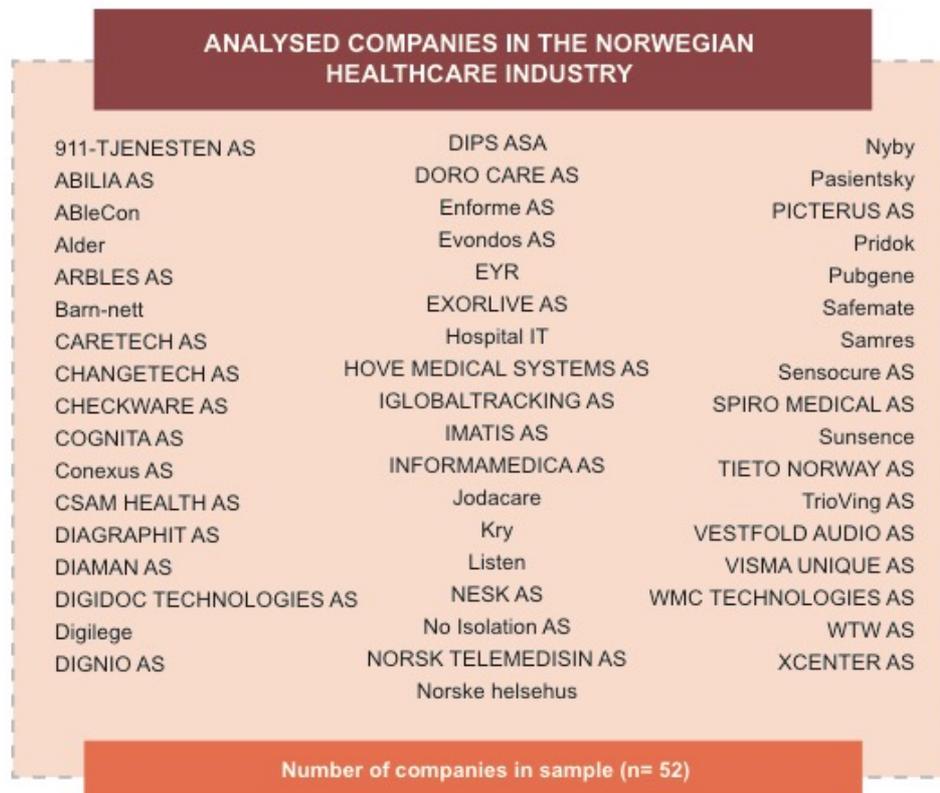
Figure 5: Sample of companies used to generate new
potential archetypes of business models in smart health.

4.4 Data collection

To answer our research question, we have used a two-fold strategy. Firstly, we gathered
secondary data online from all 52 companies along the four pillars of the business model
(Appendix 2). This was necessary in order to identify characteristics of the various business
models and generate of emerging business model types. Furthermore, we categorized all the
companies within the archetype they belonged. Second, we did a multiple case study of
companies representing each archetype by conducting in depth-interviews.

4.4.1 Part 1 - Online research for secondary data

The first step of data collection consisted of gathering publicly available data on the 52
companies in the sample. We primarily obtained information from company's homepages. We
complemented this with articles from online searches. This is an effective strategy to use when
analysing several companies (Saunders et al, 2015). Gathering relevant information that could
reveal something about how technology is affecting business models, we focused on finding
information about the four pillars in the business model framework (Presented in 3.3.1).

Consequently, we sought to find data related to value creation, value delivery, value capture and customer segments. To get an overall view handle of the available data, we structured the business model information for each company in a scheme (See appendix 2).

Afterwards, we organized it superficially along two of the business model pillars; value proposal and value delivery, as seen in Figure 6. The information revealed that the companies offer preventative or reactive treatment, and deliver this value through software alone – or in combination with hardware. Based on the online search and data structuring, we found five preliminary business models. The companies were grouped into the most fitting category, and served as a foundation for part 2 of the data collection.
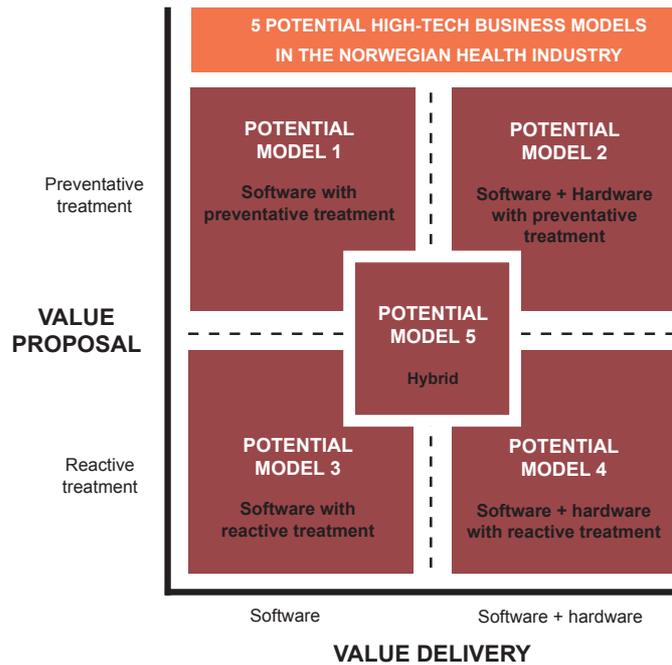
5 POTENTIAL HIGH-TECH BUSINESS MODELS IN THE NORWEGIAN HEALTH INDUSTRY

Figure 6: Preliminary typology that classifies potential archetypes in smart health business models. Authors' own research.

4.4.2 Part 2 - In-depth interviews

To gain more information on the preliminary models identified in the typology, we did a multiple case study of eight companies, and made sure that each preliminary model was well represented. A case study has the capacity to generate insights from intensive and in-depth research into the study of a phenomenon in its real-life context, which suited our study well (Saunders et al, 2015). Combining documentary research with a multiple case study allowed us to build a clear and holistic image of the various business models within smart health. We aimed to gain more insight into the various companies' business models through in-depth interviews. Interviews are extensively used in interpretive research, as it permits researchers to understand the essence of phenomena and to disclose the meanings of participants' experiences. Moreover, in exploratory studies, in-depth interviews may be very helpful to find out what is happening and to understand context (Saunders et al, 2015). Through the interviews, we wanted to uncover important aspects of the business models that we could not find online, and cross-examine

whether they belonged in the category assigned. We also wanted to uncover the motivations behind the company, and furthermore the strengths and weaknesses with the business model.

Conducting the research within a limited time frame, we decided to conduct fewer but more thorough interviews, as they are an effective method to elicit depth on a topic of interest, with nuances and contradictions (Saunders et al, 2015). We selected a few companies from each archetype to ensure that each archetype was well represented. As we wanted to ask questions related to the business models of the companies, it was important that the participants had deep knowledge of the company they represented. The participants interviewed were mostly the founders or someone in the management team of the firm. We contacted the desired interviewees by phone and email. We contacted 16 companies and managed to get interviews with eight in total. We also conducted an in-depth interview with Innovation Norway, to get a deeper understanding of the healthcare industry and particularly smart health from an institutional funding authority perspective, so the total number of interviews were nine. Four of the interviews were conducted in person, and five were conducted over Skype. The length of the interview varied from 35 minutes to 57 minutes. The companies interviewed is shown in table 2:

Interviewee	Type of interview	Duration
NyBy	Face-to-face	35 minutes
Evondos	Face-to-face	57 minutes
Listen	Face-to-face	43 minutes
Changetech	Face-to-face	36 minutes
Dips	Skype	37 minutes
Checkware	Skype	38 minutes
RoomMate	Skype	37 minutes
Anonymous	Skype	47 minutes
Innovation Norway	Skype	49 minutes

Table 2: Interviewees, interview type and duration

The interviews conducted was a mix of semi-structured and in-depth personal interviews. Semi-structured interviews are "non-standardised", and often referred to as qualitative research interviews (Saunder et al, 2015). We considered this appropriate for our study as it allowed us to keep a good structure, and at the same time it enabled us to adjust the questions to each company. Before conducting the interviews, we made a general *interview guide* (appendix 3) with a list of themes and some key questions that needed to be covered. We also adjusted the interview guide to each company. The interview guide had four main themes which was: (1) Motivation (2) Value creation (3) Value delivery (4) Value capture (5) Customer segment and

(6) Strengths and challenges. We had several sub-questions to each theme to uncover a meaningful answer. For instance, when we wanted to know how a company captured value, we asked sub-question relating to the revenue steam such as "How do you price you service?", and "Does your company have any key partnerships?". Additionally, we had questions specifically tailored to each company to find out more about each specific business model. Moreover, we included a catalogue with open-ended questions as evaluating instruments, where the participants could freely talk about events and beliefs in relation to the topic. The goal was to obtain comprehensive and straightforward responses about the business models, its strengths and challenges and their motivation.

To make sure we collected the data correctly, we took notes during each interview and captured them by audio-recording on our smartphones. We then transferred the audio-files to our computers, and transcribed the interviews to our computers the same day. We strived to transcribed the interviews the same or the next day, to make sure our memory was still intact. Two of the transcribed interviews are enclosed in appendix 4.

4.4.3 Method for analysis

After transcribing, we structured the data by following a template analysis method. First, we read through the transcripts several times, to get an understanding of what key themes we were looking for. Because we wanted to uncover how the companies create, deliver and capture value, and what their customer segments are, this was naturally our main themes as well. Because the interviews were quite unstructured after being transcribed, we colour coded the transcript by giving each theme a colour. We then compressed all the transcribed interviews so that they could fit into one page. By doing this we managed to structure the large amount of data collected, and we could clearly see similarities and dissimilarities between the companies, and get a general idea of their business models.

Based on the findings, we categorised the smart health companies in Norway, according to features of the different components in the business model, as seen in figure 7.
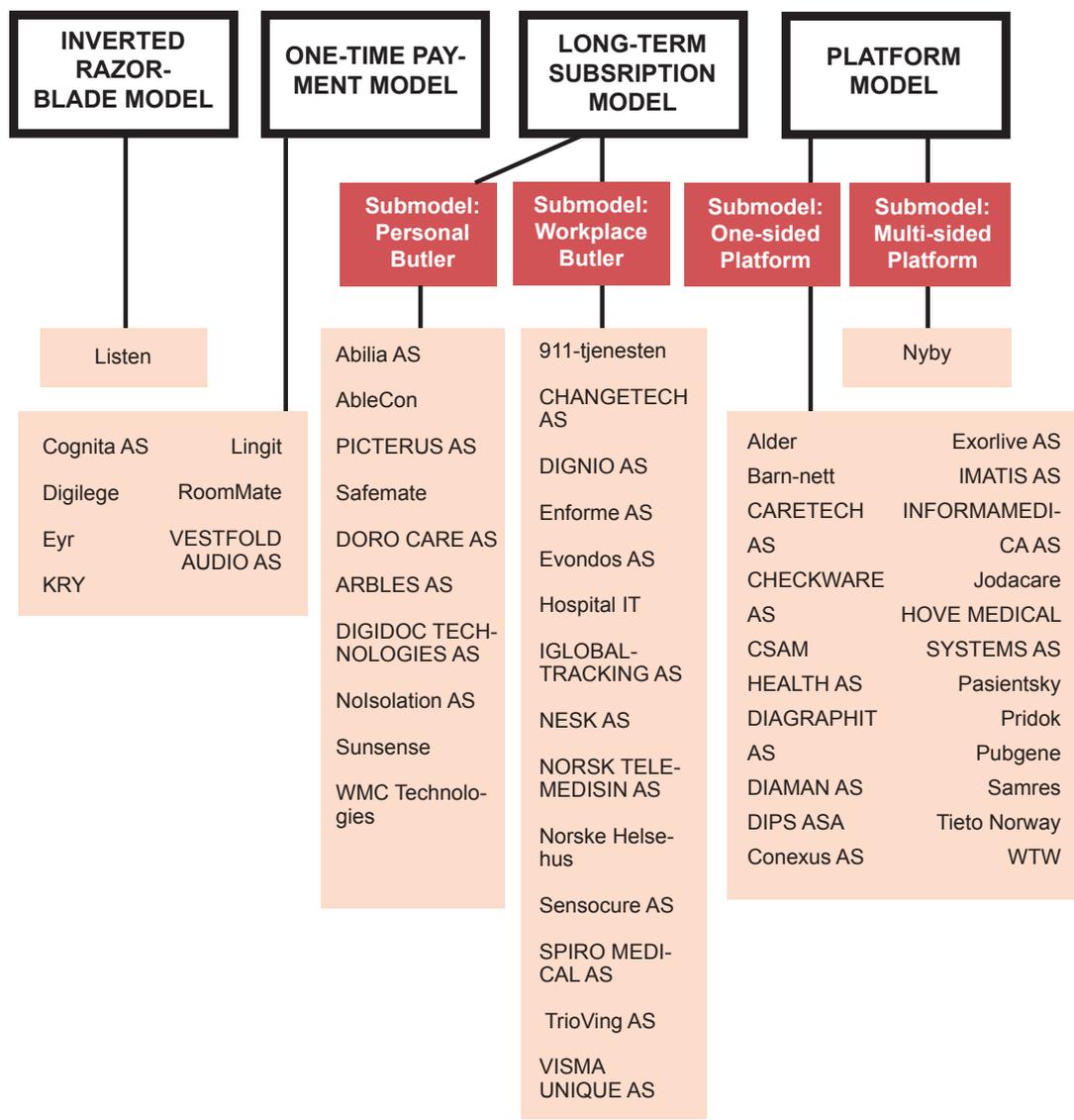
Figure 7: Companies in sample, categorised in the emerging models
and sub-model of smart health in Norway

4.5 Credibility and ethics

To ensure the quality of our findings, we will in the following evaluate our study in relation to validity, reliability and ethics. These are critical factors to judgements about the credibility of research (Saunders et al, 2015).

4.5.1 Validity

The question about validity in relation to qualitative studies, looks at how well the collected data represent the phenomenon be31ing studied. It also considers whether the researcher has gained access to a participant's knowledge and experience, and whether it is possible to infer

meaning to that what the participant intended (Saunders et al, 2015). Internal validity is usually referred to as *credibility* in qualitative studies, meaning that representation of the participants' socially constructed realities must match what participants mean (Olsen, 2017). Semi-structured and in-depth interviews can usually achieve a high level of credibility where conducted carefully using clarifying questions and exploring responses from a variety of angles.

To secure credibility we paid close attention to the appropriate use of different kinds of questions, and we discussed topics from a variety of angles. For instance, we asked questions that revealed how the company creates value. This is a complex theme, which required several questions. To gain deeper understanding, we asked the participant to elaborate on details such as interaction with the costumer. To further enhance credibility, we strived to have a relationship characterized by trust with those we interviewed (Saunders et al, 2015). We tried to gain trust by being friendly and open, and by giving detailed information to the participants on the purpose of the study. Immediately after agreeing on the interviews, we sent an email to the participant explaining the study and informing about formalities such as anonymity. At the beginning of each interview we informed the participant again about the purpose of the study, and that they could remain anonymous both as a person and as a company if they wished to do so. We also asked the participant whether they allowed us to record the interview or not. To make sure we had interpreted their meanings correctly, we asked the participant if they would like to have the transcribed documents and citation check to validate our interpretations of their answers. We also made sure to inform all participants on how the data would be handled and how we would store the data after the study is finished.

In qualitative studies, external validity is usually referred to as transferability, which explains to what degree the study may be transferred to another setting (Olsen, 2017). Although we have limited our study to the Norwegian healthcare industry, we believe that our findings will be applicable to other industries, and other markets, that are affected by technology. As we have done a comprehensive study of how technology affects all four pillars of the business model, the impacts that technology has on each pillar is not limited to the healthcare sector. Therefore, the typology and archetypes we have generated can have value for further studies.

4.5.2 Reliability

According to Saunders et al (2015), reliability consists of two elements; *replication* and *consistency*. To achieve a reliable research project result, it must be possible to conduct the

same research design over again with the same data collection technique. Due to the strict elements of replication and consistency, it may be difficult to create a consistent replication of the research design because it is generally assumed that the interview setting is complex and dynamic. Especially since the interviewees respond based on their current reflections on a fixed point in time that cannot be exactly replicated. In addition, reliability can become a concern when semi-structured and in-depth interviews lack standardization (Saunders et al, 2015). Particularly, issues may arise that are related to bias from the interviewer, the interviewee or other participants. Bias can occur by changing the tone of voice, behaving nonverbally or by making comments during the interview. Another factor that can cause bias is the lack of trust. It may be challenging to create trust in an interview setting, which in turn can affect how people perceive each other and behave. Additionally, a bias can be created if the interviewee is sensitive to reveal important information related to certain topics.

To overcome the mentioned issues related to bias, we have taken the following actions. We have used an interview guide (appendix 3) to structure the interviews (appendix 4), and we have been conscious of our own tone of voice, body language and vocabulary, to mitigate any bias caused by the interviewers. We have also been concerned not to let personal conviction or pre-defined ideas affect our perception of the interviewees and their answers. We strived to create a safe environment and to build trust between us and the respondents, by making them anonymous to such an extent that no information can be traced back. Lastly, we avoided preparing any questions of a clear sensitive nature, and we did not make the respondents elaborate if we sensed discomfort during the interview. We believe that this may have increased the probability of interviewees being more likely to elaborate on their answers, especially on topics that they would be more hesitant to respond to without trust and anonymity.

4.5.3 Ethics

To ensure our study meet ethical standards, we took several actions. For the integrity and objectivity of the researcher, we strived to act openly, truthfully, and promoting accuracy. We tried to avoid any harm to participants by making sure they were well-informed about the study, ensuring that they participated voluntarily and that they were able to withdraw from the process if needed. We further avoided asking participants questions with a sensitive nature. The questions we asked were not personal, and they only sought to reveal important aspects of the firm's business model. Furthermore, we strived to obtain privacy of those taking part in the

study. The data collected was saved on private computers with a code, and after the study is finished we will delete all data containing personal information.

5 Analysis and findings

In chapter 5, we present our analysis and findings. First, we analyse our findings from the data collection of the 52 smart health companies. The findings generated four archetypes of business models that differ in the way they are affected by technology: *The Inverted Razor-Blade Model, the One-Time Payment, the Long-term Subscription Model* and *The Platform Model*. Within the *Long-term Subscription Model* we have generated two sub-models: *Personal Butler* and *Workplace Butler*. We have also identified two sub-models within *The Platform Model*: *One-Sided Platform* and *Multi-Sided Platform.*

Based on gathered online data and nine in-depth interviews from the sample, we present a three-folded section of analysis and findings. First, we will introduce an overview of the healthcare industry in Norway, which serves as a backdrop for the business model findings. Second, we answer the first part of the research question *"How does smart technology affect the emergence of new business models in Norwegian healthcare?"*. The answer involves a presentation of the four business model archetypes that we have identified based on the sample of 52 companies. Furthermore, we will explore their similarities and dissimilarities. Finally, we analyse and present our findings for the second part of the research question: "(…) *the motivations, strengths and challenges for these models*".

5.1 Overview – Healthcare industry findings

In the following section, we introduce an overview of the healthcare industry in Norway, which serves as a backdrop for the following business model findings.

5.1.1 Smart health: Positive outlooks

Smart technology is contributing to creating an optimistic outlook for the future in the healthcare industry. Companies in the industry observe that technology enables novel opportunities to fix a broken healthcare system. First, an important factor is the excitement to take an active part in the transformational journey towards good health, universally. Companies are excited because they have the opportunity to transfer substantial technological skills found

in other Norwegian industries to healthcare. They transfer the skillset by hiring a large spectrum of entrepreneurs, skilled engineers, designers and developers from a variety of backgrounds. Second, the global trend of digitalising industries creates optimism. Norwegian healthcare is on the verge of entering a phase where many start-ups and growth companies are stepping out of pilot testing and focus on delivering to modest customer segments. They are ready to provide much needed healthcare solutions for both citizens and professionals in one of the last industries in Norway to incorporate technology.

Third, the possibilities of global expansion trigger optimism. A common trait for all the companies interviewed is their plan to expand to new markets outside of Norway. This would either be in the near future, due to the advantages of being 'born global', or as soon as the company is able to expand in more gradual phases. Fourth, policies and regulations from both national and international levels are soon to align with the way that many Norwegian smart health companies handle a core activity: The new General Data Protection Regulation (GDPR) for handling sensitive data and electronic health records are stepping into effect in Europe on the 25th of May 2018. Many of the companies have already based their value delivery on these security requirements. As a result, their early adaption to new regulations can become a source of competitive advantage. The companies can seamlessly continue to deliver services after the 25th of May 2018 without any down-time or significant remodelling on their business model. Lastly, the Norwegian healthcare industry is characterised by an interest to disrupt the isolated way of working separately in so-called silos. The majority of the companies are partnering up with a variety of private and public investors and mentors, or with organisations like Innovation Norway, which provides monetary and consulting support. More surprisingly, we also discovered a willingness towards open innovation with companies who offer similar value propositions. One of the companies interviewed stated:

"We collaborate whenever we can, but compete if we must"
Founder of a start-up company in smart health

Some of the companies in the Norwegian healthcare industry are viewing open innovation for business models as a source to ensure future competitive advantage, because it can improve their company performance. Companies realise that it is impossible to perfectly tailor all four business model pillars. Therefore, they seek to exchange ideas and support each other with complementing knowledge. One significant reason why particularly start-up companies

spearheaded by millennials choose open innovation, is their inherent quality of being 'born digital'. They may not fully implement the academic structures of a business model in their daily work life, but they understand the effects of technology. The millennials understand that it is disrupting ways of thinking and 'accelerated' living that will lead to successful businesses in the future. To be successful over time, start-up companies realise that they must strive to continually innovate their business models as markets, technologies and structures change in order to stay competitive.

5.1.2 Obstacles in the healthcare industry

According to the companies we interviewed, the primary negative aspect of the healthcare industry is the bureaucracy of the Norwegian welfare system. The state, represented by the Ministry of Health and Care Services, has the overall responsibility for specialist healthcare services (e.g. public hospitals, polyclinics), while each municipality is responsible for primary healthcare services (e.g. nursing homes and general practitioners). Consequently, private companies who offer highly technological products and services to institutions - run by the state or municipalities - are facing challenges. More specifically, the ineptness tendency in decision making and implementation among municipalities has been pointed out to be a problem. This is challenging mainly due to the need for decisiveness and monetary means to fully commit to the smart technology, in order to ensure optimal functionality. As we observed, decision makers in the state and municipalities are hesitant to invest in new technology.

Another factor that adds on to the challenge, is the decision-making process and priorities of top managers in healthcare providers. Universally, managers in other industries make executive decisions amongst selected board members and focus on profit increasing key performance indicators (KPI) for owners, by placing emphasis on increasing revenue or reducing costs. In contrast, decisions made among public healthcare providers (.e.g. hospitals) often require approval from governmental stakeholders. KPI rarely relates back to profit maximization (at least for public providers), and budgets are, comparatively speaking, earmarked to special projects. In addition to the necessary managerial engagement, the smart technology products require that multiple groups of healthcare professionals implement it. This challenge is particularly relevant for the smart health companies. Their value proposition consists of software that streamlines the information flow of large professional healthcare providers, but this requires that many departments consistently use the software.

The lack of private equity investment in healthcare is also mentioned as an industry weakness. According to Innovation Norway, the reason is that many private investors do not see healthcare as an industry in the first place. This impression among investors can make it difficult for companies to attract equity in the crucial interphase between the seed phase of the business life cycle and the establishment phase. The entrepreneurial potential of new healthcare companies remains untapped, as long as private equity is not inserted into this crucial interphase containing some financial risk.

5.2 Technological effects on business models in smart health

In the following section, the analysis will answer part one of the research question:

"How does smart technology affect the emergence of new business models in Norwegian healthcare, and what are the motivations, strengths and challenges for these models?"

5.2.1 Preliminary typology for classification – Value proposition and value delivery

After the online data gathering, as described in chapter 4, we analysed the 52 companies in our sample by using the business model framework. As a result, we generated a preliminary typology with five business model archetypes (See figure 6). The analysis revealed that smart technology particularly affects value propositions and value delivery. Value propositions can be grouped in two main categories: (1) the propositions offer preventative treatment, which involves solutions that prevent health condition from occurring (e.g. app for lifestyle changes). (2) the propositions offer reactive treatment, which includes solutions that react to a current healthcare condition (e.g. Abilia, which provide smart hardware solution to assist people with physical conditions in their everyday life). The value can be delivered to customers through software alone or in combination with hardware. Based on the initial classification, we also discovered that some companies cannot be distinctly placed in one preliminary model, which leads to the creation of a fifth potential model; the hybrid. The preliminary typology serves as a classification tool. As described in chapter 4, we first classified all 52 companies in the sample. Second, we conducted in-depth interviews with a selection of companies from each archetype to gain more insight on the various business models. Additionally, we conducted the interviews to discover whether or not the archetypes in the preliminary typology corresponds

with inside information on the business models. Based on the interviews, we created a more precise and final typology presented below in figure 6.
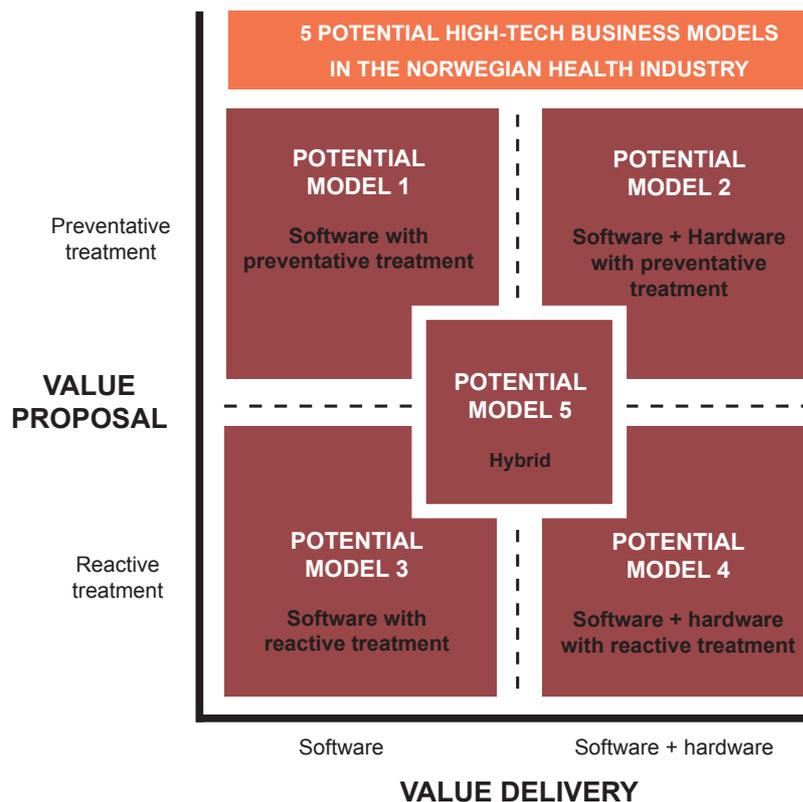
Figure 6: Preliminary typology that classifies potential archetypes
in smart health business models. Authors' own research.

5.2.2 Final typology for classification – Value delivery and cost structure

The interviews verified that the archetypes in the preliminary typology can be used to describe how smart technology is affecting business models in Norwegian healthcare. Additionally, the interviews provided novel intel on customer segments, cost structure and revenue structure. After re-evaluating the gathered online data in combination with the interviews, we found that technology affects each company differently on a micro-level. Nevertheless, common characteristics appear by zooming out. We found that that the two factors that separate the various business models the most are (1) Value delivery, and (2) Cost/Revenue structure. We discovered that value delivery can be differentiated in 'platform' and 'distribution'. Likewise, cost structure can be differentiated in 'subscription' and 'one-time payment'. The analysis generated four archetypes of business models that describe how smart technology affects healthcare companies in Norway: *The Platform Communication Model, The Long-term*

Subscription Model, The Inverted Razor-Blade Model and *The One-time Payment Model.* Additionally, we generated four additional sub-models: *One-sided Platform, Multi-sided Platform, Personal Butler* and *Workplace Butler* (see figure 8 below):
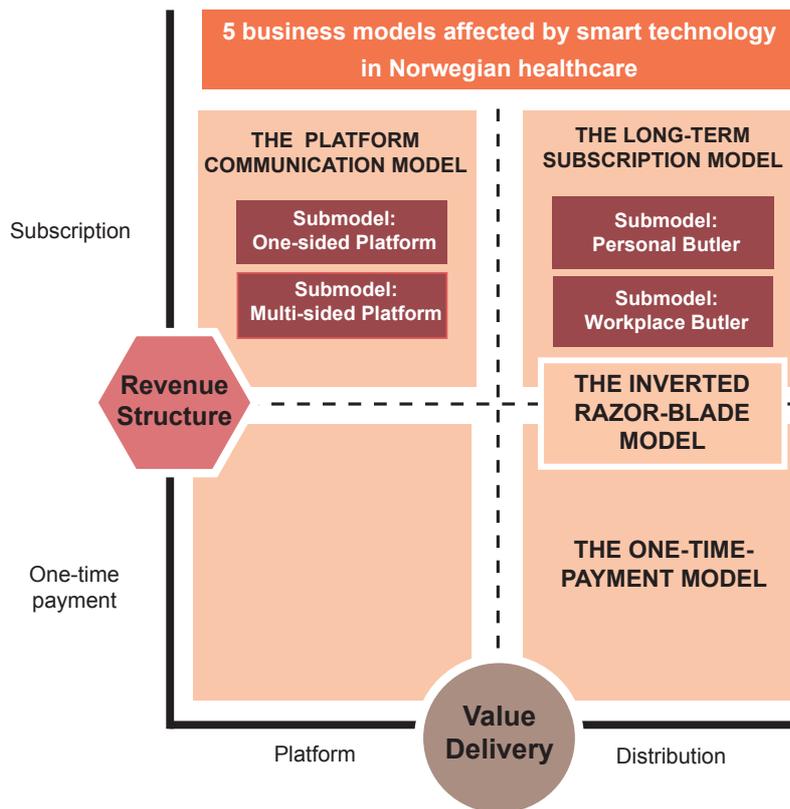
Figure 8: Final typology that classifies emerging
smart health business models in Norway. Authors' own research.

The models and sub-models in figure 8 were given names that seek to intuitively capture the essence in each of them. They particularly reflect the different revenue structures, since these express business logic and profit generation formula. To make it easier to identify the essence, we therefore attempted to give the models recognizable names that already exist as business designs (e.g. *Inverted Razor-Blade Model* and *Platform Model*). In the following section, we will elaborate how technology affects both the models and the sub-models.

5.2.3 Four business models in Norwegian smart health

In this section, findings from the models and sub-models will be presented along the pillars of the business model framework. We compare the models according to the (1) value proposition, (2) value delivery, (3) revenue streams (4) cost structure and (5) customer segment.

1. Value Proposition
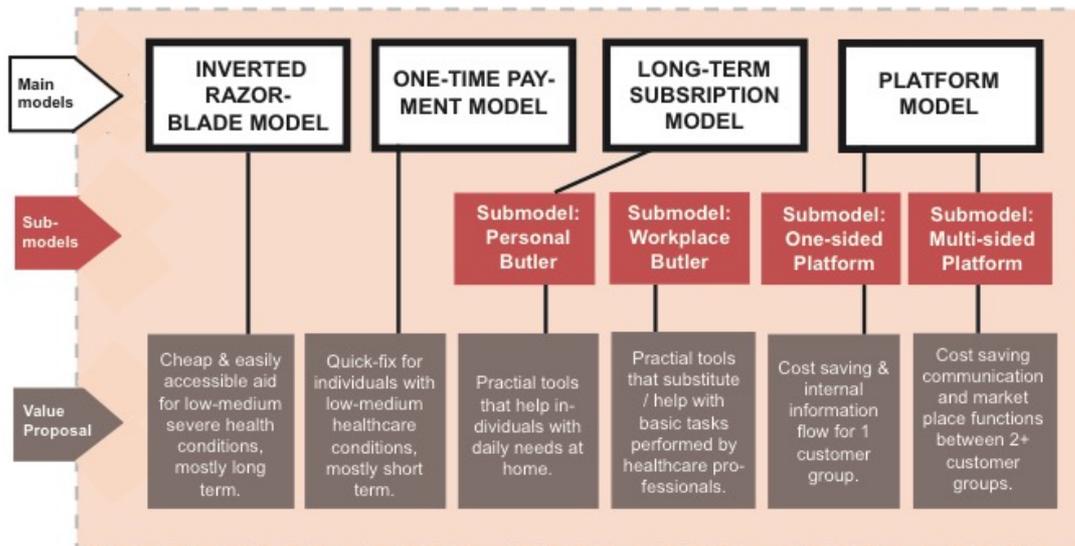
Figure 9: Value propositions in emerging smart health business models in Norway. Authors' own research.

Models and sub-models differ greatly in terms of their value propositions. Companies with the *Inverted Razor-Blade Model* have one overall value proposal for private individuals: They seek to provide cheap and accessible aid for low-medium health conditions with a long-term duration. The aid is either a better substitute to existing solutions, or an invention to the healthcare market. Value propositions targeting private individuals directly have greatly been enabled by smart technology. This is evident in values that can be delivered through software alone, such as apps and online programs that can be accessed by patients in app stores or on websites. These technological delivery methods create new and direct channels between smart health providers and private individuals. As a result, companies can offer increased levels of self-management for everyone, because the companies are able to remove professional healthcare intermediaries in the value chain, and deliver solutions directly to the patient. An example of a company within this business-to-consumer (B2C) model is the company Listen. They offer a high-quality substitute to existing hearing aids that is tailored, lightweight and discrete due to new technological developments in audio graphics. The customer manages to fully use the product herself. She simply has to take a quick hearing test and answer a few questions in the Listen app, before putting on the earplugs and enjoy better hearing.

The *One-time Payment Model* also offers easily accessible medical aid for low-medium health conditions, but only for conditions that require healthcare services over a short period of time.

For example, online consultation with a general practitioner. The patient has a 15-minute video call with the practitioner – with minimal waiting time and generous opening hours throughout the week. The general practitioner has the same qualifications as traditional general practitioners operating from medical facilities. This service dominates the *One-time Payment Model*, and is offered by both Digilege, EYR and Kry.

The *Long-Term Subscription Model* offers two different value proposals, and is therefore divided in two sub-models: *Personal Butler* and *Workplace Butler*. The *Personal Butler* offer practical tools that help individuals with daily needs at home, whilst travelling or at the workplace. Like Abilia, which offers hardware such as voice amplifiers or controllers that let the user control both virtual room and physical space. Similarly, companies with the other sub-model *Workplace Butler* offer practical tools to simplify tasks for healthcare workers. In contrast, these tools are meant to substitute existing products, or completely take over tasks performed by the healthcare workers., such as products offered by Evondos. They won Health Innovation of the year 2017 at the Health Awards with their intelligent medicine dispensing robot that automatically hands out the prescription medicine for weeks at a time. The robot offers to empower the patient and free up time for healthcare workers.

The Platform Communication Model also offers two different value proposals, highlighted in two sub-models: *One-Sided Platform* and *Multi-Sided Platform*. The *One-sided Platform* offers internal information flow for one customer group, like the company Dips, that offers to enable efficient healthcare by providing a fully integrated and digital patient record system (e.g. closed loop medication, reporting and booking and planning). Similarly, the *Multi-Sided Platform* offer information flow, but between two or more customer groups. Like Nyby, who has created a two-sided platform marketplace that connects demanders and suppliers of healthcare services directly.

2. Value Delivery
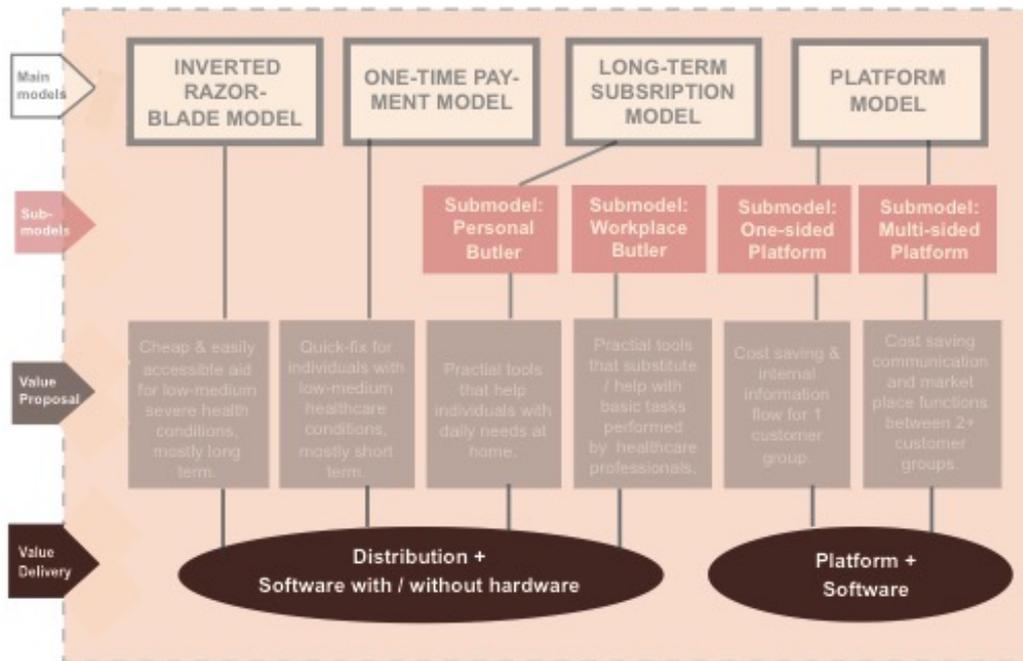
Figure 10: Value delivery in emerging smart health business models in Norway.
Authors' own research.

The way companies deliver value can be categorised in two ways: 1) Distribution through software or in combination with hardware and 2) Platform through software. Similar for all models is that they have developed a way to deliver value through highly technological software that is smart in the way it communicates with its surroundings through IoT. It is tailored with different modules to create a swift and comfortable user experience for all involved parties, not only the paying customer segment. Generally, the companies try to deliver value in a way that benefits both healthcare professionals, the patients and their support systems. Regardless of delivery method, the end-user often plays an important and active role to fulfil the value.

The model that distinguishes itself the most from the others with regards to value delivery is the *Platform Communication Model*. This is the only model where all companies deliver strictly through highly technical software platforms, alongside a wide range of tailoring opportunities through different modules. This is particularly evident in the company Nyby.

3. Revenue Structure
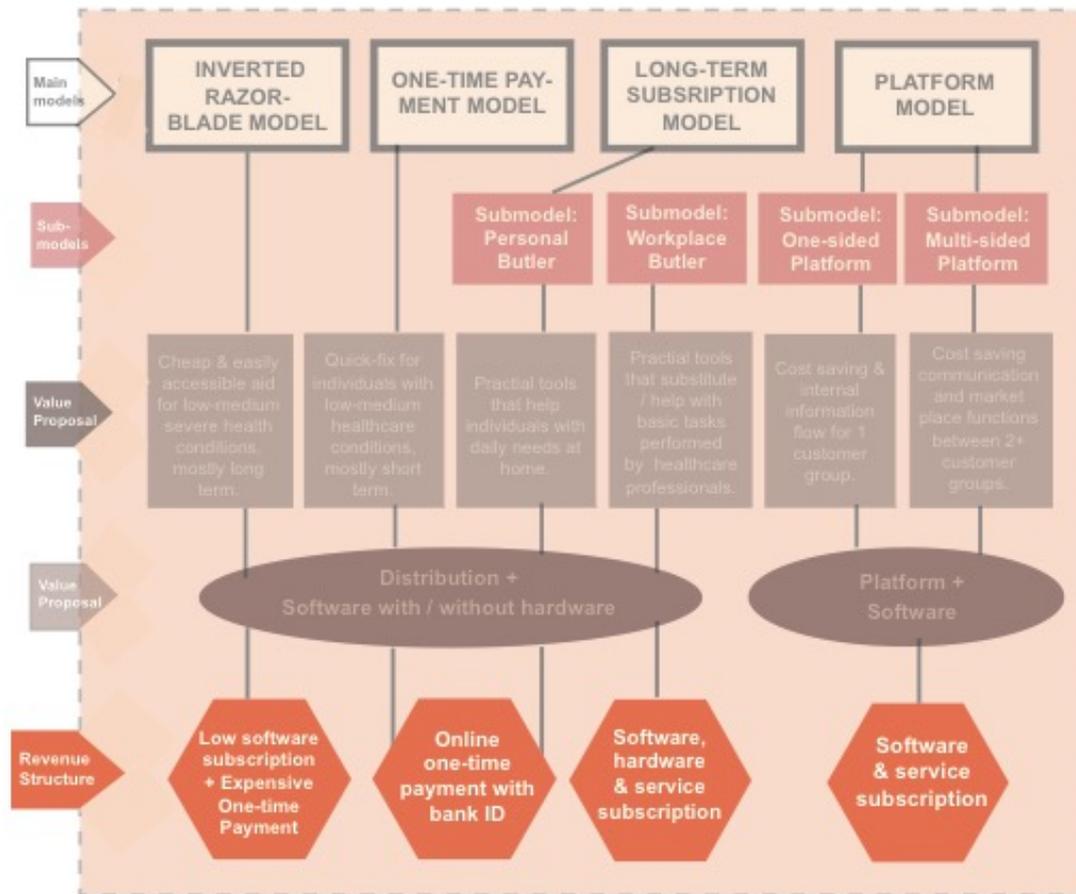
Figure 11: Revenue structure in emerging smart health business models in Norway. Authors' own research.

Technology is enabling new ways of structuring revenue, primarily through a subscription or One-time Payment structure (See final typology in figure 8). Additionally, we found that a further separation is possible. As seen in figure 11 above, subscriptions dominate the revenue structure in three of the four main models. Since the *Inverted Razor-Blade Model* is dominated by companies who offer an app in addition to hardware, subscriptions have been chosen for incurring a modest revenue from the app, while the majority of the revenue is budgeted to come from the sales of medium-high priced equipment, which significantly enhances the experience for the customer.

The subscription exception is the *One-time Payment Model*, where the choice to rather have a one-time purchasing fee corresponds with the value proposal. For the companies offering online doctor's appointments or other 'help-when-needed' services, a monthly/annual subscription fee would not be optimal. Therefore, both Digilege, EYR and Kry have chosen a One-time Payment

model, where they offer 15 minute consultations for fixed price at 350 NOK. This is introduced as they sell efficient and available healthcare consultation on demand, and outside traditional business hours. They payment is offered through online payment with BankID, which incorporates encrypted monetary transactions in the software used for video consultation. The model relies heavily on a sheer volume of patients, as well as customer loyalty to ensure long-term revenue.

Even though every business model needs to develop its four pillars in some form or order, we find it interesting that companies have obtained significant funding and collaborations without a clear plan for revenue structure. Some of our interviewees explained how they have gathered millions of Norwegian Kroner in funding and entered partnerships with municipalities without having a specific customer segment or cost/revenue structure. One of the reasons why new business models have been so welcomed by investors and healthcare providers, such as municipalities, can be explained by the critical situation in the industry:

"The healthcare providers (municipalities) are on a burning platform.
They have to change."
Top management, Nyby

4. Cost Structure

Figure 12: Cost structure in emerging smart health business models in Norway.
Authors' own research.

Technology is affecting the cost structure in two major ways. First, technology is particularly affecting the early start-up phase, as all four business models are characterised by large initial investments cost for research and development (R&D). This is the result of smart and highly technological software being at the core of all value proposals. Creating better substitutes to previous solutions in smart health require not only skilled engineering and software developers, but it also requires piloting projects to optimise services. These tasks are labour intensive, which in turn creates substantial salary expenses. For Nyby significant funds has been invested

towards a functional software platform. They offer a multi-sided digital software platform that matches the healthcare service needs of different customer segments with suppliers of these exact services. Such a platform not only requires a digital market place enabling service trades, but also a system for securing identification, screening and approving adequate suppliers, and an internal dashboard for organising supply and demand for each customer group. In addition, it requires extensive pilot projects with municipalities for adjusting the software. Additionally, some of the companies with the *Inverted Razor-Blade Model,* One-time Payment *Model* and *Long-term Subscription Model* require R&D for the hardware products. As a result, these companies are faced with expenses for equipment, raw material and the salary expenses.

Second, technology usually increases the scalability of products after the start-up phase. This is especially true for the companies that only deliver software solutions, as they have low variable production costs. As one firm that delivers a communication platform puts it, "Once we manage to have low implementation costs, we can sell the solutions very cheap and grow fast. It will cost us nearly the same to serve one customer as to serve one hundred".

As the sample for this thesis consisted of companies in start-up, growth and establishment phases, the evolving cost structure is limited to these phases. All models have relatively high fixed costs, where salary makes up the majority of the expenses. The companies offering primarily software, such as the *Platform Communication Model*, experience a shift from R&D incurring labour costs, to implementation, maintenance, and potential tailoring of modules to specific customers. In contrast, the other three business models have labour costs incurred by production in phases of scaling. For all business models besides the *Platform Communication Model*, expenses for location also make up for a significant fixed cost due to hardware production space. This is the case for Evondos, which creates both the software and hardware for the intelligent medicine dispensing robot. In contrast, the companies with the other three business models are less dependent on office space for production (and visitation) since customer communication is done mainly through the software. Despite the constant need for some human labour, the total fixed costs may be reduced over time as previous tasks not related to R&D can be automated (e.g. chatbots and robots created with artificial intelligence that can answer service chats and more complex customer services). The variable costs for the same life cycle phases are limited for the *Platform Communication Model*, as scalability in software incurs no production or shipping costs. In contrast, the three other models experience these costs.

5. Customer Segment
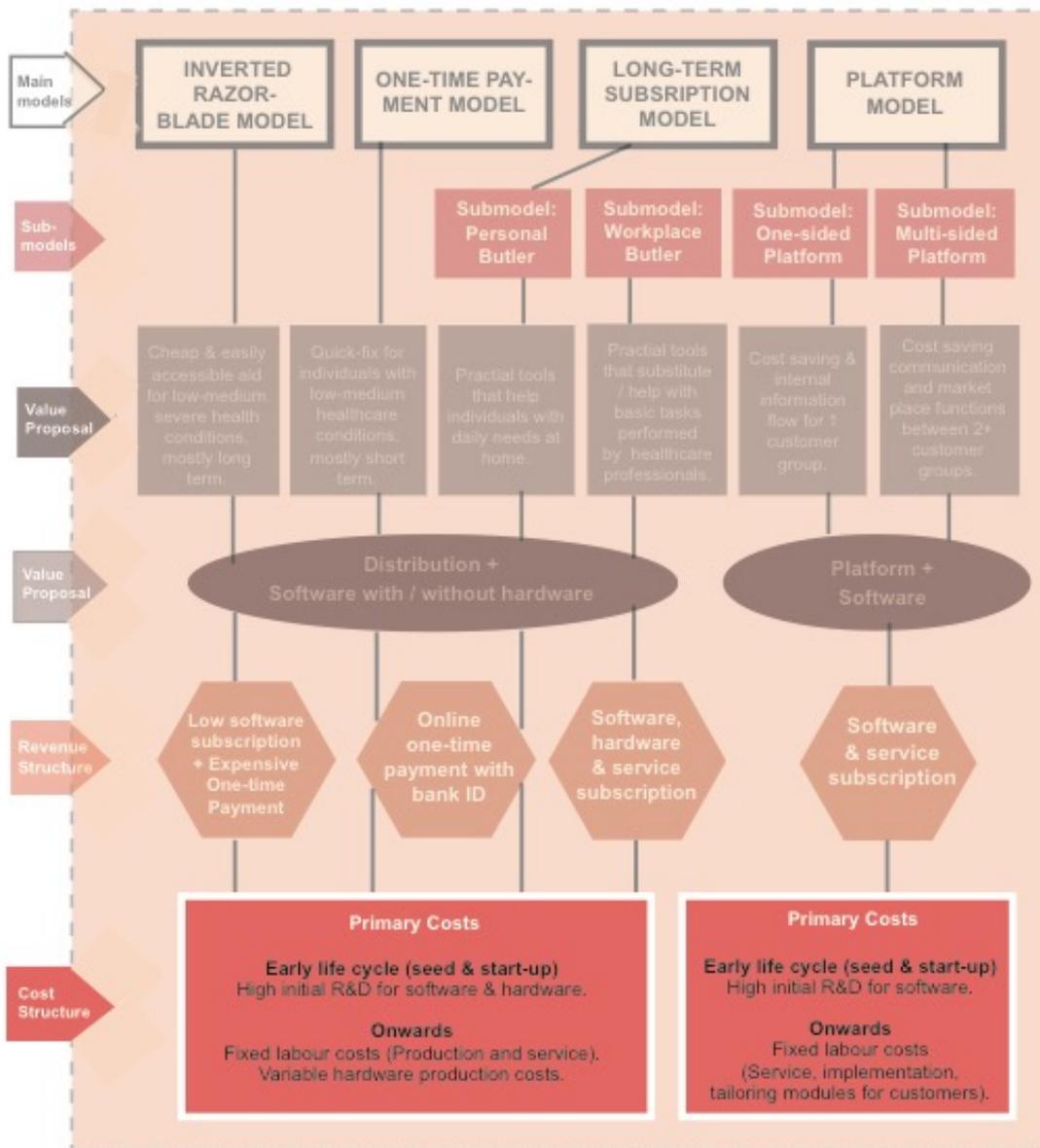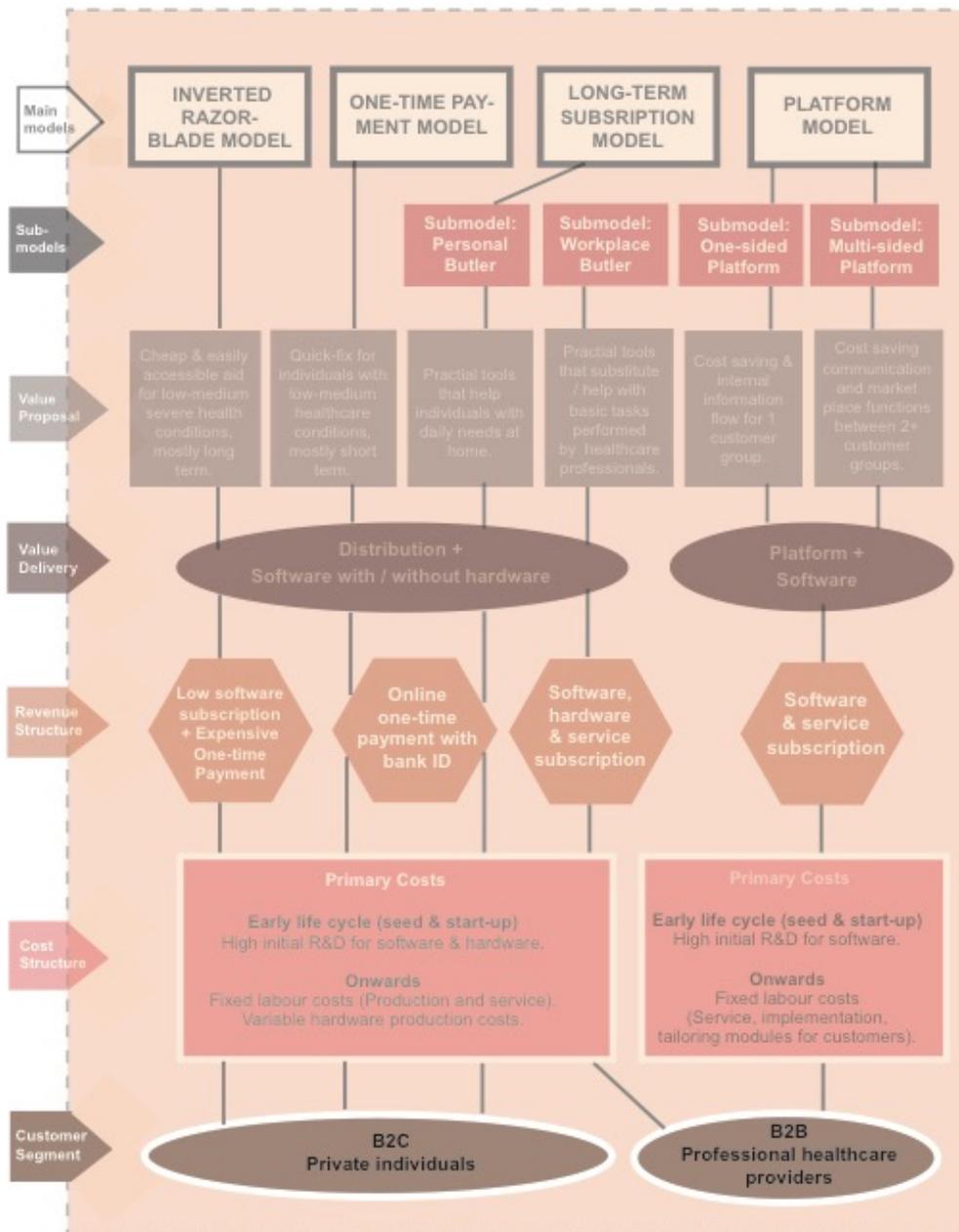

Figure 13: Customer segment in emerging smart health business models in Norway. Authors' own research.

Technology is affecting the targeted customer segments in several ways. Firstly, technology enables companies to target private individuals more directly (B2C), since software enables companies to fulfil needs through highly technological and personalised software (e.g. apps, platforms, online video conference), in addition to the hardware (e.g. robots, voice amplifiers, controls, UV detecting bracelets). Due to the of the explosion of smartphones, the market for m-health services has experienced a major increase, and there is nearly an unlimited access to health care apps online. For instance, the company Sunsense offers an app with an UV detecting

bracelet that lets the user monitor and track their accumulated UV dose, and become warned when the daily dose limit has been reached. The companies targeting the end user directly as a result of technology, are mainly the ones that offer low-cost solutions to help low-to-medium health conditions or preventative health, such as *the Inverted Razor-Blade Model*, the *One-time Payment* model and the *Personal Butler* sub-model. Secondly, technology enables companies to reach larger audiences and new markets. Because of the opportunity to reach a larger share of the population, described under revenue streams, many of the companies interviewed have a clear vision of serving a large customer base. They want to have a business that is built to scale. The companies delivering mobile apps can reach large audiences worldwide through app stores. All the companies we have interviewed are aware of the existing market competition, and they all seem to have a very global mind set.

5.2.4 Concluding remarks

The objective in this chapter was to generate business models for smart health that are relevant in the healthcare industry. We have presented the different models by focusing on their similarities and dissimilarities to get a better understanding of each model, and how they differ. It must be emphasised that this is a presentation of different models that may represent the different focal points business models can inhibit, but it does not conclude that the models are mutually exclusive. Smart health companies can shift from one model to the other, or implement more than one type at the same time. We do not expect that smart health companies will fit only one model perfectly. Rather, our intention was to conceptualize the different types in order to provide a roadmap towards an end goal, which may help practitioners to evolve and shift towards smarter practises. The different types are summarized in table 3 and figure 14:

Business model	Value proposition	Customer segment	Value delivery	Value capture
Inverted Razor-Blade	Reactive solutions to aid with light to medium conditions	Private individuals	Software alone or in combination with hardware	Gain revenue through selling complementing medium/high priced hardware to low-priced software solution
One-Time Payment	Accessible and effective solutions for a wide range of conditions	Private individuals	Software alone or in combination with hardware	High volume and loyalty through one-time purchase.
Long-Term subscripiption	Practical solutions that make it easier to perform or substitute daily tasks	Private individuals or professional healthcare workers	Software alone or in combination with hardware	Software and service subscription with a long-term lock-in
Platform Communication	Communication internally or between customer groups.	Professional healthcare providers	Software	Software and service subscription with a long-term lock-in

Table 3: Summary of business model pillars in smart health business models. Authors' own research.
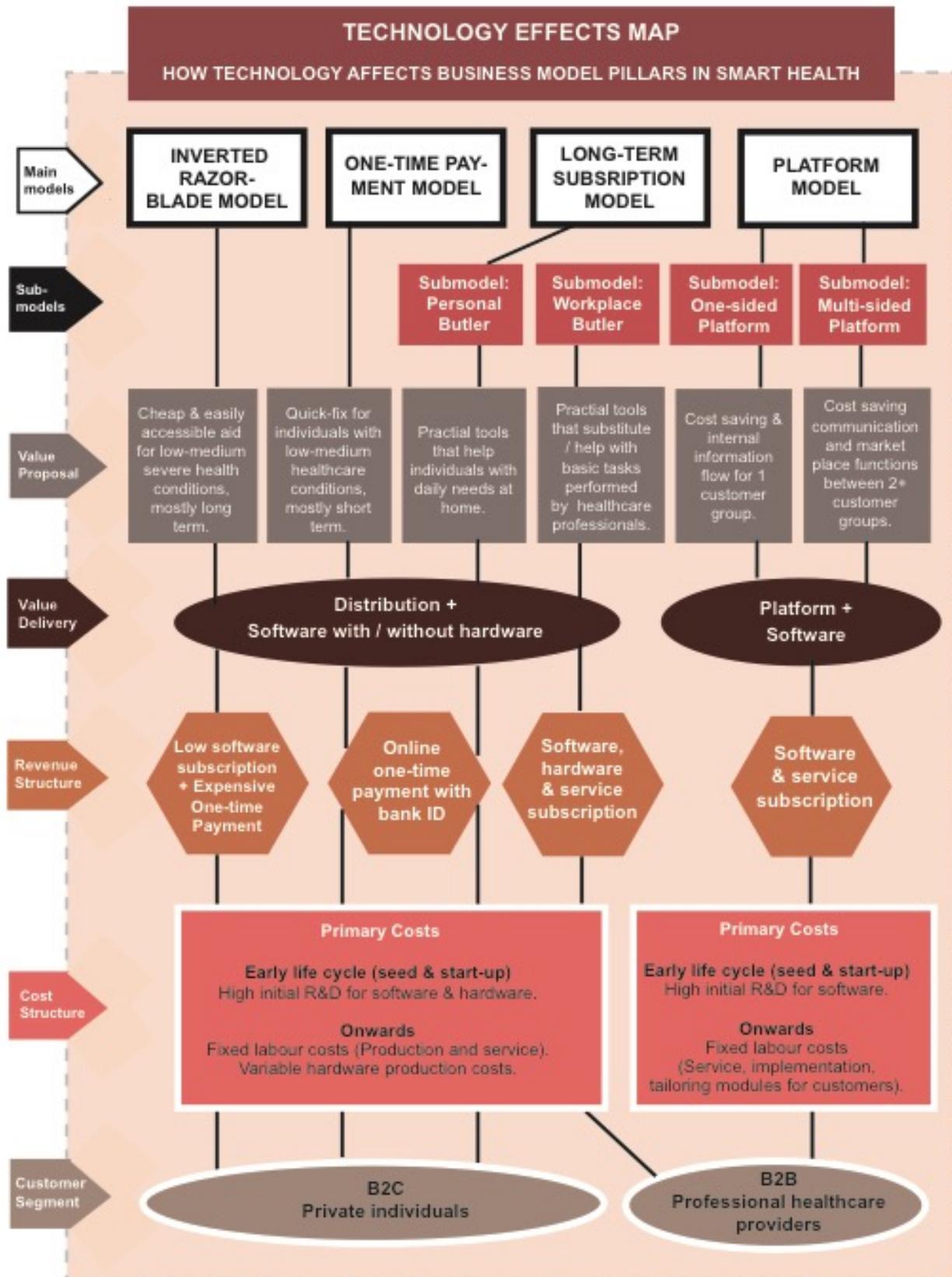
Figure 14: The Technology Effects Map. Presents how technology affects the pillars of business models in smart health in Norway. Authors' own research.

5.3 Motivation, strengths and challenges in smart health business models

In this section, we will address the second part of the research question:

"How does smart technology affect the emergence of new business models in Norwegian healthcare, and **what are the motivations, strengths and challenges for these models?**"

We will first discuss our findings related to the motivation behind the smart health companies, before we discuss the strengths and weaknesses related to each model.

5.3.1 Motivation behind smart health companies

Based on eight in-depth interviews with companies from the sample, we found that the motivational factor behind starting smart health companies did not seem to vary significantly between the different business models. All companies we interviewed have in common that they have personally experienced issues in the Norwegian healthcare system, and that they are eager to improve these by providing a much sought-after value proposition. As presented in more detail below, the value proposition is the catalyst that has motivated founders of emerging smart health companies to create four new different business models.

The business models have an intrinsically motivation at its core: The value proposals seek to both offer highly technological solutions to correct faults in the current healthcare system, and to push the limits of current best-practise to make further improvements. The reason why value propositions play a motivational role relates to how the companies were initiated in the first place. The clear majority of the founders had experienced at least one unsuccessful personal or professional incident within the Norwegian healthcare system. Experiencing this inadequateness sparked a motivation among the company founders to create a business related to the healthcare industry, because they experienced a market failure first hand. As an example, the founder of Evondos experienced that the medication his grandmother received was not delivered in a satisfying way (e.g wrong doses, not at appropriate times etc). He identified that there was several jobs-to-be done for several stakeholders. Patients needed medicine delivered more precisely, health-care workers wanted to release time from medicating patients, and companies delivering healthcare services wanted to save money by reducing labour costs. This

motivated the founder of Evondos to develop a medicine dispenser that could be placed in patient's home, and deliver medicine more accurately than people were able to in the past. The medicine dispenser is a highly advanced robot. To sum up, the motivation behind this company came from a personal observation, and the ability to identify an uncovered need for customers.

As a result of value propositions being sparked by various experiences, this pillar differentiates itself the most from the other pillars of the business model. Consequently, it requires that we not only create the four main categories of new business models, but also four additional sub-models, which adds up as six value proposals in total (See Figure 8). The in-depth interviews with companies representing all models and sub-models, revealed that they seek to empower the user, whilst making the work of healthcare personnel more efficient, productive and transparent. The interviews also revealed that some of the company founders were motivated by the opportunity to improve the lives of people. By proposing a value that substitutes existing and lower-quality products or introducing a new service, the founders and top management feel that they are making an improvement in the lives of people who are dependent on healthcare services.

The founders and top management are also motivated by the opportunity to make monetary gains through their value proposition, and therefore seek to tailor the business model pillars to best maximize profits. Still, this extrinsic motivation comes second compared to the intrinsic motivation of fixing the broken healthcare system and improving lives. As one of the Nyby representatives put it:

"(…) The impact of what we are doing is so great that we will somehow make money out of it (…) We didn't focus on 'how to make money' during the first two years. That's something we have started working more on now".

5.3.2 Strengths and weaknesses in smart health business models

In this section, we will make use of the business model framework to analyse each models along the four pillars of the business model to reveal their strengths and challenges.

Value proposition

One common strengths across the models is the value proposed to customers. As presented in 5.2. on value proposition, the company founders are creating new products and services as a result of having observed or experienced a specific need in the healthcare industry. Consequently, the various value propositions are characterised by being very specific and clear. The companies we interviewed all focused on the value proposition before shifting focus to the three other pillars of the business model (e.g. value delivery, value capture and customer segment). This needs-based proposal anchors the business from the very start, and ensures that there is a market demand for the solution in question. Further, companies in all four models emphasise collaborations and piloting the solution to perfection, with both the paying customer and the end-users, which makes the value proposals more resilient and tailored to market needs. A prominent strength in all four business models that they propose a much sought-after solution to a problem.

As we discussed, the value proposition is a strength for all the companies we have interviewed and the archetypal models we have identified. However, the value proposition of the companies within each archetype varies to some degree. Not all companies manage to clearly propose the value they are creating, or for whom specifically they are creating it. As many of the companies we have analysed are in the start-up phase, some companies are still working on figuring out how to propose their value. This proves to be increasingly harder if the target customer is not fully identified. We will discuss this in more under *customer.*

Value Delivery

A strength related to smart health companies, is the ability to deliver the value to a large customer base. Regardless of the business model, the sample selection is dominated by companies that are either "born global" – or have plans to gradually expand across continents. Among the four business models discovered in smart health today, only the *Platform Delivery Model* has a distinct benefit in achieving global scaling plans when it comes to value delivery. Because companies with this model offer services solely through software, they have limited production and transportation costs. Further, the *Inverted Razor-Blade Model* consists of another value delivery strength: Companies with this model delivers both software and hardware solutions separately to complement each other, which enables them to potentially obtain market shares and synergies from operating in two separate markets. An example is Listen, which offers an app and is currently developing earbuds.

All the companies we have analysed rely on technology to deliver value, and as discussed above this brings with it strengths such as scalability. But delivering value through technology, especially the internet, challenge all companies regardless of business model. Delivery through technology requires government-regulated measurements for patient data, which means that companies must meet certain standards. Despite discovering that specific companies we interviewed see this as a strength because they have implemented such standards from the very beginning, it is primarily a business model challenge because it is crucially a technical challenge to be overcome.

Revenue and cost structure

The *Inverted Razor-Blade Model, The Long-term Subscription Model* and the *Platform Communication Model* all benefits from a subscription pricing model. This entails that companies operating with these models can easily predict revenue through recurring sales. Depending on the lock-in time set by the company, these companies can more easily predict their future revenue streams months or years ahead. Further, the revenue and cost structures are primary strengths for the *Inverted Razor-Blade Model* because they secure customers over time. Companies with this model have, at least, a twofold structure. By offering a free or low cost software (e.g. app) they seek to attract customers in the early phase, and later entice them to buy a complementing high-cost hardware. Companies with this model are able to set a low revenue for the software since it has minimal costs related to scaling up the customer segment. An example is the aforementioned company Listen, whichs proposes better hearing aids at a lower cost. They seek to substitute the traditional hearing device for those with light to medium hearing conditions. This is a relatively traditional proposal in terms of replacing an existing product, but due to its delivery methods, the revenue structure benefits from having a two-folded structure. Listen offer an innovative app that improves the hearing ability of the user through audio graphic technology and regular earphones, which has not been launched or marketed in Norway before. The pricing model of Listen is not set yet, but they expect that the app will have a low cost to attract customers. The app can be used with any personal headphones, but Listen are currently developing earbuds based on advanced technology to compliment the app. The app will still work with other types of headphones, so this is not a pure lock-in model, but the earbuds will enhance the experience. Therefore, it is expected that this pricing model will generate more revenue.

In contrast to the models benefitting from a long-term subscription lock-in, *the One-time Payment Model* has no knowledge on future cash flow. Therefore, companies operating with this business model and sell hardware, find alternative methods to secure long-term revenue. One method that can be used by companies, is to sell batches of the products to an intermediary company, like the company RoomMate. They sell monitoring hardware in batches to the intermediary company Atea, which re-sells them individually or in bundles with other products.

Customer segment

The customer segment is a particular strength of the B2C (Business to customer) models targeting private individuals (e.g. The *Inverted Razor-Blade Model, One-time Payment Model* and the *Personal Butler Model*). Having private individuals as a customer segment can be a strength for, because the sheer size of the segment, and that it is only limited by what value proposition the companies decide to offer. Unlike many traditional B2B (Business to business) healthcare providers, they avoid bureaucratic frictions, and slow decision-making processes within the state or municipalities to reach the paying customer. A requirement for a customer segment to be a considered a strength, is that the top management is clear on what specific customers to target.

The multi-sided platform has a strength regarding the costumer segment. Multi-sided platform markets bring together interdependent groups who need each other in some way, and in this model the critical asset is the community and the resources of its members. The strategy of the platform company is to focus on orchestrating those resources (Alstyne, 2016). When multi-sided platforms manage to reach a critical mass of members (customers), the ecosystem value increases and more members are attracted to the marketplace due to network externalities. However, being reliable on a critical mass of members also makes the platform model vulnerable. If the marketplace loses members, this can have a downwards spiralling effect. An example of a multi-sided platform market is NyBy, which provides a digital marketplace for the supply and demand of healthcare services.

The customer segment is a challenge for business models proving solutions through B2B, like the *Workplace Butler within Long-Term Subscription*. These models provide communication platforms and practical tools that to some extent will also be used by a private individual. Despite having professional healthcare providers as paying customers, these companies also must fulfil the requirements set by patient who often are end users. We found that companies

operating B2B sometimes struggle with reaching out to their customer. For instance, Evondos, the medication dispenser company, operates with a workplace butler model. They target municipalities, but their end user could be either a nurse or a patient living at home. Hence, they create value for several groups. The offer time release for the nurses, increased quality in the medication process for the patient, and cost savings for the municipalities. However, the challenge is to convince the municipalities as they are the customer and final decision maker. As the decision-making process in municipalities usually takes time, this can be a challenge for companies targeting such customers.

As mentioned, the B2C models can experience positive benefits related to their customer segment. However, it can also be considered as a challenge. Due to the opportunity of catching a broader segment by targeting private individuals, some companies get lost in the process, and end up with not matching the value proposal and specific customer segments sufficiently to turn potential targets to actual paying customers. Others struggle with reaching the private individuals through efficient marketing channels, and may resort to an intermediary for reaching the paying customer. E.g. Changetech, which sells a lifestyle transformation programs through insurance companies, are not able to reach the private individual who uses the solution because they are not able to successfully reach the private end user directly.

5.3.3 Summary of challenges and opportunities / Concluding remarks

The objective of this Section was two-folded: First, the objective is to provide an insight into the motivational factors behind smart health companies. Second, to gain deeper understanding of the strengths and challenges related to each business model. We have summarized our findings in table 4:

Business model	Motivation	Strengths	Challenges
The Inverted Razor-Blade Model	Negative experience with the existing healthcare system	Value proposition, costumer segments	Cost/revenue structure, value delivery
The One-Time Payment Model	Negative experience with the existing healthcare system	Value proposition, costumer segment, value delivery	Value delivery
The Long-term Subscription Model	Negative experience with the existing healthcare system	Value proposition, cost/revenue structure	Value proposition, value delivery
The Platform Model	Negative experience with the existing healthcare system	Value proposition, Value delivery	Cost/revenue structure, value delivery

Table 4: Summary of motivation, strengths and challenges of smart health business models. Authors' own research.

6 Discussion and concluding remarks

There is a pressing need for smarter healthcare companies, and there are two main obstacles to become smart: (1) There lacks a clear conceptualisation of the different types of smart business models that managers can adopt, and (2) there is a lack of an understanding of the motivation, strengths and challenges behind the various business models. To address these issues, the aim of our thesis has been two-fold: Firstly, we have identified the emerging types of business models within the healthcare industry that are 'smart'. Secondly, we have provided deep insight into the motivational factors, strengths and challenges of smart health businesses. Finally, we will provide a discussion on the theoretical and managerial implications of our findings, discuss the thesis' limitations, and propose avenues for future research.

6.1 Effects of technology on smart health business models

By identifying emerging types of smart business models in the healthcare industry, we generated four models that differ in the way they are affected by technology. The models we generated are *the Inverted Razor-Blade Model, the One-Time Payment Model, the Long-Term Subscription Model* and *the Platform Model*. Within the *long-term subscription model* we have generated two sub-models: *The personal butler* and *the workplace butler*. We have also

identified two sub-models within *the platform model*: *The one-sided platform* and *the multi-sided platform*.

The Inverted Razor-Blade is a model that offers cheap and accessible aid for low to medium severe health conditions, to private costumers. The model attracts customers by providing affordable software, and secures revenue by complimenting the software with relatively expensive hardware for the ultimate value creation. The *One-Time Payment Model* proposes a quick-fix for private individuals who has short term needs, that can be delivered anywhere at any time. *The long-term subscription* is characterised by a subscription pricing model, and is further divided into two sub-models: (1) The personal butler and (2) the workplace butler. The *Personal Butler* offers practical tools to help individuals carry out their everyday lives. The *Workplace Butler* substitutes basic tasks for healthcare workers, or aid them to perform basic tasks more efficiently. *The Platform Model* connects people through a platform solely based on software and on service, and can further be divided into the (1) a one-sided platform model and (2) a multi-sided platform model. *The One-Sided Platform Model* makes information more accessible and communication more efficient between co-workers, healthcare worker and patient, but also between companies. The multi-sided platform model offers a marketplace for both providers and demanders of healthcare services in order to streamline healthcare services and avoid bottlenecks.

As seen in table 3, the main dissimilarities are value concerned with proposition, value delivery and revenue structure: The value propositions differ as a result of how the companies were at the outset: For example, companies with the *Long-term Subscription* use technology to offer tools that ease everyday life tasks, or decrease the number of tasks necessary to receive the same value. In contrast, the *Platform Communication* uses technology to increase and streamline the information flow for professional healthcare workers. Regarding value delivery, the solutions are either delivered through highly technological software alone or in combination with hardware. In the case of *Platform Communication*, it is the only model that delivers solely on a software platform (one-sided or multi-sided platform). The revenue structure is dissimilar between the models because they either choose single purchases like the *One-time Payment*, or variations of long-term 'software & service' subscriptions like *Inverted Razor-Blade, Long-term Subscription* and *Platform Communication*.

The primary similarities between the models relate to cost structure and customer segment. The cost structures of the companies depend on high initial R&D due to novel technology creation, and fixed costs incurred by labour for service related tasks. Lastly, the customer segments can be divided in two groups main groups. They either target private individuals through B2C, or professional healthcare providers in B2B. Despite these similarities, the models are mutually exclusive. This is a result of our decision to categorise the value proposals in a fairly detailed manner.

We assumed we would generate more than four business models and four sub-models. This assumption was based on our impression that healthcare is complex industry with many stakeholders keep in mind when developing business models. Furthermore, we know that healthcare operates with other strategies, production patterns and key performance indicator than the majority of other industries who have profit maximisation at its core. We believed that this could also affect the range of business models. Additionally, we assumed that the companies would have a more clearly defined revenue structure from the outset, as the notion of how companies will make money and survive long-term is vital. This was not always the case with the interviewed companies. Finally, we assumed that the customer segments would be more clearly defined as the companies exists solely for the purpose of delivering solutions to a specific group of people.

We were surprised to find that the intrinsic motivation among the founders was often triggered by personal experiences in the healthcare industry. Additionally, we were surprised that the vast majority of the companies only turn to professional healthcare providers (e.g. hospitals) for paying customer segments, despite having private individuals as end-user. Lastly, we were surprised by the 'born global' spirit in the interviewed companies across all models. They wish to expand internationally as soon as possible and already use English in their marketing channels (e.g. website) despite being in the start-up phase without specific customer segments. Based on our findings, we predict an emergence of more companies operating within all business models as illustrated in figure 8. More specifically, we predict to see an increase in companies operating with the *Platform Model*, and furthermore that in the empty square in figure 8 will be filled with a new emergent model; the *Vipps Model*.

We believe that the *Vipps Model* will deliver value through two-sided platforms and require one-time payments. The prediction is based on the same platform scaling argument as for *Platform Communication*, but is accompanied by the tendencies discovered in *One-time Payment:* Recently, several companies that offer one-time payments in combination with highly technological solutions have been launched with great success. In Norway, the most famous example is perhaps Vipps – a multi-sided platform that enables different customer groups to transfer money between them.
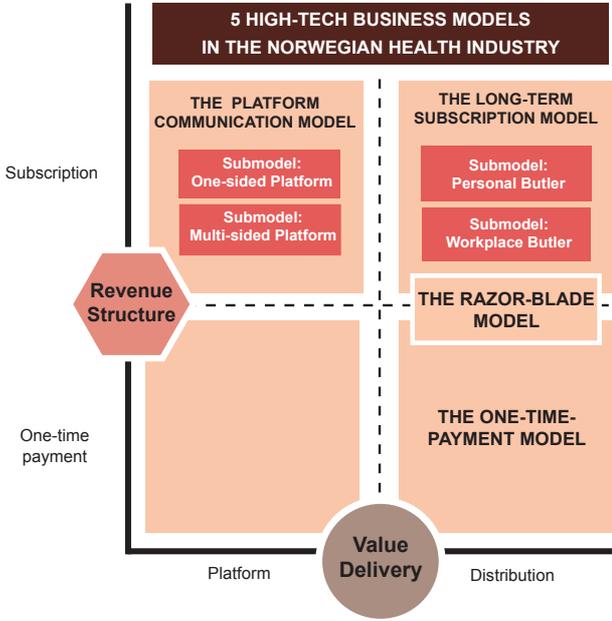
Figure 8: Final typology that classifies emerging smart health business models in Norway. Authors' own research.

The owners of Vipps get a one-time income from each transaction over a certain figure. Based on our findings, we believe that a Vipps model in smart healthcare can be successful with a multi-sided software platform that targets private individuals who are in need of service on an irregular basis. The services will demand various skillsets, where both professionals and unskilled individuals can contribute. As seen in the multi-sided platform Nyby, the business model may require verification of the suppliers internally from a service team. Optionally, similar rating systems to Uber and AirBnb may be implemented as a substitute to service teams. Regardless, the function must be to ensure safety and match compatible skillsets with tasks. Based on our findings, we indicate that value proposals consist of various low-tech services that are either reactive in preventative in nature. In addition they will all require some form of professional training. We predict that services will be provided by healthcare professionals who have the opportunity to adjust their schedules and offer services irregularly when time allows it (e.g. therapists and dentists). We believe some potential services are: Ergo- and physio therapy, dentistry, personal training, therapy and mental coaching.

Furthermore, we believe that emerging companies will operate more with the *Platform Model* resulting from global scaling plans. This model generates less costs. Strict delivery through software has limited variable scaling costs. Additionally, this model can in the future be adjusted to a B2C from the current B2B standard by moving from the popular one-sided

platform to multi-sided. (Our sample had companies in the one-sided sub-model, and only one in the multi-sided, see figure 7). By opening up for private individuals as customer segments in B2C, companies may upscale more easily through apps and online market places without going through bureaucratic decision-making procedures and funding processes among professional healthcare providers, municipalities and governmental bodies.

6.2 Motivations, strengths and challenges for smart health business models

Despite conducting eight in-depth interviews with companies represented across all models, we found no notable difference in their motivation. The findings show that business models have a dual intrinsic motivation at its core when it comes to building smart health companies: Value proposals seek to both offer highly technological solutions to correct a flaw in the current healthcare system, and push the limits of current best-practise to make further improvements. The solutions either target patients, the professional healthcare workers or both segments. Additionally, and to some extent, extrinsic motivation is present. It involves the monetary motivation component.

A prominent strength in all four business models is therefore that they see value proposal as a source of competitive advantage. They focus on creating need-based solutions that are high in demand, and achieve this through collaborations, which in turn help to improve pilot value proposals to perfection. In addition, the business models have the following variations in strengths:

Inverted Razor-Blade is strong when it comes to delivery, because of the separated delivery of software and hardware, which can create synergies from operating in two separate markets. Revenue can also be beneficial, because the two-folded pricing model enables the company to attract an initially high user-base due to low prices, prior to offering high priced complementing products at a higher price. Lastly, targeting private individuals in B2C is also an advantage when operating in the healthcare industry, because there are no bureaucratic tender or decision-making processes to reach the paying customer. The *One-Time Payment* has customer segment as a primary strength for the same reason as *Inverted Razor-Blade,* in addition to the value

proposal. *Long-Term Subscription* benefits from a subscription structure to secure revenue, ensuring that important knowledge about their future cash flow is available. *Platform Communication* has a distinct benefit in achieving global scaling plans when it comes to value delivery, because it offers services solely through software, which incurs limited variable costs. Finally, it has a strength in subscription based revenue due to the same information about future cash-flows as the other subscription based models.

A common challenge for all models is the handling of sensitive healthcare data, because all business models depend on technology to deliver value that requires particular government-regulated measures for patient data. Additionally, the business models have the following variations of challenges:

Inverted Razor-blade has a challenge when it comes to customer segment, in addition to it being a strength. The problems relate to not specifying the segments enough, and reaching the customer through the correct marketing channels. *One-time Payment* faces a challenge to obtain a clear picture of long-term revenue, as it only offers customers a one-time in-the-moment purchase. Additionally, it faces the same customer segment challenge as *Inverted Razor-Blade.* *Long-term Subscription* is partially also included in this challenge, as it may offer solutions to private individuals. *Platform Communication* is primarily challenged by the B2B process of manoeuvring the decision process of professional customer segment.

6.3 Industry findings

Based on the in-depth interviews, we found that companies in the Norwegian healthcare industry have different relations to their business models, depending on their stage in the business life cycle. From the interview with Innovation Norway, we learned that many seed and early start-up companies are too detailed in their planning and too future-oriented to ensure a flexible business model. The models are often not flexible enough for the inevitable changes that will occur in early pilot phases. A common trait we found that a particular strength is their focus on creating a clear value proposal. Additionally, companies they break down silos internally between the providers of professional equipment by enabling compatibility with other brands.

Simultaneously, we found that many firms struggle to define their customer segment, since solutions often are used by both paying customers and other end-users. The core technology in the solution can be tailored to several needs in the healthcare industry, which amplifies the complex customer segment decision. Finally, we found that companies – regardless of life cycle phase – have a view on business models that is based on academic literature or the four exact components chosen for this thesis: *value proposal, value delivery, value capture* and *customer segments.*

6.4 Theoretical implications

The implications of our findings are twofold. First, we contribute to a better understanding on the emerging research field of smart health. Although this subject is experiencing increased interest from industry, there is very limited scientific literature on the field of study today. Existing literature focus on defining the phenomena as a subset of smart cities (e.g Pramanik et al, 2017: Smart health: Big data enabled health paradigm within smart cities), but limited studies acknowledge smart health as a separate field of study. We have explored the evolution of smart health, and contributed with a clarification of the core constructs, such as differentiating e-health, m-health and smart health.

Specifically, we have contributed with a business model perspective to the smart health literature, which have been unexplored until now. No other study examines the concept of smart health and business models combined that we are aware off. This is problematic, because there is a need for a better understanding of how smart heath companies operate, and the architecture of their business models. Moreover, we have contributed with an understanding of the motivation behind smart health companies, which has been lacking in literature until now. Researchers can use our findings to further investigate whether the motivation behind smart businesses change over time, and what triggers this change. Our findings are not only relevant to studies within smart health, they could also be applicable to further research on smart cities.

Second, our findings contribute to the nascent literature on business model innovation, particularly the role of new technologies as antecedents of new business models. Prior research on the effect of technology on business models has fallen victim to a static view, and merely points towards the outcome of the driver (e,g studying the performance of companies or the impact on individuals). There is limited research considering these drivers from a dynamic

view, and the few that adopts a more dynamic view treats the drivers in very general terms. Hence, there has been a lack in literature considering the triggers of emerging business models. It is important to pay attention to the external drivers of business models as successful models must be adjustable to change. In our thesis, we have shown how technological advancements, such as in context of smart health, have led to the emergence of new types of business models. These new business models differ significantly in comparison to traditional healthcare providers in terms of the value they offer and how this is being delivered. Thus, this new technology has affected core elements of the business model.

Furthermore, we have generated a typology that may be used as a classification tool for further business model research. The typology is not limited to the healthcare industry, and can also be transferred to other settings, such as e.g. researching the effect technology has on business models in other industries where smart technology is making an entry.

Existing literature on business models mainly pay attention to established enterprises, however, disruptive business models tend to arrive with smaller companies and start-ups (Markides, 2005). It is therefore important to study the business model logic of these companies to understand why innovations often is born here. We assume that our findings on motivations behind smart health companies can be used by scholars researching differences in start-ups and established companies, and not just limited to the healthcare industry.

6.5 Managerial implications

It is difficult for managers and policy makers to gain an overview of the smart health segment and to assess the effects of a new technology on the emergence of new business models. For managers of both incumbent and new entrant firms, our findings have great significance. Firstly, we have provided them with an overview of the novel segment of smart health and given a clarification of the concept and definitions to the term. Secondly, we have generated four archetypes of emerging business models, with four associated sub-models. The types of business models conceptualised in this thesis, can be used as end goals for companies wanting to become smarter, or act as a roadmap for incumbents that want to adjust their business model. For instance, a company can use the models to understand what kind of resources they must allocate for certain models, or in a reversed fashion, identify what kind of business models that are suitable for the resources they are already in possession of. Furthermore, by analysing the

strengths and weaknesses of the various models, thriving smart companies are in a better position to get an overview of how they can position their business models to meet new technology and future challenges. Thirdly, we have provided a typology that may be used as a classification tool for businesses. We have identified that smart health business models can be classified based on two pillars of the business model, namely the value delivery and cost structure.

Our finding are also of great importance to policy and decision-makers. If smart healthcare companies are to evolve and thrive, policy makers must facilitate growth and understand what triggers and hinders smart health companies. As we have found that most companies struggle with funding in the crucial intermediate phase between start-up and establishment, policy makers and investors can use the knowledge provided in our thesis to support these companies. By revealing the motivation behind smart health companies, we have provided policy makers with insight into an important mechanism behind a smarter society. Policy can use this information to better tailor efficient framework for the industry with incentives that trigger novel technology usage in an industry that lacks significant labour resources.

Furthermore, our findings have significance to decision makers that provide healthcare services. We found that companies targeting their service to institutions run by the state or municipalities, experience that decision-makers are hesitant to invest in smart technology, and hence these institutions are lagging behind. As Norway is facing operational challenges in providing healthcare services to all, it is important to understand the importance of technological advances and innovate the traditional healthcare industry.

6.6 Limitations and future research

As we are among the first to explore the intersection of smart health and business models, there are limitations and further research is needed to gain a deeper understanding. There are limitations related to our sample of 52 companies. It is not limited due to the access to more data, but because of strict time constraints in writing the thesis. The time constrains also limited us to conduct interviews with eight companies from our sample. Several in-depth interviews would have strengthened our thesis, and potentially given us a different result. This, combined with the fact that we only examined companies in the Norwegian healthcare market, implies a lower degree of generalisability in our findings.

We categorize the companies according to generic features in their business models, hence the value proposition, value delivery, value capture and costumer segment. There are, however, many specific features affecting the business model that we were not able to analyse. For instance, future research is needed to explore the effects that leadership has on business models, to understand what triggers managers incorporate technology in their business models and what hinders them to do so. Furthermore, most the companies we have analysed are in the start-up phase. Consequently, it is hard to measure the success of these companies. However, as the companies analysed have managed to survive the first critical seed stage and gained funding from investors, one could say that this is a positive indicator.

Another topic we touched upon but did not study thoroughly is the effect of collaboration. From our study, we found that many companies are positive to open innovation and want to break up silos. Further research could study the effect collaboration in an ecosystem has on business models, or the effect of open innovation.

More work lies ahead for future research on business models in smart healthcare. The types of smart health business models that we present in this thesis provides an overview, and an indication of how companies can structure their business model. Hence, our contribution can serve as a starting point. There is however, a need for more further research to clarify the concept of smart health and business models, gain deeper insight in each of the four responsible business models, and develop and test empirical measures. There is a need for further research on additional business models archetypes, as business models will continue to emerge and change due to constant technological advances.

7 References

Amit, R. & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal,* 22, p. 493-520, doi: 10.1002/smj.187

Amit, R., & Zott, C. (2010). Business model innovation: Creating value in times of change. *IESE Business School Working Paper No. 870.* doi: 10.2139/ssrn.1701660

Aue G., Biesdorf S., & Henke N. (2016). How healthcare systems can become digital-health leaders. *McKinsey & Company*. Published January 2016. Downloaded 16 December 2017 at https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/how-healthcare-systems-can-become-digital-health-leaders

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and corporate change*, *11*(3), 529-555.

Christensson, P. (2010, January 4). *ICT Definition*. Retrieved 2017, Oct 25, from https://techterms.com

Solanas, A., Patsakis, C., Conti, M., Vlachos, I. S., Ramos, V., Falcone, F., ... & Martinez-Balleste, A. (2014). Smart health: a context-aware health paradigm within smart cities. *IEEE Communications Magazine*, *52*(8), 74-81.

Duffy, J. (2015, 11 February). Ten apps that are changing healthcare. PCMagazine, Retrieved 13 October 2017 from http://uk.pcmag.com/apps/39662/feature/10-apps-that-are-changing-healthcare

Espelien, Anne., Dyrstad, G., H., (2017). *Key Key players and suppliers for smart communities* (Report no. xx) Menon Economics.

Eysenbach G. What is e-health? Journal of Medical Internet Research. 2001 Jun 18;3(2):e20. doi: 10.2196/jmir.3.2.e20.

Farahani, B., Firouzi, F., Chang, V., Badaroglu, M., Constant, N., & Mankodiya, K. (2018). Towards fog-driven IoT eHealth: Promises and challenges of IoT in medicine and healthcare. *Future Generation Computer Systems*, *78*, 659-676.

Foss, N.J., Saebi, T., Business models and business model innovation: Between wicked and paradigmatic problems, *Long Range Planning (2017)*, doi: http://dx.doi.org/10.1016/j.lrp.2017.07.006

Free, C., Phillips, G., Felix, L., Galli, L., Patel, V., & Edwards, P. (2010). The effectiveness of M-health technologies for improving health and health services: a systematic review protocol. *BMC research notes*, *3*(1), 250.

Frankenberger, K., Weiblen, T., Csik, M., & Gassmann, O. (2013). The 4I-framework of business model innovation: A structured view on process phases and challenges. *International Journal of Product Development*, *18*(3-4), 249-273.

Ghauri P. & Grønhaug, K. (2010). Research Methods in Business Studies (4th ed.). Essex: Prentice Hall

Høye, B. (2017). Digitale løsninger for pasientens helsetjeneste, published 27 September 2017 at https://www.regjeringen.no/no/aktuelt/digitale-losninger-for-pasientens-helsetjeneste/id2573083/

Innovation Norway (2017), Smart Cities. Retrieved 25 October 2017 from http://www.innovasjonnorge.no/no/Kontorer-i-utlandet/uk/fram-smart-cities/how-to-apply4/

Istepanian, R. S., & Woodward, B. (2016). *M-health: Fundamentals and Applications*. John Wiley & Sons.

Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard business review*, *86*(12), 57-68.

Kurzweil, R. (2013). *This is your future.* Retrived 18 October 2017 from: http://edition.cnn.com/2013/12/10/business/ray-kurzweil-future-of-human-life/index.html)

Lambert, Dr. Susan, (2015). The importance of classification to business model research. *Journal of Business Models*, Vol. 3, No. 1, pp. 49-61

Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, *24*(3), 149-157.

Markides, C. (2006). Disruptive innovation: In need of better theory. Journal of product innovation management, 23(1), 19-25.

Mettler, T., & Eurich, M. (2012). A "design-pattern"-based approach for analyzing e-health business models. *Health Policy and Technology*, *1*(2), 77-85.

Olsen, Karen Modesta (2017). Lecturenotes retrieved from It's Learning.

Opinion (2017). Teknologibarometeret 2017 survey presented at Aftenpostens Teknologikonferanse, 16 October 2017.

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying business models: Origins, present, and future of the concept. *Communications of the association for Information Systems*, *16*(1), 1.

Pagliari, C., Sloan, D., Gregor, P., Sullivan, F., Detmer, D., Kahan, J. P., ... & MacGillivray, S. (2005). What is eHealth (4): a scoping exercise to map the field. *Journal of medical Internet research*, *7*(1).

Pérez-Martínez P. A., Martínez-Ballesté A., & Solanas A. (2013). Privacy in Smart Cities — A Case Study of Smart Public Parking. *Proc. 3rd Int'l Conf. Pervasive Embedded Computing and Commun. Sys.*, 2013, p. 56.

Perlacia, A. S., Duml, V., & Saebi, T. (2017). Collaborative Consumption: Live Fashion, Don't Own It. *Beta*, *31*(01), 6-24.

Pramanik, Md. Ileas., Lau, R.Y.K., Raymond, Demirkan, H., Azad, Md. A.K. (2017). Smart health: Big data enabled health paradigm within smart cities. *Elsevier, 2017* (Volume 87), 370-383. doi: https://doi.org/10.1016/j.eswa.2017.06.027

Röcker, C., Ziefle, M., & Holzinger, A. (2013). *From computer innovation to human integration: Current trends and challenges for pervasive Health Technologies*. DOI: 10.1007/978-1-4471-6413-5_1

Saebi, T., Lien, L., & Foss, N. J. (2016). What drives business model adaptation? The impact of opportunities, threats and strategic orientation. *Long Range Planning*. doi: http://dx.doi.org/10.1016/j.lrp.2016.06.006

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2015). *Research methods for business students* (6th edition). New York: Financial Times Prentice Hall.

Scopus, 2017a, Search for 'smart health' in publication title. Results were generated 30 September, 2017. Scopus - The largest abstract and citation database covering peer-reviewed literature, provided by Elsevier. Retrieved from https://www.scopus.com/results/results.uri?sort=plf-f&src=s&st1=%22smart+health%22&nlo=&nlr=&nls=&sid=d73b3225b91c01024e055d72ce50cff1&sot=b&sdt=cl&cluster=scopubyr%2c%222018%22%2cf&sl=21&s=TITLE%28%22smart+health%22%29&origin=resultslist&zone=leftSideBar&editSaveSearch=&txGid=438b36eee25313751b0cd514b60eb38c

Scopus, 2017b, Search for 'smart healthcare' in publication title. Results were generated 30 September, 2017. Retrieved from https://www.scopus.com/results/results.uri?sort=plf-f&src=s&sid=9c20842902948963ee69daf1c2237672&sot=a&sdt=a&cluster=scopubyr%2c%222018+%22%2cf&sl=25&s=TITLE%28%22smart+healthcare%22%29&origin=searchadvanced&editSaveSearch=&txGid=9ebe65e18bb2763c11967ac062861ee5

Scopus, 2017c: Search for 'business model' hits during 2008-2017. Results were
generated 3 October. Retrieved from
https://www.scopus.com/results/results.uri?sort=plf-
f&src=s&st1=%22business+model%22&nlo=&nlr=&nls=&sid=6f08af0aa3ff01950f0
18c55e6f93c1a&sot=b&sdt=cl&cluster=scopubyr%2c%222017%22%2ct%2c%22201
6%22%2ct%2c%222015%22%2ct%2c%222014%22%2ct%2c%222013%22%2ct%2c
%222012%22%2ct%2c%222011%22%2ct%2c%222010%22%2ct%2c%222009%22
%2ct%2c%222008%22%2ct&sl=23&s=TITLE%28%22business+model%22%29&ori
gin=resultslist&zone=leftSideBar&editSaveSearch=&txGid=b132bffc682f3ef044aaa6
67d3b82fe8

Scopus, 2017d: Search for 'business model' hits during 2008-2017. Results were
generated 3 October. Retrieved from
https://www.scopus.com/results/results.uri?sort=plf-
f&src=s&st1=%22business+model%22&nlo=&nlr=&nls=&sid=9608d9ab1e0c74d812
631207dbcc1e1e&sot=b&sdt=cl&cluster=scopubyr%2c%222007%22%2ct%2c%2220
06%22%2ct%2c%222005%22%2ct%2c%222004%22%2ct%2c%222003%22%2ct%2
c%222002%22%2ct%2c%222001%22%2ct%2c%222000%22%2ct%2c%221999%22
%2ct%2c%221998%22%2ct&sl=23&s=TITLE%28%22business+model%22%29&ori
gin=resultslist&zone=leftSideBar&editSaveSearch=&txGid=2cec9be5a71d8f7dc850d
922eb351b02

Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. *Business
horizons*, *48*(3), 199-207.

Sherry, J. M., & Ratzan, S. C. (2012). Measurement and evaluation outcomes for mHealth
communication: don't we have an app for that?

Solanas, A., Patsakis, C., Conti, M., Vlachos, I., Ramos, V., Falcone, F., Postolache, O.,
Pérez-Martínez P. A., Di Pietro R., Perrea, D. N., Ballesté, A.M. (2014). Smart
Health: A Context-Aware Health Paradigm within Smart Cities. *IEEE
Communications Magazine* (52). 74-81. Doi: 10.1109/MCOM.2014.6871673.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long range
planning, Volume 43, Issues 2-3,* p. 172-194. doi:
https://doi.org/10.1016/j.lrp.2009.07.003

United Nations (2017). Retrieved 16 December 2017 from
http://www.un.org/sustainabledevelopment/health/

Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. (2016). Pipelines, platforms, and the
new rules of strategy. Harvard Business Review, 94(4), 54-62.

Visma. (2017, 5 desember). Hentet fra:
https://www.visma.no/unique/pasientjournal/vaernes-kundecase/

Wirtz, B., Pistoia, A., Ullrich, S., Göttel, V. (2016). Business models: Origin, development,
and future research perspectives. *Long range planning,* 46, 2016, p 37.
doi: https://doi.org/10.1016/j.lrp.2015.04.001

Zott, C., Amit R., & Massa, L. (2011). The business model: Recent developments and future research. *Journal of Management Vol. 37* No. 4, July 2011 doi: 10.1177/0149206311406265

Zott, C., & Amit, R. (2010). Business model design: an activity system perspective. *Long range planning*, *43*(2), 216-226.

8   Appendix

Appendix 1: Literature review

Searches of relevant academic articles on business models in the context of smart health and e-health.

STAGE	SEARCH WORD(S)	FIELD	RESULTS
1	"business model"	Title	1962 hits
2	"smart health"	Title, abstract and keywords	109 hits
3	"business model" and "smart health"	Title, abstract and keywords	2 hits
4	"e-health"	Title	824 hits
5	"business model" and "e-health"	Title, abstract and keywords	4 hits
6	"technology" and "business models" and "smart health"	Title, abstract and keywords	No results

Search for "Business models"
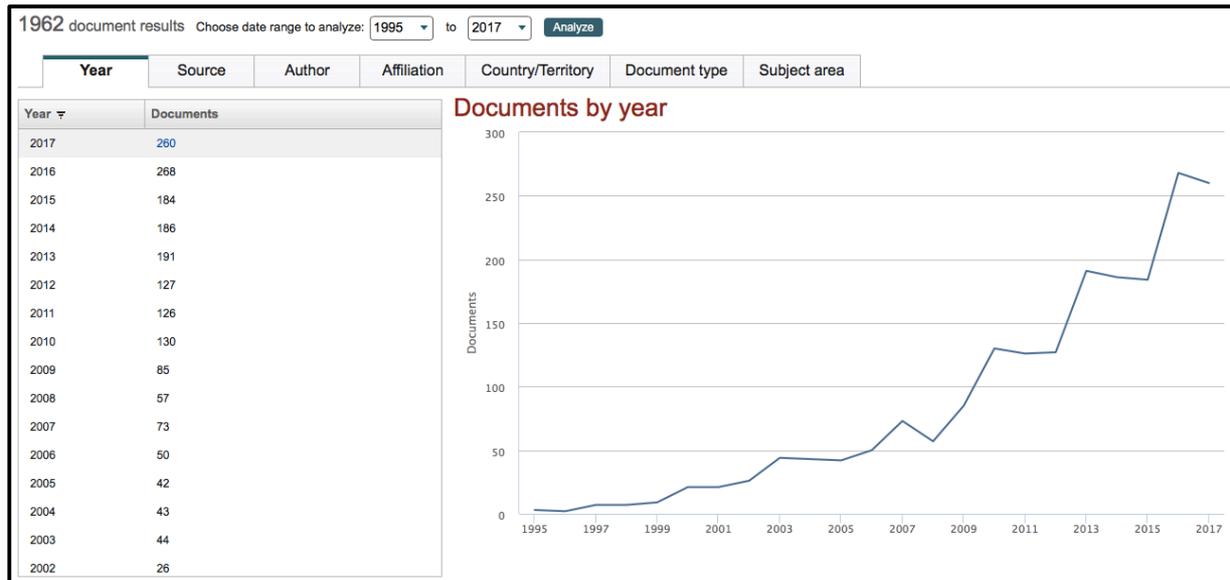
Source: Scopus, 1995-2017. "Business model" (BM). 1962 hits.

Search for "Smart health"
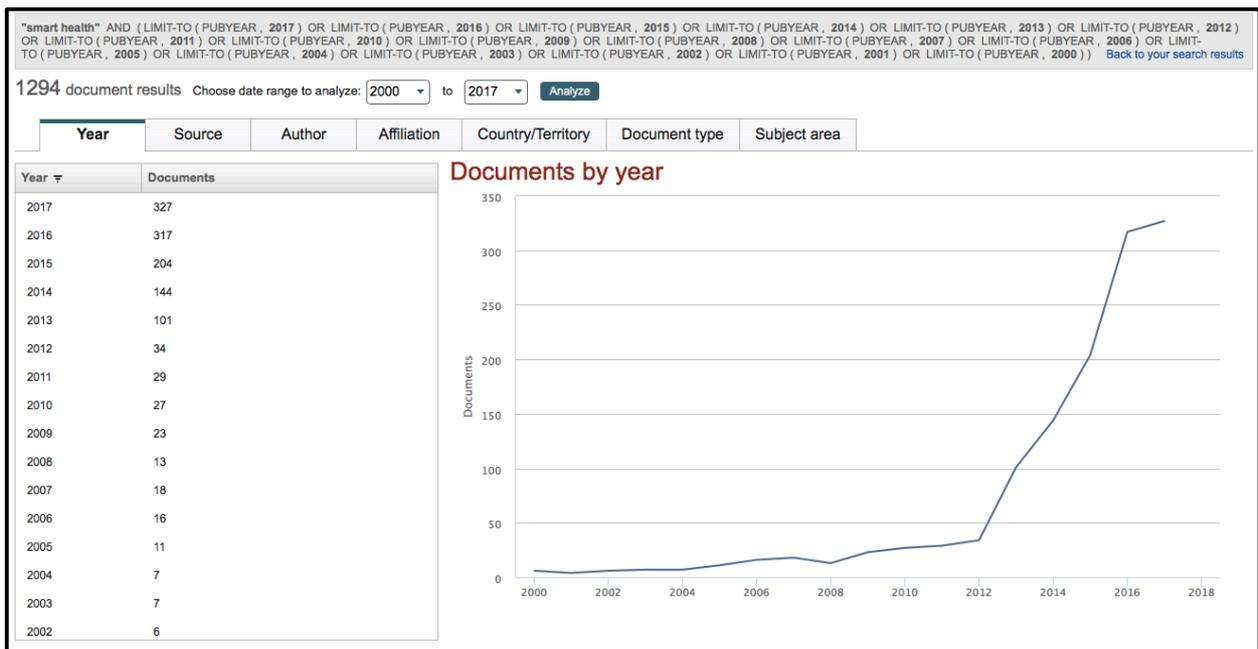
Source: Scopus, 2000-2017. "Smart health". 1294 hits.

Search for "Business model" and "Smart health"

Source: Scopus, 2013-2017. "business model" and "smart health". 4 hits.

Appendix 2 – Part 1 of analysis (online data)

Companies from Menon Economics. Companies excluded from sample are marked in red.

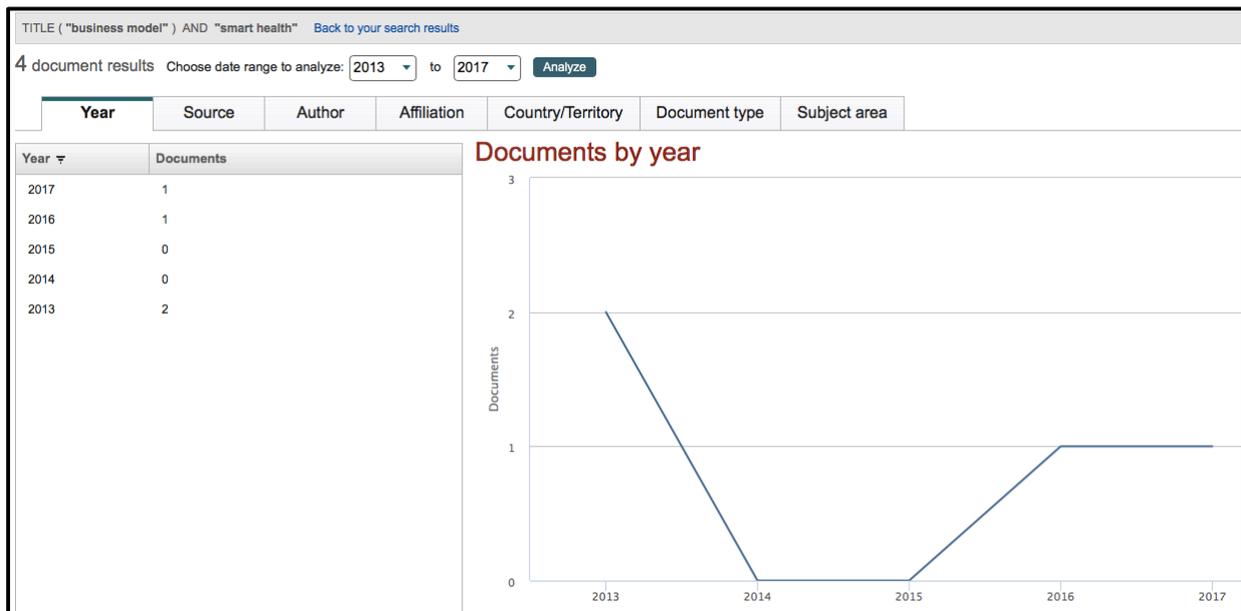| Company name	Value proposition	Details about product and/or service	Product and/or Service	Cost / Revenue structure	Customer Segment	Role(s) of company	Partners	Sales channels	Rental channels	Support channel
911-TJENESTEN AS	Safety for users				Professional actors	Distributor	No info	Phone and email	-	Fill out form in webpage / Phone
ABILIA AS	"Helps people structure everyday life, communicate with their environment, manage features at home, and call for help when needed"		Product		Disabled people. (ADHD, elders, etc)	Distributor	-	Phone and email	NAV hjelpemidde lsentral	Fill out form in webpage / Phone
ABleOn Medical	Assist elders and people with disabilities through the entire shower routine		Product		Elders, disabled people and care workers	Developer and distributor	Nordic Innovation, Innovation Norway, Oslo kommune, Voss kommune ++	Message through webpage	-	
AbleCon	Løsninger som kan muliggjøre mer integrasjon for svaksynte		Product and service		People who are visually impaired	Developer and distributor	Hjelpemiddelsentralene, NAV Arbeid and Pedagogisk psykologisk tjeneste	Trudvangveien 67 = Official adress -> Shop?	NAV ++?	Webpage (Online tutor-videos), phone, email
Alder	Alder skaper rikere liv ved å bruke intelligente systemer til å knytte mennesker sammen.		Service		Primary target group: Coordinator of volunteer work. Secondary: Volunteers	Platform	Norwegian Smart cluster, Oslo MedTech, nasjonalforeningen for folkehelse, krefthoreningen ++	Phone and email	-	
Altibox AS	No info on Altibox webpages									
Alu Rehab AS	"Enable joy of life" for people in need of a wheelchair	Wheelchair	Product		Users of wheelchair	Developer and distributor?				
Arbies AS (but product name is Juztmove)	"Bedre helse, livsstil og velvære hvor du enn befinner deg"	Internet based subscription service. Workout classes, presentations, show, sports events	Service	Fixed monthly fee for customers	Private individuals + Companies	Developer + distributor	Universitetet i Stavanger, Stavanger Universitetssykehus, Ipark	Webpage	-	Webpage
Barn-nett	Save time and money by collecting kindergarten systems in one place.		Product (App) with many services + courses		Kindergartens	Developer and distributor		Contact from webpage		Wepage, courses
CARETECH AS	AALT Portalen ™ connects people, regardless of their role, and provides them with the technological tools needed to provide the best possible healthcare tailor made for the individual.	A portal with many solutions in welfare-technology	Product and service		Organizations and communities, healthcare workers and dependents (pårørende)	Developer and distributor	AALT-portalen is developed in close collaboration between elders, professional developers, academia and Norwegian government	Contact from webpage		
CHANGETECH AS	Easyexchange to quit smoking, drink less, stress down, eat healthier, become more active, increase their mood and wellbeing or live better with a chronic disease.	Provide "Easyxchange programs" in order to help people change habits. Stop drinking, smoking, start exercising, stress down and so on	Service		People who want to change their habits. Stop drinking, smoking, start exercising, stress down and so on		Statoil, Evry, SOS, Aikan, Pfizer, Fack, Janssen, J&J, Sansomi, Abbvie, Helsedirektoratet, Innovasjon Norge ++	Contact trough webpage		
CHECKWARE AS	Digital selvrapportering og egenmestring til pasientene	CheckWare er en sikker eHelse-løsning som automatiserer innsamling og rapportering av målenesultater og muliggjør behandlerstøttet behandling over internett.	Product		Clinics and research projects in the field of mental health and substance abuse treatment who use psykometric tests	Developer + Distributor + implementor?	Norsk Helsenett, Dlf, journalleverandører: Dips, HK data, SOMA, Extensor, ASPIT.	Contact through webpage, phone, email	-	Webpage (login page to support system) (+ Email + Phone, but login seems to be the primary support)
COGNITA AS	Cognita simplifies the digital everyday life and contributes to coping	Digital products to helt communication, orientation and memory. Also have courses	Products and courses		Not very specified, but people who need help with communication, orientation etc			Webpage		Webpage
Conexus AS	Help the teacher help the student	Digital solutions for learning	Products and services?		Teachers, Schools, Students		Stiftelsen IMTEC, IST, CSX, KMD, Microsoft	Webpage, phone		
CSAM HEALTH AS	"Enable healthcare providers access relevant clinical information at the point of care"	Solutions enable healthcare providers access relevant clinical information at the point of care.	Software solutions		Hospitals and other healthcare professionals	Developer + Distributor	Webpage does not specify business partners' names (On Dips' webpage, we find that CSAM is one of their partners through)	Direct contact, email and phone found on webpage	-	Login to portal through webpage (+ phone + email)
Danfo	Offer a range of toilets for public use. Some are high-tech and automatic.	Public Toilets	Product		No info	Developer and Distributor		Contact trough phone, email		
DIAGRAPHIT AS	The software collects and displays concrete and relevant clinical information for patients and healthcare professionals.	DiaGraphIT® offers treatment tools for mental disorders, osteoporosis, dermatological and neurological disorders, infections, cancer treatment and IBD patients (gastro).	Product and service		A tool for doctos to help mental pasients, osteoporosis, dermatological and neurological, infections, cancer and IBD	Developer		Contact trough message or phone		
DIAMAN AS	Help patients increase their selfcare abilities, better controll of their diabetes, increased wellness, fewer late complications and a longer life.	Electronic pasient monitoring system that also enables communication between pasient and health services. Works on computers, phones and tablet devices.	Product and service (Unclear)		Diabetes patients	Developer and distributor	Pan-American Health Organization (PAHO, WHO) International Diabetes Federation - South and Central American (IDF SACA) ++			
DIGIDOC TECHNOLOGIES AS	Make health more accessabile and more mobile	Personal training, specialize in software and app development, but still with a focus on telemedicine, eHealth and mHealth	Product and service		People concerned with their health	Developer		Contact by email, phone		
DIGNIO AS	Dignio provides welfare technology solutions that improve health and improve quality of life.	Dignio Prevent is a follow-up system for welfare technology that ensures that the municipality assumes its responsibility to a large number of users	Product and Service		Municipalities	Developer	Atea, Apple, iHealth, Bejey, Nonin, COMM, AND, ForaCare, Doro, HBV, Høgskolen iØstfold, Innovasjon Norge ++	Contact by phone, email		
DIPS ASA	Enable significant rationalization of work, quality improvement of of patient care and increased patient safety	Leading supplier of e-Health computer systems to Norwegian hospitals. Includes closed loop medication, charting, booking and planning, electronic document workflow, CPOE, multimedia and reporting ++	Product and service (Unclear)		Public and private hospitals + primary care institutions in Norway + hospitals in Denmark	Developer + Distributor	Deloitte, Microsoft, Oracle, openEHR, Oslo Med Tech, Acos, Analysesenteret, Avans, Canon, CSAM HEALTH AS ++	Contact by phone, email	-	"E-learning courses provide knowledge about the utilization of DIPS as a system.
DORO CARE AS	Doro Care offers municipalities complete, safe and quality assured systems for the elderly and the disabled	Safety alarms. "Doro Visit", (fjemilsyn) Product "Smoke" røykdetektor.	Products and services		Municipalities	Developer		Webshop, costumer service		
Enform AS	Inspires people to do lifestyle-changes	e-health tool where participants make an independent assessment of their own health and lifestyle.	Service		Municipalities, Schools, Companies	Developer in close collaboration with academia	Innovasjon Norge, Norwegian Smart care cluster			

Company name	Value proposition	Details about product and/or service	Product and/or Service	Cost / Revenue structure	Customer Segment	Role(s) of company	Partners	Sales channels	Rental channels	Support channel
Epleslang	Meaningful and active job + Good concience and tidy gardens + ecologic drink. En meningsfull og aktiv jobb / God samvittighet og ryddige hager / Kortreist og økologisk mat	Organic apple juice with self-picked apples	Product		Disabled people and young people who are looking for work experience (in Oslo area)	Developer + distributor	Dyre Gård, Spir-Oslo, Balder-Tekstil, Nordpolen Industrier AS, Asker Produkt, Gamle Oslo Tre & Tekstil	Webshop in webpage, stores, restaurants and cafees	-	Email
Evondos AS	With the help of Evondos® "auto-medication service, long-term service recipients can get the right medicines at the right time and at the right dose - completely automatic	The Evondos® service includes a drug vending machine located at the home of the service recipient, as well as a remote care system with wireless connection to the vending machine	Products and services		Elders and long-term patiens in "hjemmesykepleien"	Developers		Contact by email or phone	-	Support phone
EXORLIVE AS	Inspire people to move and excercise	Excercise	Product and service		People working with fitness and sports, schools	Developers		Webpage	-	Support on webpage
FORGET-ME-NOT AS	Support independence	Electronic calendars	Product		People with dementia	Developer and distributor	Perhaps Abilia, since they link to them for product purchase?	Webpage shows products, but directs to Abilia AS (abilia no or phone)	-	Support manuals for download on webpage
Hospital IT	We will create a new arena for efficiency, interaction, information and communication between patient and health / care sector based on the patient termina	Solutions to the healthcare industry	Service		Municipalities	Developer	Many partners, check website	Contact my phone or email	-	
HOVE MEDICAL SYSTEMS AS	Help people working within healthcare keep patientjournals	System for patients journals	Service		Doctors, hospitals, clinics	Developer	Aiere, aspector, Credicare, Furst gorum, Inzz medical, K-tech, Legedata, Max Manus, Medic IT, Medilink, Software, Melin Medical, Mitec, Norsk heisenett, Cdin kapital, Vika As	Contact trough phone or email	-	-
HT SAFE A/S	Make communication between healthcare-workers and patelians easy and safe	Alarm system to 40 municipalities, legevaktformidling, sentralbordtjeneste, ruteformidling.	Service		Municipalities	Developer		Contact trough phone og email	-	-
IGLOBALTRACKING AS	Our platform helps to streamline personal health and safety solutions outside the institutional environment	Alarmsystem. Software for mobile and web.	Service and product		Schools, hospitals, private persons etc	Developer	Many partners. See webpage	Contact trough webpage.	-	Service center
IMATIS AS	Developing great software products for healthcare is our main mission.	Platform and software-service.	Product and service.		Hospital, community, home care	Developer and distributor	Hewlet-PAckard, tieto, Microsoft, Evry, Cisco ++	Facebok, linkedin, Twitter, Webpage	-	Service center
INFORMAMEDICA AS	InformaMedica provides visual tools in the dialogue with the patient, through easy-to-understand medical illustrations, photos, movies and animations.	Apps on phone or copmuter that aims to help the user to determine which disorder of the muscle and skeletal system you are most likely to struggle with	Product	Cost of App: 249 NOK	Medical workers, private persons and companies wanting to reduce sickness	Developer	Apple, Google, Konsept IT	AppleStore, Google play	-	Service center
Inventas	Innovative design	Designcompany that operates in many sectors. One project is "medicine": Have developed AgneGraph, visual system for MRI etc	Product		Hospitals, clinics	Developer, designer		Contact trough phone, email	-	Service creter
JETRO AS	When Jetro initiates a new project, the target is zero changes on PCB and software after delivery to customer	Devepolsteachnology for the healthcare industry (+ other sectors).	Service		Many industries, but among other medical equipment	Developer on request	-	Contact trough phone, mail	-	Offers follow-uo if a company wants to make changes or have issues
Jodacare	Easy communication between patiens, dependents and workers. Updates about daily life aswell as more important messages	Communication between sufferers of dementia and other illnesses, their dependsns and healthcareworkers.	Serivce		Dependents, healthcare workers and "patients"	Developer	Medic IT AS	Contact info from Webpage. Phone, email	-	-
Kahoot kolonial.no										
Komplett apotek	Online pharmacy which makes it easy to order products	Online Pharmacy	Products		Everyone	Retailer	Apotekforeningen	Online and one physical store	-	Contact trough webpage
LETTBO AS			Serivce and product			Developer		Contact trough webpage	-	
LINGIT AS	Make reading and writing easier for people suffering from dyslexia	Tools to help dyslectic students with reading and writing in several languages.	Serivce and product		Dyslectics. Private and companies	Developer				
Listen	Our mission is to give everyone, everywhere an attractive, affordable and easier access to great hearing.	With an iPhone, app and hearphones people with bad hearing can hear phone conversations better, mucic etc	Service and product		People with bad hearing	Developer	Sintef	App store	-	Youtube, Contact trough webpage
Norske helsehus	Homes with adapted solutions for residents such as built-in welfare technology	Development, development and financing of better housing adapted to users with care needs or adapted for an active life in their own homes.	Product and service	?	Municipalities	Developer and landlord	Incita, På rett kjøl, Hospital IT, BioOffice	Sell services, but rents out buildings	Rental	-
LUNDELAB AS	No info	Learning games for young children	Service and product		Children	Developer		No info	-	-
NESK AS	Safety for people and healthcare companies	Safety alarms systems	Service and products		Helsevesenet, municipalities etc.	Developer		Contact form trough webpage	-	
No Isolation AS	Help people out of loneliness and isolation. Help sick children stay updatet with what is going on in the classroom	Robot AV1	Product and service		Sick children who are uanble to participate. Private people, schools, companies	Developer	Norwegian cancer society, Sunnaas sykehus, St. Olavs hospital, UIO	Contact trough webpage	Rental offered for private persons	Youtube, chat on webpage
NORSK TELEMEDISIN AS	Increased calm and sleep quality	Digital watch	Products and service	?	Municipalities	Developer and distributor	Norwegian Smart care cluster			
Pasientsky	Free up resources and make it easier to manage the activities performed on a daily basis by patients, therapists and healthcare professionals.	Cloud Platform	Service	?	Clinics and private persons	Developer	Telenor, Komplett Apotek	Website	-	Website
PICTERUS AS	Help poeple monitor jaundice in newborns trough smartphones, especially for the poor regions of the worl	Picterus is an app under development designed to monitor jaundice (gulsott)	Service	?	Private persons in poor countries	Developer	-	Under developement, not for sale	-	-
Pridok	Pridok AS will deliver the most robust, safe, and user-friendly journal, process, and phage system to the primary health service	Cloud Platform for patient journals	Service	?	Hospitals and clinics	Developer	Innovation Norway, Microsoft, PayEX	Contact info trough website	-	Chat function in their product, so that is is easy to get support

Company name	Value proposition	Details about product and/or service	Product and/or Service	Cost / Revenue structure	Customer Segment	Role(s) of company	Partners	Sales channels	Rental channels	Support channel
Pubgene AS	Hard to get the gist of it, see details about product.	Coremine Medical provides qualified connections between medical concepts such as diseases, drugs, treatments, symptoms, genes and medical experts.	Product and service	?	Clinicians, Medical research companies, service providers, bioinformatics system integrators.	Developer	UIO, Oslo Universitetssykehus, Norwegian Cancer genomics consortium, Oslo cancer cluster, Oslo Med tech, Statics for Innovation	email	-	-
Safemate	Focus on security, ease of use and simplicity	Mobile security alarm with built-in GPS tracking	Product and service	Monthly fee	Elders, youngsters, children. Private, public, companies	Developer	Sintef og Innovasjon Norge. Google, Telenor, Hapro, Doro, Smartly, Hospital IT, Draug Gard, Atea	Webshop	-	Guidance on Website
Samres AB	spesialisert oss på bestillingssentraler for tilrettelagt transport, sykereiser og andre typer bestillingstransport.	Bestillingsmottak for tilrettelagt transport og annen anropsstyrt trafikk.	Service	?	I Norge har Samres oppdrag for Oslo kommune (Oppdragsgiver = Velferdsetaten)	Developer		Webform, phone, email	-	Phone, email
SCARDI AS				?						
Sensocure AS	Real-time monitoring of body functions and early detection of organ damage in postoperative monitoring of internal organs. Easy to use. Live monitoring of patients	Biomedical sensors for healthcare - IscAlert™, a body-implantable micro biosensor that can monitor blood flow in the human body organs.	Product	?	Medical personell performing cardiac surgery, vascular surgery, transplant surgery and reconstructive surgery.	"Developer and manufactur"	Research/university sector and the industrial sector ++		-	-
SPIRO MEDICAL AS	In their domestic surroundings. Easy to set up. Well tolerated. No disturbance of sleep. No patient interaction. Provides the clinician with the diagnostic information to identify the optimum treatment pathway.	ApneaGraph® Spiro: The only ambulatory monitor in the world to combine identification of pharyngeal (nocturnal) obstruction with an automated whole night SRBD diagnostic study (cardio-respiratory sleep study	Product		People struggling with Obstructive Sleep Apnea and Snoring	"Development, production, sales and support"		Distributors	-	Tutorials on webpage
Sunsence	SunSense technology puts you in control of your UV exposure by letting you track and monitor your accumulated UV dose in real-time.	SunSense digital solar meters will precisely measure the daily amount of exposure to the sun, and sound an alarm when the daily safe accumulated UV dose limit has been reached	Product		People with skin diseases (skin cancer etc) + people who want to protect themselves against dangerous UV radiation	Designer, developer, distributor		Webshop	-	Webpage, FAQ. User manuals download on webpage
TIETO NORWAY AS	Seamless care and service chains from birth to old age:	We enable better system efficiency through better coordination of care and better communication between the patient and all health and social care providers. Primary care, Secondary care, Medical services. Elderly and home care, Family and child care, Day care and education	Product / service (Unclear)		Lfecare Løsninger for sykehus Løsninger for NAV/Sosial Kommunal helse og omsorg	Developer, distributor, more?				
TriVing AS (from sept 2018: ASSA ABLOY Norway)	Products that ensure mobility, hospitality and generosity without loosing the feeling of safety	Most relevant product for smart healthcare: Electronic door locks that opens/locks with phone. (TrioVing er Norges største leverandør av låssystemer, beslag, elektromekanisk avlåsning, adgangssystemer, derautiomatikk m.m for sikring og styring av dører, porter og vinduer)	Product and service		Private customers, developers, architects, entrepreneurs rehabilitating or creating new buildings	Distribution, counselling, installation, service. Project support for new constructions and rehabilitation.	TriVing doesn't sell directly to private customers, but through 70 locksmiths, hundreds of building material stores.	Webshop for retailers and partners.	-	Phone, email
VESTFOLD AUDIO AS	hjelp til å høre og høres bedre, safety	Sound + alarm systems: Alerts, sound, voice amplification and telephony for use in homes and at workplaces.	Product		People with hearing disabilities and/or special needs	Developer, producer, distributor, service		Direct contact (phone, webform)	-	They have a login page on their webpage (infosenter), aka support page perhaps?
VISMA UNIQUE AS	24-7 care with minimal disturbance for the pasient.	Elektronisk Pasientjournal (EPJ), Central unit ("sentralenhet") attached to wall in residence.	Product / Service (Unclear)		Pleie-, rehabiliterings- og omsorgstjenesten i kommuner.		-	Direct contact	-	Webpage + phone
WMC TECHNOLOGIES AS	Vår oppgave er å sørge for at kritisk helseinformasjon er tilgjengelig det øyeblikket det er kritisk å ha den	Vår unlike tjeneste, World Medical Card®, redder liv ved å samle din personlige og medisinske informasjon på ett sted. World Medical Card® fungerer hvor som helst i verden – døgnet rundt	Product	Fixed costs either monthly or per year	People who travel outside of their home country	Developer and distributor		Webshop	-	Phone, email
WTW AS	Flawless user experience. Solving consumer needs and simultaneously considering the profitability of partners.	HelseRespons pasient dialogue. Order of doctor appointments and prescriptions via phone and internet. (They also have other services not related to heath)	Product / service (Unclear)		Medical practices and other health institutions	Developer and distributor (not sure about implementation, assuming they do that too)	Not stated on webpage - Despite being a part of the value proposal	Direct contact (email, phone)	-	Not stated on webpage (Email, phone)
XCENTER AS	Digital remote supervision with automatic alerting of critical situations. Anonymous images – privacy by design.	Xcenter RoomMate – intelligent and anonymous remote supervision. Alarms are automatically raised for a number of critical situations such as if a person falls. No user-interaction and with no need for the user to carry any equipment on the body.	Product		Residents in nursing homes, assisted living facilities and private homes	Developer and distributor (not sure about implementation, assuming they do that too)	Not stated on webpage	Direct contact (email, phone)	-	Not stated on webpage (Email, phone)
ZEPPELIN AS	Create tomorrow's digital winners, by developing solutions that work, content that engages, we strengthen your brand thorugh colour, shape and style, and develop handmade technical solutions.	ONE-STOP-SHOP: Selfdeveloped software and innovative digitale services that are complete and integrated. Digital marketing and analytics. Delivery of measurable business results	Product and service? (They write service on their webpage)			Developer and distributor and implementor	Not stated on webpage	Direct contact (email, phone)	-	Not specified on webpage, assuming phone and email

Appendix 3 - Interview guide

Short description of the master thesis
We have identified archetypes of business models within smart health, and now wish to conduct qualitative interviews with selected companies from each archetype. Our goal is to gain deeper insight into the various business models, and check it the companies belong in the archetype we have placed them in. Our aim is to provide a typology of emerging business model within healthcare, as a result of technology. We want to give companies within smart health, aspiring entrepreneurs, policy makers and investors a clear picture of how business models in smart health can look like, and what the motivation behind are. Further, we want to reveal strengths and weaknesses.

Interview questions/themes

1. **The motivation behind the company**
   a. What is the history of the company
   b. How did the idea occur?
   c. What is the vision of the company?
   d. How conscious of the business model?
   e. Conscious of smart health?
2. **Value creation**
   a. What value does the company give the costumer?
   b. What is the job to be solved?
   c. Describe the products/service
   d. Reactive/Preventative
   e. Can products be tailored?
3. **Target customer**
   a. Who are the target segments? (The paying customers, the end users etc)
   b. Channels to reach out to target?
   c. Plan to go global?
4. **Value delivery**
   a. In what channels is the value delivered?
   b. What resources does it take?
   c. Software/Hardware?
   d. How involved is the costumer/end user?
   e. How does technology affect the value delivery? (Communication etc.)
5. **Value capture**
   a. Resources that can give competitive advantage?
   b. Partnerships?
   c. How does technology affect the competition in the market?
   d. Cost structure (Fixed, variable)
   e. Revenue structure (Pricing model, is the company dependent on investors)
   f. What are your plans for growth? escalating?
6. **Strengths & weaknesses**
   a. Describe any element of the BM that is a special strength
   b. Describe any element of the BM that can be a weakness/challenge
   c. What opportunities does technology create for your BM?
   d. How does technology create challenges for your BM? (How is sensitive information handled etc.

Appendix 4 - Transcribed interviews

(2/ 9 enclosed)

Checkware - Transcribed interview
(extract)

Could you briefly explain why Checkware was created?
- Yes, it was started in order to digitalize psychometric tests used in the healthcare industry. Our solution substitutes pen and paper, and makes it possible to gather research data and clinical data. We have further developed this, and we are now marked leaders in Norway in what we call digital patient involvement. Our vision is to become the market leader in all of the Western world. The digital patient involvement consists of three parts: self-reporting, mastery for the patient with exercises you need to get involved in to learn how to handle your disease, and dialogue through chat and safe video.

When was the company first started?
- 10 years ago. 2007 in Trondheim.

How many employees do you have today?
- Just under 30 people. Half here in Trondheim, approx. 10 in Poland and the rest in England.

On your webpage, we see that you offer "a safe E-health solution". Another term that often occurs when we talk about E-health, is smart health. Is this a term that you have any knowledge of?
- I have seen that term is starting to pop up, but we have never used it. I actually don't really know that it means.

That is perfectly fine.
- But I'm guessing we are a part of it!

Well yes, as I mentioned at the beginning, you are one of the companies on the list in the Menon report, so one could say so. But it is interesting to hear what you as a company think about it.
(...)

What relationships would you say that Checkware has to its business model, where a business model consists of the four pillars I mentioned earlier.
- Oh yes! That's all we do! All the areas you mentioned are very important to us, perhaps not by using the same categories as you did, but still. We work on it all the time.

Is the business model something the whole company is concerned with, or is it primarily the upper management?
- We are concerned about making sure that everyone understands how the different parts of the company are connected. From performance targets to how we produce and sell the product. And of course also what value the product gives to our customers. Not everyone are very involved - I'd say the development in Poland are the furthest from

the business model. But we try. We try to be very open, so that everyone understands their own role in the larger picture.

Sounds like you are very conscious of your business model. That is great.
- Of course, we want to become successful!

Can you elaborate on the products and services that Checkware offers?
- Our main product is a cloud-based software solution. Our customers buy this - with access to health forms and psychometric tests. These can be put together in different variants. With a software and service model when it comes to pricing. Customers pay a yearly subscription. In order to start using the software, we offer project and consultancy services. After this installation phase, the customers have support deals with us. We also offer courses for the professional users of the products.

Your webpage also says that you have distribution rights for 900 psychometric tests and health forms. Have you created these in house?
- No, these are developed by scientists all over the world, primarily England and the US. So we have made the digital. Previously, the health industry used these with pen and paper. (...) We have contacted the creators of the tests and forms, and asked if we could get the right to digitalize and distribute it.

(...)
What types of tests and forms do you offer?
- We offer tests and forms within mental health; anxiety, depression, trauma - every aspect of mental health. We also have products for drug abuse - which is also related to mental health, but we also have products for drug habits. In addition, we offer products for assessing pain - for example for cancer patients. We have forms for nutrition, obesity and other lifestyle diseases. And for rehabilitation.

What value does the products offer the patients?
- First of all, there are two megatrends in the healthcare industry. The digitalization itself, where healthcare is the last major industry that is experiencing this transformation. The second megatrend is patient involvement in order to create patient empowerment. The patients say they feel more cared for when they have submitted information to the doctor before the doctors appointment itself. They feel more prepared.

Very interesting. One of the trends we are seeing within healthcare is that the products can be grouped in two main categories. They either offer a 1) reactive value, where the product responds to an existing health condition, or 2) offer a preventative value where the products seeks to preserve a good health condition. Which category would you say that Checkware's products fall into?
- Our product is very well suited for both preventative causes, and investigations, follow-ups and treatment. But there is little money to make in the preventative category. No one is putting money into it, even though they might see that it should be done. For example obesity: We have patients within this area. They know that if they had started their transformation before they became patients - that would have been a lot more beneficial for society. There's probably companies who develop various solutions, but the health industry itself doesn't have any budgets for preventative health. So our product is well suited for both preventative and reactive causes, but is only used for reactive causes.

(...)

- I don't know the budgets of those who offer preventive products, but I assume that the work mainly involves giving information - health enterprises don't have money for projects that are not related to to actual patients. They receive money for patients.

We have another question that is related to value creation, but focuses on another aspect. Your briefly mentioned that Checkware targets many different customers. To what extent is it possible to tailor the software to the various customers?
- The solution can be tailored to any course of action for the patient, or to the services that the health provider can offer. So it's about configuration - not software development. The other tailoring we offer relates to what tests the customers use among the 900 we have. Thirdly, we offer various modules for the software.

(...)

Another thing we noticed when we looked at the website is that Checkware can easily be integrated with health apps and patient journals. Are these delivered by other companies?
- Yes.

Can you please explain how the solution can be integrated with hardware and these health apps and patient journals?
- This is one of our advantages. Hardware isn't an issue since we offer a web-based solution that can be used on phone, tablet and computer. But it is very important to integrate well with the patient journals, since the patient reports on his/her condition. Which gives the professional healthcare worker decision support. And they have to not be dependent on so many systems. They have access to the patient journal, but also see the patient's own reports in this journal - which is enabled by Checkware. In addition, health apps containing information that gives clinical value for the healthcare worker can be integrated by Checkware.

Speaking of the health care workers. Are there any challenges related to reaching the many different target groups?
- Our customer is the healthcare industry. Which means healthcare enterprises - there are 22 in Norway - and private clinics who normally have deals with the various enterprises. In addition, we have scientists, but they also work within the same spectrum. But lately, we started targeting municipalities. We do not contact the patients themselves. So it's not hard to know who we should be talking to. Norway is such a small country. But of course, when we go outside of the country, it becomes a little more tricky. So we are not good enough when it comes to tailoring our message to each target segment. This is something we know - and that we are working on. This is for example very evident when you look at our webpage. It is difficult to understand what we offer.

Another element that may be challenging is patient data. Could you please explain how Checkware handles sensitive patient data?
- First of all: We are very happy that the GDPR regulations are arriving. Because Checkware is by design created to handle sensitive data.

What are the GDPR regulations?
- A new regulations for Europe being put in place from 1 May 2018. Until now, you have been able to just say that you have a safe solution for the data. And then wait for someone to come and check. But now, you have to document how your company safely

handles sensitive data. We have a safe solutions, and we have internal procedures. Checkware was made for handling sensitive data, so this a an advantage, since other have been able to operate in our same marked without necessarily having to take it seriously.

(...)

We are now touching upon the topic of competitive advantages. Are there any other qualities besides being able to handle sensitive data that you would like to comment on?

- The thing that separates us from all others, is the distributions rights. No one else has ever done anything similar, ever. So we have contacted all publishers and all licensees in the western world. We have now passed 1000 tests. And we have build a solution where we can analyse the data in different ways based on the guidelines for each test. That is our main advantage. It's not rocket science software. So the rights, safety and of course all the knowledge on how patient involvement should be in order to integrate it with other professional systems.

This brings us over to the competitive landscape. Could you please explain a bit about it?

- There are many who have created solutions that are diagnose specific. But we have still not encountered anyone who has an extensive selection of tests and forms like we do. Where the solution is as scalable as ours. There are several who are starting to create patient portals. But gathering clinical data in the way we have, is not something we have come across with anyone else. So the most important aspect of competing - is just continuing in the same way that we have up until now.

Another important element in the value capture is cost and income structure. Could you please explain how the costs are divided between fixed and variable costs?

- Cost of goods consumed is 10%. Which means that the rest is fixed costs. Personnel costs stands for 80%, included development costs. These costs depend on whether we are creating new modules or not - let's say that 50% are due to maintenance and 50% for new products.

We also wonder how the startup of the company was financed?

- We had shareholders, OFU from Innovation Norway (Offentlig Forsknings- og Utviklingsprosjekt / Public Research and Development Project) - which means private company and public customer. We made a deal with Helsedirektoratet, where we got 30 % from Innovation Norway, the company financed 35 % and where the customer also contributed.

And how are you financed today?

- We make money now - so the intention is that we are financed through income. But we are a 'SkatteFUNN' project, which means that some of the development is funded from them. We also have loans from banks and Innovation Norway.

We are now approaching the end of the interview. We therefore wonder if there any elements that we have discussed, or any new elements, that you would like to go more into?

- We haven't talked that much about the income structure.

That is correct, please elaborate a bit about it.

- There are two main elements. The first is the subscription for the software, which has developed from a software license plus maintenance fees. If you talk to startups, I doubt that many of them have this structure. Today, you pay an annual fee.

Is there a lock-in period?

- Yes, the lock-in period depends on the customer segment. The usual deals last a period of three years. If the healthcare enterprises are out on public tenders, which they normally are when they reach a certain size, the lock lasts for four years. And then it is expanded with one year after another later on.

Do companies pay different fees depending on how many patients they have?

- The fee is calculated based on the number of patients you are going to treat. We spent many years trying to find a pricing model that worked for us.

Are you happy with the model you have now?

- Yes. At least for now. Because the customer pays based on the number of patients you are treating and how much functionality you use.

You previously mentioned that implementation costs may vary. Could you elaborate a bit more on this?

- Yes, that is the second bulk of pricing. You have the subscription fee, and this service fee. We have the standard service package for the small clinics, but for a hospital, it depends on how much help they want. If they only want training or if they want us to be present for the whole introduction period. I don't know it this is something you look at in your thesis, but when it comes to calculating the value of health companies - very many of these companies are either looking for investors or are about to be sold - The valuation of these kinds of companies are very often linked to ongoing subscriptions. So it's all about getting the numbers up for subscribers, without incurring more costs.

So being able to scale is a key element?

- Yes, absolutely.

Do have any plans to scale up the business?

- Yes. Our markets are now in Norway and England, but we are making plans for 2018 now.

Great. We are coming to an end now with our questions. We got the answers we needed, so thank you!

Nyby – Transcribed interview

(Full Norwegian transcription)

Kan du starte med å fortelle litt om hvordan Nyby ble til?

- Det er faktisk veldig bråkete her. Jja, men vi prøver. Hvordan det ble til?
- Det ble gjennom, ja da kjenner dere sikkert litt til det, jeg har jobbet med teknologi-startups i mange år, også parallelt med det så har jeg hatt en lillebror som ikke lever lenger nå, og som ble sykere og sykere gjennom ti år. Og det bare fikk meg til å reflektere masse rundt hvordan vi organiserer omsorg egentlig, og velferdssamfunnet. Også da begynte jeg liksom, det er masse behov, men det er masse ressurser, men det er vanskelig å skalere, og det er masse fine koblinger, men det er vanskelig å skalere. Også kjenner jeg jo godt til kraften i digitale plattformer, så det er sånn man kommer til å få dytte offentlig sektor inn på sånne plattformer etterhvert, men spørsmålet er på en måte når da, og om tiden var moden nå da.

Ja.

- Og da brukte vi først en god del på, det er viktig med alle startups, eller alle idéer, før man blir for forelska i en idé - prøve å drepe'n egentlig. Finne ut hva, er det noen ideologiske barrierer, noen juridiske barrierer, som gjør at dette på en måte er naivt, og umulig å få til. Også brukte vi ganske mye tid på det, og klarte ikke å drepe idéen da. Men gjennom det blir også idéen mer og mer robust, fordi man aktivt går inn og prøver å finne noe feil med den.

Var du da alene eller i et mindre team?

- Da var jeg alene.

Ja.

- Også, tenkte jeg 'okei, klarte ikke å drepe'n'. Da må jeg prøve å validere den. Se om det kan bevises at det er en god idé. Som en motsatt hypotese bare.

Mm.

- Og da tenkte jeg sånn at nå må jeg sikkert snakke med 20 kommuner, også kanskje én er gæren nok til å være med å teste. Og da ville vi gjøre det likevel, for potensialet er så stort, men så startet jeg bare med Asker kommune, for det er der jeg er vokst opp egentlig. Også var både politisk ledelse, med ordfører og hele rådmannens rådgruppe bare elsket det, så de ville være med, og syntes det var kjempegøy. Og det var et veldig uslepent case egentlig. Og de ville være med å betale for det og alt.

Okei, oi!

- Ja, kjempebra! Også gikk jeg til bydelen Gamle Oslo, for det er der jeg bor, og de ville også gjerne ha det, og da var det bare " wow, to av to forhåndssalg av et produkt som ikke finnes, det er kjempebra".

Ja.

- Aldri hatt så bra validering fra markedet noen gang, også bare gikk vi bare helt under radaren, ingen nettsider, ingenting. Begynte å scramble ting. Begynte å utforske hva vi egentlig skulle lage. For da hadde vi egentlig bare en visjon, og et konsept.

Hadde dere tanken om appen klar da på det tidspunktet eller?

- Nei, bare at vi skulle ta læring fra delingsøkonomi, det visste vi. Men ikke appen.

Okei.

- Men de hadde tillit til at vi var riktig team til å gjøre det. Også var det jo bare å - ingen nettsider, ingenting, bare helt under radaren for å kunne jobbe i ro med de to første kundene. Også var det bare flere bydeler i Oslo som hørte om det. Kirkens Bymisjon, Gjensidige og veldig mange flere som kom til da, selv uten...

Så dere reklamerte ikke noe for det?

- Nei, ingenting. Ingen nettside. Så det er jo sånn helt fantastisk da. Og da fikk vi veldig bra validering, så det endte med at Asker og Bærum har betalt for å stå i kø, også har vi utviklet dette i Oslo, også begynner vi å flytte til Asker og Bærum nå som produktet er mer modent da.

Kult! Kan du utdype litt mer om hvordan det funker? For vi har jo sett på nettsiden deres og videoen du sendte meg, og vi sliter litt med å forstå hvem som kan tilby tjenester?

- Det skjønner jeg.

Kan en privatperson gjøre det, eller må du være organisert?

- Nei, du må være del av en gruppe i dag for å bidra. Og det er for å sikre kvalitet.

Mm.

- Så det er egentlig - ikke sant - man har Nabobil, Finn Småjobb, og alle datingtjenester, og AirBnb, og Nabohjelp, og alle disse. Alle kan melde seg inn og si de kan gjøre hva som helst, også sikrer man kvalitet over tid gjennom å gi rating - reputation by crowd - . Også tenker vi at det er alt for risikabelt med den type tjenester som vi primært skal gå inn å løse, og da må man heller ta å benytte det beste fra - pluss at mange har lyst til å tilhøre en organisasjon for å få høyere kompetanse også, ikke sant.

Men når du sier organisasjon - kan en privatperson da melde seg inn i en organisasjon, eller må man være faglærte?

- Nei, det er akkurat sånn som man gjør det i dag. Man melder seg inn i Røde Kors for eksempel, eller en frivillig sentral, og da er man en del av det. Eller, jeg kan bli ansatt i en organisasjon som bruker NyBy.

Mm.

- Så det er helt uavhengig av om du er frivillig eller ansatt eller freelancer, eller lønn på ansiennitet, eller ikke og så videre. Det spiller ingen rolle for NyBy, der er du bare en ressurs som har fått tillatelse av din gruppeleder til å gjøre en del ting, og det er det egentlig.

Ja.

- Så det er en organisasjon som går inn i NyBy som bestemmer hvem som skal gå inn i hva med hvilke ressurser. Hvem skal kunne ønske seg hva av mine ressurser, eller hvem grupper jeg velger å samarbeide med.

Og hvem er det som matcher? Gjør man det selv?

- Det er gruppelederne som bestemmer det. Jeg kan egentlig vise dere, hvis dere vil se.

Ja. Ja, vi prøvde å laste ned appen selv, men da kom vi ikke så veldig langt.

- Nei, da kommer dere ikke så langt. Dere må være medlem. Her er sånn, hvordan det ofte skjer i dag da. Da har man en organisasjon, en sjef kanskje, en gruppeleder, som har noen ressurser som ønsker å bidra med et eller annet. La oss si det er en frivillig sentral - dette er jo private selskaper. Vi har Elkjøp også som kommer til å gå inn her nå og tilby tech service for eksempel. Noen ønsker å bidra med ærend og følgehjelp og turer for eksempel. Okei, sånn som det er i dag da så har man kanskje gjerne en nettside, med en katalog som distribueres til brukere.

Mm.

- Også må brukerne se på katalogen, tenke seg om og sånn, også hvis de har lyst på noe, så tar de kontakt med den som er ansvarlig.

Okei.

- Også tar den ansvarlige og snakker med sine ressurser og er flaskehals da, eller koordinator i koblingen her, også har behov for ærend, snakker med sjefen, det er tre stykker som er kvalifiserte for å drive med ærend ikke sant, noen kan, noen kan ikke, sånn fortsetter det, og da trenger man ikke tenke så lenge før man skjønner at her er det en veldig flaskehals for skalering, og det brukes utrolig mye tid på koordinering i arbeidstiden. Dette er behov som gjerne dukker opp på kveldstid, dette er på dagtid, også videre.

Men det vil fremdeles være en viss grad av koordinering i organisasjonen, for hvis hun/han skal finne ut av hvilke ressurser det er som venstresiden her kan bidra med -

- Yes! Så det gjøres fortsatt i NyBy.

Ja.

- Dette her er bare en nåsituasjon, så er det masse systemer som brukes for å spille henne bedre da, ikke sant, for at hun skal huske ting bedre og sånn. Men vi lager et system der hun kan kommunisere direkte innenfor samme trygge rammer. Det er fortsatt en person som sikrer at disse menneskene er kvalifisert, men at man kan snakke direkte. Da blir det sånn som dette her da. Akkurat som du sier da, så har hun et panel her sånn, og hun bestemmer. Laster inn tjenestene som skal tilbys i en app, også gjør hun akkurat den jobben som du sa: Kvalifiserer til ærend. Da er det de tre her som passer. Og det er viktig at det er hennes know-how som er bygd opp i organisasjonen i lang lang tid - hva er det som gjør at du er en god person, riktig til å gjøre ærend eller andre ting. Det er akkurat det samme med Uber med kvalifisering av sjåførene sine.

Ja.

- Forsikring må være sånn og sånn, og sjåføren må ha hatt sertifikatet så og så lenge. Da blir man kvalifisert. Akkurat samme type prosess har vi her. Også følgehjelp ikke sant, da er det de også turvenner der. Det er en jobb hun gjør. For hun kjenner sine brukere og sine ressurser, også tar man inn brukerne. Og når en da har behov for ærend, så går det rett til de.

Er det noen begrensninger på hva slags type oppgaver dere har der? Er det for eksempel ganske store sykdommer som blir prioritert?

- Nei. Vi har ingen føring på det i det hele tatt. Vi har et helt generisk system, som enhver gruppe hvor alt fra brukersentral til kommunal hjemmetjeneste til Elkjøp. De bestemmer hvilke tjenester de vil tilby. Skriver inn med sine ord og sine kvalifikasjonskrav og alt, så bestemmer de hvordan de vil kvalifisere sine brukere. også er det sitt eget brand de risikerer ikke sant. så de vil gjøre det på lik måte som det gjøres i dag. Også publiserer vi det ut i plattformen som vil blir synelig for grupper de vil samarbeide med.

Mm.

- Og da blir det sånn som dette her da, de snakker sammen direkte, administratoren - da går du fra koordinering til selvorganisering. Og da frigjøres masse tid her til nettopp det du snakket om, spille disse her god, kvalifisere de, rekruttere flere, rekruttere flere kunder, det er liksom, da går man fra å micro management til leadership da.

Mm.

- Og da kan man samarbeide med andre grupper som også skal få lov til å ønske seg ting. Så du kan vide ut markedet ditt. Så setter man opp et samarbeid her mellom sjefen i en annen gruppe og her. De skal også få lov å be om de samme tingene. Og sånn kan man gjøre på den her siden og. Få flere ressurser.

Er det noen store utfordringer, sånn teknologisk, med at alt foregår gjennom en app? Personvern, eller den type ting?
- Ja.

For dere sitter på mye sensitiv informasjon?
- Ja, det jobber vi masse med. Vi jobber med GDPR-regimet. Det er sånn personvern som EU stiller veldig høye krav til Facebook og Snapchat og alle disse her. Alle de skal fra og med midten av mai neste år kunne ta med oss all dataen som en tjeneste har laget om oss.

Okei.
- Så det med teknisk sikkerhet - hvor det lagres og hvordan det lagres - og hva slags grensesnitt, …..

Så det ble veldig tydelig.
- Ja, det er det som er så bra med GDPR, det blir veldig tydeli, så Det er bra timing for oss, for vi har bygget tjenesten inn mot det fra bunnen av siden vi er en ny aktør. Også er det det neste rundt appen, når du er inne på sensitiv informasjon og sånn, så er det også opplæring av brukere. Og da er det særlig der hvor det er problematisk er der man må holde tunga rett i munnen, er med profesjonelle brukere for eksempel hjemmesykepleie som er hjemme hos en bruker, ser et behov, legger ut et behov i NyBy på vegne av brukeren. Da må man ha samtykke, samtykke, fra alle disse tingene. Da har vi laget sammen med Helsedirektoratet og Helsetaten en sånn veileder på hvordan er det de skal få samtykke og sjekke samtykkekompetanse. Loggføre det de gjør i NyBy i sine fagsystemer og så videre, så de er helt trygge på at de gjør det riktig. Og det er helt sånn avgjørende for oss. For det var en major friksjon, at de var redde for å gjøre ting feil.

Men er det noe som tar veldig lang tid for eksempel?
- For hjemmesykepleieren?

Mm.
- Nei, egentlig ikke. For det er bare - samtykke kan innhentes muntlig. Og hver gang de er ferdige med et besøk så noterer de uansett i fagsystemet sitt. Så det er bare en linje til om at "jeg la også ut behovet i NyBy". Så det er mye mindre tid enn den melkeruta som er i dag.

Ja.
- Det er sånn helt definitivt tidsbesparende da.

Mm. Ja, men det er spennende. Hvilke ressurser vil du si at dere sitter på som gjør at dere i stand til å drive, altså dere har ikke så mange konkurrenter?
- Nei altså, det er mange som ligner litt.

Er det plattformer?
- Ja, man kan jo tenke at Nabohjelp er det på et vis.

Ja.
- Og det er masse systemer - særlig som går på å digitalisere den funksjonen, den koordinator-funksjonen da.

Mm.
- Og vi har mange sånne rene Uber for helse for eksempel som kommer, det er sikkert tusen som kommer i Europa, men da er det jo gjerne at de tilbyr - at de prøver å disrupte og erstatte det eksisterende.

Mm, å ja.
- Private aktører som da lager apper som gjør at man enkelt kan bestille og sånt, men det er noe helt annet enn å lage en plattform for å inkludere de eksisterende spillerne. Der hvor Uber er disruptive og erstatter eksisterende, så er … med vår posisjonering, så ville vi lagt en plattform for eksisterende taxiselskaper som kunne gå inn og importere sine sjåfører, sine tjenester, sine priser på plattformen. Også kunne kundene vært på en plattform med alle taxiselskapene, og med kanskje Ruter og Flytoget i tillegg. Og det hadde vært mye bedre for brukeren. For da ville du hatt alt på ett sted, også er det personalisert til meg. Også er det masse som er bedre med det egentlig.

Men er det det noen ressurser som dere sitter på som du føler gagner dere veldig? For eksempel samarbeid - vi ser at dere er med i Norwegian Healthcare Cluster.
- Ja.

Hva går det ut på for eksempel?
- Jeg tror at hvis vi har en slide. Skal vi se.

Hvis denne presentasjonen er noe du har mulighet til å sende oss -
- Ja, det kan jeg gjøre.

… så hadde vi satt stor pris på det.
- Det skal jeg gjøre, skal vi se.

Det er veldig interessant at det så mange nye selskaper som tar i bruk nettverk og nye partnerships, og jobber veldig tverrfaglig. Så det er derfor vi er spesielt interessert i -
- Det tror jeg kanskje er - det er hele - jeg gikk jo rett på netopp partnere før jeg bygde team til og med. Dette hadde vært sånn helt fullstendig naivt prosjekt hvis vi ikke hadde hatt med noen store partnere. For vi lager jo infrastruktur for morgendagens velferdssamfunn. Så da måtte vi ha med kommuner i første rekke, også består det nye velferdssamfunnet i vår visjon… hele tide netopp av samarbeid på tvers av siloer og sektorer, som er private, offentlige, ideelle frivillige sektorer. Så da måtte vi ha med noen og hver av de.

Det er partnere deres?
- Det er liksom utviklet partnere, også har vi flere på vei inn nå. Men det er da Asker og Bærum. Så alle de har betalt. Det er ikke helt public da, men de betalte noen hundretusen hver og over anbuds - de har bypassed anbudsregler og alt da for å være med. Så vi er et team på 14 som er fundet av disse her og litt Helsedirektoratet.

Så det var det som fundet dere?
- Ja.

Og hvordan tjener dere penger nå?

- Nå er vi fortsatt på utviklingskontrakter med disse, men hvordan vi tjener penger er det dashboardet som en gruppeleder har. Og det er en lisens. Så det er en software and service modell, hvor de betaler lisens for å ha tilgang til dashboardet. Som er egentlig et forvaltningsverktøy og medlemsadministrasjon.

Så det er kommunene?

- Kommunene og private og frivillige organisasjoner.

Så alle betaler inn til den her da.

- Så det er en helt enkel forretningsmodell.

Er det på månedlig basis eller er det -

- eller om det er årlig? Det må vi bare se an om det blir årlig en månedlig. Men det som er et større spørsmål for oss er: Klarer vi å gjøre det så enkelt å ta i bruk at vi har veldig lav implementeringskost. Da kan vi selge det veldig billig og vokse veldig fort. Sånn som Slack og - hvis dere kjenner til de…. og det er det vi lager da. Det er det vi sikter på. Men det er også avhengig av modenheten i de forskjellige kommunene. Hvis vi klarer å få dem til å bli omtrent self starting, bare hjelpe dem littegrann, så kan vi selge det veldig billig. Hvis vi ser at de trenger mye støtte for å komme i gang, kanskje fordi produktet vårt er for komplisert, og de ikke er modne nok, da må vi selge de mye dyrere fordi da må vi implementation teams, ikke sant. Som fortsatt kan være veldig bra business for oss, men som vokser saktere, og da må vi selge det mye dyrere til kommunene.

Hvordan vil du si det er i dag?

- Nå bruker vi mye tid - for nå driver vi fortsatt å lærer.

Ja.

- Så nå bruker vi masse tid med kommunene. Men det er det vi skal ha ordentlig fokus på i Q1 neste år, å gjøre de self-starting. Og eventuelt bare simplifye mer og fjerne mer funksjonalitet hvis det er det som skal til da. Så det er jo en kommunikasjonsutfordring ikke sant. Vi lager et nytt produkt. Vi kan ikke bare si at vi er Uber for helse, for da hadde det jo vært at vi også leverte sjåførene. Eller leverte tjenesten. Og det er det jo ikke. Og det er ikke AirBnb, og det er ikke Slack. Det er et eller annet sted i mellom der da. Så det er en ny produktkategori som må kommuniseres.

Det stiller vel helt andre krav til sikkerhet og personvern og tillit, i forhold til mange av de selskapene du nevner her?

- Ja, absolutt. Og forståelse for arbeidsmarkedet. Vi snakker med fagforeninger og sånt også ikke sant, at de ikke må bli en brems på dette ved å føle seg truet ved å gå inn i løsarbeidersamfunn og den type ting da.

Hvordan har responsen vært i og med at dere har forsøkt å fått med eksterne aktører ganske tidlig i starten? For det er ofte …. ikke skal ta over andre…. så kan det jo være litt motstand likevel.

- Ja.

Hvordan føler dere at dere har blitt tatt i mot?

- Vi opplever at det har vært veldig bra. Vi har en kjempefin dialog med en god del fra fagbevegelsen, og ser på utviklingssamarbeid med de også. Fordi det skaper masse transparens, og det åpner masse muligheter for de også - med plattform. Merkelig lite motstand. Dere var litt inne på partnere…. Også har vi jo bare et sjukt bra team da.

Dere er 14 stykker nå?
- Ja.

Hva slags bakgrunn har dere? Er det mye teknologibakgrunn?
- Ja, egentlig. Jeg har vært med i teknologistartups. Vært med å starte Kolonial.no og Swipe. Eller ikke startet , men jobbet mye med både Swipe og Filmgrail og forskjellig. Også har vi Knut som er teknisk sjef hos oss, som har vært CTO også i noe som heter Stay.com, som ble kåret til et av verdens beste websiter av Times Magazine - et verdensklasseprodukt som er et softwareprodukt da. Også har vi Kristina fra McKinsey, som har vært syv år i McKinsey, også har vi Magnus som er produktsjef hos oss som har vært med å startet noe som heter Spond hvis dere kjenner til det. My sånn tech-selskaper egentlig. Også har vi både Kristin og og jeg - vi har begge studert statsvitenskap også, så vi har liksom både tech og statsvitenskap. Som er ganske sjeldent da. Også har vi veldig fokus på design. Vi har et design-selskap som heter... som har vunnet masse priser og som er kjempeflinke, både på UX og design. Det skal være digg og friendly.. Og digg å bruke da.

Ja. Veldig kule hjemmesider.
- Ja, kult takk. Det er de da, som kjører.

Bra team! Har dere mulighet til å ta ut lønn -
- Noen gjør det, og noen gjør ikke det. Vi har en modell som gjør at de som jobber uten lønn de får mer aksjer…. Man har forskjellig behov rundt bordet på hvor mye lønn man trenger.

Skjønner. Er det noen typiske ting som du kan se er spesielle styrker ved deres forretningsmodell? I måten dere enten skaper verdi på, leverer verdi på -
- Det er det at en organisasjon kommer for et verktøy, som er å bli selvorganiserende, som er den effekten som du så i sted, alle som skulle koble mange opp mot mange, eller mange en-til-en koblinger. De kan bli selvorganiserende, om er en kjempeeffekt i seg selv, også er det sånn at de blir værende på grunn av nettverket fordi vi er et B2B tool som kan selges som software and service med veldig sterke nettverkseffekter. Og da kan man selge det billig til å begynne med, og få ordentlig kritisk masse og stickiness og sånn, og utvikle og selge flere moduler.

Er dette noe du føler hele teamet er veldig bevisst på? Altså forretningsmodellen? At dette er noe som går igjen? For i større organisasjoner så er det kanskje toppledelsen som styrer med dette?
- Det er jo en av mange ting som er en fordel med å være en liten gruppe smarte mennesker. At da kan det være en rød tråd fra backend til forretningsutvikling til - hele veien. Men så er vi også litt sånn - Det viktigste for oss er hvorfor vi eksisterer. Det er jo for å gjøre ting bedre. Å få de her koblingene. Også har vi sett sånn ja, forretningsmodell, det har vi ikke fokus på. Vi har disse utviklingskontraktene, også er det så stor impact av det vi får til at det skal vi klare å tjene penger på. Vi har god

komfort på det. Så vi har faktisk ikke hatt fokus på 'hvordan tjene penger' eller noe sånt så mye de første to årene. Det er noe vi har begynt å jobbe mer med nå.

Er det noen svakheter ved forretningsmodellen deres? Noe forbedringspotensiale?

- Ja, det er jo mange muligheter til - altså skal det være transaksjonsbasert, eller skal det være brukerbasert? Kanskje skal man også kunne ta penger fra brukerne? Det er utrolig mye sånn man kunne bygge inn. Og det er sikkert mye lurt man kan gjøre med data også, som vi bare ikke har kommet til på en måte. Men vi tenker jo - vi er opptatt av at det skal være minst mulig friksjon for det å møte folk og hjelpe folk. Også tenker vi at samtidig må vi ha god inntjening sånn at vi kan skalere det enormt, og være overalt i verden egentlig. Og da må det være også veldig lønnsomt. Men det er altså et hav av lure modeller som man kan begynne med, men software and service, det er sånn enkelt for alle å forholde seg til.

Ja, det er jo det. Da tror jeg vi har gått gjennom de fleste av spørsmålene våre. Man får jo svar på litt flere ting samtidig her. Det er et veldig kult konsept. Det virker nesten som at styrken deres er jobben som skal gjøres, den er så stor at forretningsmodellen order seg av seg selv? Det er nesten det inntrykket jeg får?

- Ja, det er faktisk sånn. Nå har vi vært litt bevisst på det og sånn med folk som vil investere og sånn. 'Ja, trust me liksom'. Vi finner en måte å høste - eller å tjene penger på det.

Mm.

- Hvis vi klarer å løse halvparten av de problemene som vi sikter på å løse, eller en tiendel av det, så er det et verdipotensiale da.

Men hva er det, sånn som investorer og kommuner, du nevnte helt i starten at det var investorer og kommuner som hev seg på nesten før du hadde rukket å presentert noe. Hva vil du si er key elements i deres forretningsmodell? Hva som gjør at de bare går for det?

- De er på burning platform. Fordi velferdsmodellen vår ser sånn ut. Så de må endre seg. Også har man snakket i 10-15 år, med ulike stortingsmeldinger, noe som heter Omsorg 2020 og Morgendagens Omsorg, og kommune 3.0, at vi bare må tenke nye modeller, vi må ta i bruk fellesskapet mer, og så videre. Også har man snakket om det lenge. Men så klarer vi ikke å skalere fordi det er så mye friksjon i dag. Bare det å få kjørt en til legen er jo tre timer administrasjon. Det er helt håpløst. De må endre seg. Også er det nok god timing for oss også med at det er fokus på digitalisering og mange sånne ting også. Men det er liksom det bildet der, med toppledelsen, på tvers av kommunen og departement, og politisk styringsspektrum, så må vi løse det.

Men kan du se for deg at noen kommuner kvier seg for å ta i bruk sånne teknologiske ting?

- Jaja.

At kanskje det kan være litt vanskelig å selge inn til enkelte steder?

- Ja. Og derfor så forholder vi oss veldig til - og det opplever vi at hjemmesykepleierne synes det er veldig kult. Fordi de er i en tidsklemme i dag. Og kan enkelt trekke på kvalifisert hjelp. Veldig enkelt. Også opplever vi at jo høyere man er i forvaltningen, jo mer digger man det. Fordi man har det helhetsperspektivet og har dette her under huden. Men så er det kanskje mellomledere og sånn, som alltid er de som er mest resistent for change, de sloss vi litt mer med da. Men derfor så forholder vi oss til - hvis dere kjenner

til den adoption curve - så forholder vi oss til - vi driver ikke å banker kommunene… først skal vi dekke hele Østlandet, så Vestlandet, så skal vi banke alle dører og konvertere alle. Nei, vi markedsfører gjennom magnet-prinsippet. Du holder opp en kul visjon, et kult opplegg, og de som det appellerer til - de hopper opp til magneten, hopper opp til oss. Også det er en måte å sjekke at de er early adaptors - eller early movers, og de jobber vi med.

Men det er en ting jeg tenker på da. Dere henvender dere til kommuner. Men organisasjonene de kom av seg selv sa du?

- Ja, og mange av kommunene og.

Ja, okei. Men man må jo på en måte ha tilbydere og etterspørrere for at det skal fungere. Så kan du se for deg at etterhvert, så kan det kanskje komme flere og flere etterspørrere? At man trenger flere organisasjoner? At man må nå ut med ting man -

- Okei, når man bygger markedsplass, er det alltid sånn kritisk masse. Man må ha nok etterspørrere og tilbydere, hvis ikke går den ene ned også den andre. Tomt-rom tankegang. Mens kommunene, de har jo utrolig mange brukere, som er målgruppe for veldig mange. Både for frivillige, private og ideelle organisasjoner. Og da når de er inne, og er selvorganiserende og får nytte av det selv om det bare er kommuner så vil de andre vil inn, for da er du en veldig stor del av markedet, for kunden er der. Så det med at kommunen får glede av å være på plattformen selv om de er alene, også kommer de andre inn - for det er det som er med at det en og nettverk, ikke bare et nettverk. Og det betyr at enten kan en kommune komme inn først, også kommer de andre etter fordi de har lyst til å samarbeide med kommunen, eller så kan bare en organisasjon bli selvorganiserende, også kommer noen andre eller ikke, men allikevel så har de glede av det. Som gjør at vi unngår den tomt-rom problematikken.

Dere unngår det ja. Og per dags dato så er det dere i teamet som da screener organisasjonene i og med at det ikke er så mange ennå?

- Ja, riktig. Og det er sånn som vi diskuterer. Skal vi ha noen krav for å være organisasjon i NyBy, eller skal vi si at ethvert borettslag og enhver familie - storfamilie - skal kunne være. Og det tenker vi kanskje at de skal da. At man kanskje har noen forskjellige statuser eller et eller annet sånt. For det er uansett jeg som leder for min gruppe, som må stole på den gruppen som jeg oppretter samarbeid med. Og det er kanskje gjennom fysiske møter. En organisasjon vi samarbeider litt med allerede i dag men har lyst til å integrere direkte med de, og endel aktiviter.

Da begynner vi å runde av. Er det noen ting som vi ikke har snakket om som du føler at vi burde vite om NyBy?

- Jeg vet ikke jeg. Det er det som er problemet. Jeg kan snakke om NyBy…. Dere hadde fire sånne punkter, hadde dere ikke det?

Ja, de fire punktene er om forretningsmodellen. Altså hvilken verdi dere leverer, som vi har snakket en del om, hvordan den verdien -

- Men den verdien kan vi si litt om da.

Vi har snakket litt om kostnadsstruktur som også er et punkt. Og kanskje hvordan verdien skiller seg. For her har man jo egentlig ulike målgrupper. Så de største verdiene dere gir til både tilbydere og de som etterspør -

- Ja, veldig mange generelt sett. Det som er overordnet, det er to verdier: Vi har social impact som første. Vi har to bunnlinjer. Social impact og finansiell impact. Finansiell impact skal ikke gå på bekostning av social impact. Også skal social impact være Pareto-optimal hvis dere -

Ja, vi er NHH.

- Ja, det er bra ikke sant. Så det er viktig å ta inn når vi måler. Hvordan måle social impact? Det er ikke så greit å si ikke sant. Men det er på en måte en egen arbeidsstrøm som mange holder på med. Så da tenker vi bare - vi kobler oss på et eller annet bra måleinstrument som passer for de dataene vi pleier å få opp. Hvis man ser på andre ting som vi får til da - for det er litt sånn som et Kinder-egg: Gjennom å få løst masse oppgaver, så er det masse bi-effekter av det. Ja, det reduserer ensomhet -

Ja, for det var noe vi hadde tenkt å spørre deg om. For vi ser nemlig på forskjellen mellom preventiv og reaktiv helse.

- Yes.

Og da har vi tenkt at på hvilken kategori skal vi plassere dere i?

- Nei, det går ikke. Og det er nettopp fordi at - det er virkelig en av de tingene vi virkelig angriper da, denne silo-tankegangen - i forhold til startups så lærer man én ting. Man må lage et produkt som du spisser til én tjeneste, mot et segment. Det er 'the way to go'. Det er veldig mye som er bra med det, du får en veldig fokusert brukerreise som er veldig targeted. Men det er en silo. Og hele problemet vi nesten angriper er nettopp det at i den ene siloen så er det alt for mye behov som er pleie og omsorg, for eksempel, og i den andre siloen er det alt for mye ledige hender. Og det er jo NAV. Så det vi gjør er å lage det laget som er i mellom som kobler nettopp den siloen med den siloen. Og da får man gjennom nettopp å løse behov der - for her trengs det flere hender, så løser du utenforskap og ensomhet og så videre i den siloen. Og noen av dem som er eldre, som er på vei inn i pleie-siloen, men ikke er der ennå, de kan unngå å komme til den pleie-siloen gjennom å bli empowered og få betydning for noen andre.

Så det er både preventivt og reaktivt?

- Yes, det er akkurat det. Og der er bare - og da man man tenke at 'oi, det er kjempegenialt', men så egentlig så er det ikke det. Det er veldig naturlig for mennesker. Det er sånn vi har holdt på i 10 000 år. Hjelpe hverandre direkte. 'Du trenger hjelp til det, jeg kan hjelpe deg med det. Fine, da bare avtaler vi det'. Det er veldig mye mer naturlig det enn å gå opp til sjefen sin som snakker med sjefen som snakker med sjefen i en annen silo - også plutselig så møter jeg på døra di. Det er bare tull, ikke sant. Så det er det vi gjør og kombinerer det beste fra velferdsstaten med det beste fra landsbyen. Og i landsbyen så var det ikke så masse ensomhet og utenforskap og noen ble mobba selvfølgelig - det var masse greier i landsbyen da - Men ja, det er bra det, dere kan ikke kategorisere det.

Men det er kult, for det er en ting som vi gjerne vil ta med oss.

- Ja.

Nå har vi ikke noe mer her, men vi har prøvd å lage en slags matrix her der vi plasserer de ulike selskapene. Og da er det noen selskaper som ikke passer inn, og det er blant annet NyBy fordi det er en plattform -

- Men kanskje det da kan - hvis dere lager sånn med reaktivt og proaktivt, hvis det var det -

Vi har faktisk tatt proaktivt langs den ene dimensjonen også har vi tatt leveringen der, men-
- Ja, for hvis dere gjør sånn så er vi der. Og det er der alle vi være.

Okei, kult. Vi ser at mange av kommunikasjonsselskapene som vi ser på går litt utenfor her.
- Oi, det er interessant.

Siden businessmodeller har fire dimensjoner så har vi valgt ut to for det er med de bedriftene skiller seg mest ut på i smart helse. Men det er mange ulike selskaper vi har sett på. I den informasjonen jeg sendte deg sto det om en sånn rapport fra Menon, som vi har tatt utgangspunkt i, men vi addet noen selskaper som vi mente burde vært med der da, sånn som NyBy.

Og det vi har sett er at det er veldig mange selskaper der verdien de leverer for eksempel er kommunikasjon som kobler mennesker sammen, som plattformer, så det er egentlig en helt egen kategori. Så vi vurderer å lage en litt annen, et slags tre, så vi får fram alle kategoriene via treet.

Det er faktisk der, av alle de 57 selskapene vi analyserer - de som har at value proposal er kommunikasjon - alle de går litt ut av matrixen, mens alle de som leverer ting som går på sikkerhet, enklere hverdag og den type ting, går inn her. Men de som leverer kommunikasjon blir så komplekse, de får så mange nivåer og blir hybride.
- Ja

Og det som er kult er at veldig mange selskaper leverer preventive tjenester da.
- Morsomt. Kan jeg få den?

Ja, du kan få den. Væresgo. Vi kan også sende deg oppgaven hvis du vil det.
- Jaja, det er gøy det. For det er hele tiden sånn å knekke om på hva er det man egentlig driver med ikke sant. For da er det sånn at man får flere hender, samme kompetansekrav, redusert kost, ikke sant. Og det er nettopp fordi man gjerne tenker sånn at okei, skal det være økt kvalitet eller skal det være billigere?

- Også blir det sånn politisk diskusjon, hvor skal man liksom legge seg. ggså blir det bare sånn 'kult, vi bare bedre kvalitet og billigere.

Ja, for det så jeg på den videoen.
- Ja, det er superviktig da. Og empowement. Og det at vi får med de norske velferdsverdiene. Men bra, da er vi ferdige?
Ja, supert.