Platform Strategy, Platform Risk, and Market Failure in the Swedish Healthcare Industry

Single Case Study of Siemens Healthineers with a Comparative Outlook towards the Norwegian Healthcare Industry

HANNA JEDVALL

MATILDA STRÖMBÄCK

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Abstract:

Today, the Swedish public healthcare industry experiences difficulties with absorbing the benefits of the platform innovations that several MedTech suppliers recently have been introducing. So far, researchers have studied the superior possibilities of platforms, however not paid as much attention to platform risks. By analysing platform strategy from the perspective of platform risks and market failures, this thesis aims to investigate the main challenges for the Swedish healthcare industry to absorb the benefits of platform innovations. The thesis furthermore aspires to examine what internal and external changes are needed to alleviate these challenges and facilitate the absorption of benefits for the Swedish healthcare industry.

The methodology used for this thesis is a qualitative case study, with Siemens' MedTech division *Healthineers* as the chosen case object being analysed. The study is not a single-case study, but a comparative case study, with the Norwegian healthcare industry functioning as the comparative variable. Through a data collection process, primarily based on in-depth interviews with different stakeholders within the Swedish healthcare industry, we find that the main challenges exist on a political- and juridical level. The comparative study with the Norwegian healthcare industry emphasises other necessary, but not individually sufficient explanations, namely that a resistance towards digitalisation and AI-solutions from medical professionals, mainly from the 'older generation', is further hampering the benefit absorption for hospitals. We argue that these challenges could be alleviated by either changing the market dynamics or by changing the business model for platform innovations.

Keywords:
Platform strategy, platform innovation, platform risks, MedTech industry, Swedish healthcare industry

Authors:
Hanna Jedvall (23960), Matilda Strömbäck (50496)

Tutor:
Henrik Glimstedt, Associate Professor, Department of Marketing and Strategy

Examinator:
Patric Andersson, Associate Professor, Department of Marketing and Strategy

Bachelor Thesis
Bachelor Program in Business & Economics
Stockholm School of Economics

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Contents

Definitions

Market failure: is in this thesis defined, accordingly to the definition in business economics, as a state in which a belief exists that innovations will lead to better outcomes for customers, but the customers cannot absorb the benefits due to their structural composition.

Silo: is a part of a company, industry or system that does not communicate with, understand or work well with other parts.

Network externalities: is a phenomenon whereby an increased number of people or participants improve the value of a good or service.

Path Dependency: is a tendency of a past or traditional practice or preference to continue even if better alternatives are available.

Algorithms: is a set of mathematical instructions or rules that, especially if given to a computer, will help to calculate an answer to a problem.

Platform risk: is the potential risk associated with platform implementation.

Diffusion process: determines the success or failure of a new product. It is important for a marketer to understand the diffusion process so as to ensure proper management of the spread of a new product or service.

Internal changes: are in this thesis referred to the changes within the organisation of Siemens Healthineers, hence within their control.

External changes: are in this thesis referred to the changes in the external environment, outside the control of Siemens Healthineers.

1. Introduction

With the rise of Apple, Google, Facebook, Uber and Airbnb - to mention a few - platforms are today increasingly becoming a popular topic. Accordingly, many scientific articles have been published, presenting proofs of how the transformation from products to platforms is an essential component for successful companies (e.g. Gawer and Cusumano 2002; Cusomano; Gawe 2011; Parker et al 2016). This has created a "buzz" about platforms, and corporations progressively try to implement platform strategies into their current business models. Corporations already having started this transformation have seen their company values increase significantly (Parker et al. 2016).

However, the aim of strategy literature is often to reach general truths (Colin S. Gray, 2010). The critic here lies in the fact that companies searching for general truths risk ending up in situations where the general truth is not applicable for their particular business model. This is true for platform strategy as well. Platform strategy in general may sound appealing, but there are some limitations, which we call *platform risks (*the potential risk associated with platform implementation). One criticism that has arisen is the creation of network externalities and network effects (Katz and Schapiro 1985; Economides 1996), where lock-in effect and path-dependencies are created, resulting in inferior technological and economic outcomes for the society (e.g. United States vs. Microsoft Corporation). David (1985) famously illustrated negative standards lock-in with the historical dominance of the QWERT keyboard layout. Another famous illustration is the triumph of VCR standard over the allegedly more advanced Betamax, sponsored by Sony (Cusumano, Mylonadis, and Rich 1996). A different point of view is that platform champion companies themselves become locked-in by their own set standards for the platform, which may impede the company's growth when a more advanced platform technology, building on different standards, emerges (Glimstedt 2018).

This thesis contributes to prevailing literature by analysing platform products as a *market failure* and shed light on potential *platform risks*. When corporations move from products to platforms (Cusumano, 2008), there is a risk that customers do not transform in the same pace and hence their market is not structured in a way that allows them to absorb the expected benefits.

We apply a single-case study with a comparative outlook, focusing empirically on the theoretically relevant case of Siemens Healthineers, and its operations in the public Swedish healthcare (HC) industry. To amplify the analysis, a comparative analysis is executed, where the Norwegian HC industry acts like the comparative variable. We argue that Siemens and other MedTech suppliers struggle with the implementation of platform products since their customers - hospitals - cannot absorb the benefits as of today. Thus,

this thesis aims to examine the challenges for the Swedish, public HC industry to absorb the expected benefits from platform innovations, as well as what potential changes are needed to alleviate these challenges.

1.1. Background: outline of arguments

Siemens Healthineers is today the leading MedTech supplier in digital imaging and laboratory diagnostics (International Sales Manager at Siemens, 2019). Their current focus is on hardware products; however, they have recently become more software-driven, due to a demand-shift in the HC industry, with an increasing demand for more time- and cost-efficient solutions. *Teamplay* is a cloud-based platform product developed by Siemens Healthineers, with a fundamental aim to increase healthcare efficiency while simultaneously reduce associated costs. However, the sale of Teamplay has not yet led to successful results, since hospitals show little interest for it, due to the difficulties they have with absorbing the benefits of these platform innovations. Thus, it exists several challenges for Siemens Healthineers and other MedTech suppliers to succeed with their platform innovation, due to this market failure pervading in the industry.

Please see the result presentation in section 4 for a more detailed background description of Siemens Healthineers, Teamplay and the Swedish MedTech- and Healthcare industry in general. The rest of this Background Section will outline the arguments that can be followed in section 4, "Results – narrative process".

This thesis analyses the case company Siemens and its MedTech Division *Healthineers* in a comparative methodology, with the Norwegian HC industry as the comparative variable. The procedure undertaken for the presentation of results is a narrative approach, divided into four sections.

The first section focuses on the Swedish MedTech- and healthcare industry as of today. The MedTech industry is first described, together with its implications for the HC sector per se. Here, Sweden's significant role within the MedTech industry is also highlighted. Thereafter, a brief description of the structure of the Swedish HC industry, as well as the current budget system and its imperfections is presented.

The second section covers an explanation of our case company Siemens and their MedTech division Healthineers in the context of the Swedish HC market focusing on the last decades. The main focus of this section is Siemens Healthineers' strategy until today. The section argues that Siemens for long has been a product-oriented company with their competitive edge being the high quality of their hardware products. This competitive advantage is what has made Siemens the leading company in the industry. Healthineers' marketing communications, with the main focus being Key Account Management, is also described in this section.

The platform revolution, resulting from the increasing demand for a more efficient healthcare, is presented in the third section. This section thus describes why the platform revolution has developed, which is primarily due to the increasing challenges within the HC industry (an aging population and an increase in chronic diseases), as well as the digitalisation trend that has emerged. Hence, the platform offer is presented more concrete in this section, to emphasise the potential, overall gain that the Swedish HC sector could achieve by implementing platform innovations. The third section also presents Siemens' platform Teamplay and their new platform-oriented strategy - a strategy that has grown due to the healthcare's challenges.

Finally, there is a section presenting the major challenges for the hospitals to absorb the platform benefits as of today. This section thus confirms the market failure currently existing in the Swedish HC sector. The challenges introduced in this section is (1) the internal challenges for MedTech suppliers when moving from a product-oriented to platform-oriented strategy, (2) the revenue model challenges, and (3) the challenges originating from the current structure of the Swedish HC sector. Furthermore, to find other necessary, but not individually sufficient explanations (Bloch, 2011), a comparison with the Norwegian HC sector is introduced, as the public procurement system and the structure of the HC industry differ significantly between the two countries. In this way, it is easier to compare the advantages and disadvantages with a more nationalised system (as in Norway) versus the system currently existing in Sweden, with individual counties being in charge of their own procurement processes. Moreover, this nuances the case study, as it shed lights on other challenges that explain the market failure that today prevents hospitals from absorbing the potential benefits of cloud-based platforms.

1.2. Research gap

During the past couple of years, several articles and theories have gradually been published relating to platform strategy. While much literature addresses the superior possibilities of platforms, research on platforms only very scarcely pays attention to *platform risks*. Our contribution, which aims at filling this gap, thus builds on a study of platform strategy and market failure as a special form of platform risks within the Swedish HC sector.

1.3. Purpose and research question

The objective of this thesis is first and foremost to empirically investigate the extent to which existing literature can explain "platform risk" and "market failure" with regards to the Swedish, public HC industry. The market failure in this case, exists since the public sector on the demand side fails to absorb the benefits of the platform innovations already in place on the supply side. More specifically, the purpose of this thesis is to provide

knowledge of the challenges hampering hospitals in Sweden to absorb the possible benefits of today's platform solutions. Moreover, it aims to shed light on the internal and external changes needed for hospitals to be able to absorb these benefits, and hence for MedTech suppliers to be able to provide their current platform innovations to the HC market.

Hence, this thesis is set out to highlight the challenges for the Swedish healthcare industry to absorb the benefits of platform innovations, which today impedes MedTech suppliers to sell their platform products;

- *What are the key challenges for the Swedish, public healthcare industry to absorb the benefits of platform innovations?*

To further develop a deeper insight into platform products as a market failure and what is needed to alleviate this market failure, the sub-research question is;

- *What internal and external changes[1] are needed to alleviate these challenges, in order to facilitate the absorption of benefits for the Swedish, public healthcare industry?*

1.4. Expected contribution

The so far published articles regarding platform strategy have one common denominator: they present a one-sided view by shedding light on the benefits that companies embracing platform strategy might experience. Moving from products to platforms is presented as a revolutionary way for companies to move forward in a constantly changing environment (Parker et al. 2016). According to Eisenmann et al. (2011), digitalisation is today disrupting almost every industry, making it inevitable for companies to not be part of this evolution by introducing platform innovations. Some economists have however criticised platform innovations. Krugman's (1994) and Evan's (2016) criticism with regards to network externalities and path dependency is one example, but there are some critics not yet explored.

Even though platforms are becoming a vital part of companies' strategies, several external factors must be met for these strategies to create any value at all. The most important factor is that the end-customers must be able to absorb the benefits that platform strategies bring (Hannah et al. 2015). If this criterion is not met, a market failure can be argued to exist, as is the case in the Swedish HC industry today. It turns out that the end-customers

[1] Please see the definition list on page 5 for an explanation of what "internal" and "external" changes mean in this context.

within this industry - the hospitals - currently have severe difficulties with absorbing these platform benefits.

With respect to this situation, this thesis aims to contribute to the existing research by closing the current gap of platform discussions. The case study provides insights on how the current situation in the Swedish, public HC industry can be viewed as a market failure, by highlighting the challenges for Swedish hospitals to absorb the platform benefits. Thus, it is key to emphasise that this thesis sheds light on a new research area regarding the risks associated with platforms. The thesis thus nuances the one-sided view of a platform product as a key factor to success in a constantly evolving and digitalised market. Rather than further emphasise the positive aspects of platform innovations, or further insist with the critics in terms of network externalities and path dependency, this study addresses another critic to platform innovations. In this manner, the thesis contributes to the existing platform literature in a meaningful way, by introducing platform risks to shed light on potential market failures.

1.5. Delimitations

In this study, several limitations have been undertaken in order to deep-dive into the narrow purpose and research questions stated above. The first limitation is a geographical limitation, whereby the chosen case company is analysed within the Swedish market. This is accurate since e.g. the selling process, through public procurement, differs a lot depending on national regulations restricted to country areas (konkurrensverket.se, 2019). Healthcare in general also differs a lot between different countries. In the US for example, the healthcare is mainly private, thus facing different challenges compared to the Swedish healthcare, which is mainly public. For this reason, and due to differences in the procurement processes, the study is furthermore limited to only incorporate and analyse the *public* Swedish HC sector. However, the comparative case study of the Norwegian HC industry nuances the analysis by comparing the Swedish market with the Norwegian market[2].

There are many stakeholders of interest within the HC industry. However, due to the time limit and the scope of this thesis, we have chosen to delimit the primary data collection to the interview subjects of highest interest. Our intention was to interview many different stakeholders, in order to nuance the analysis, e.g. MedTech suppliers, healthcare clinical executives, high-level public sector employees and healthcare experts. We however did not choose to interview any patients. This since patients are not the end-customers for

[2] The Norwegian Healthcare industry was chosen on the back of the significant restructuring that took place in 2002, when the healthcare industry went from being controlled by the counties to be controlled by the state. Indeed, the healthcare industry in countries such as Denmark and Germany differ from the Swedish healthcare industry as well. However, there is currently a discussion in Sweden regarding a potential restructuring similar to the one that took place in Norway, which is why the Norwegian healthcare industry was considered to be the best option for comparison.

MedTech suppliers and hence not relevant when analysing hospitals' difficulties with benefit absorption.

Lastly, due to the time limit and the limited space available, a complete comparative case study could not be pursued. Instead, the Norwegian HC industry was used as a comparative variable where information was gathered through in-depth interviews with a health economic expert. This hence made it possible to reach the same comparison that would have been reached if a complete comparative analysis would have been conducted.

2. Theoretical framework

In this theoretical background section, three different theories are presented. The first part (2.1) describes *platform theory* in terms of how companies today move from being product-oriented to become platform-oriented. The second part (2.2) describes the theory of *market failure* and the different definitions existing today. Finally, the last section (2.3) outlines the i*nnovation theory,* with two different conceptualisations of it, in order to better understand how to best introduce a platform product in a complex market, e.g. the Swedish HC market.

Some prior research regarding the Swedish HC sector from a business economics perspective is relevant for our study, in particular those that incorporate the topic of innovation. For instance, Hans Kjellberg (2015) presents in his study "Market innovation processes: Balancing stability and change" two important findings: (1) how innovations can be marketed and (2) how to stabilise markets in order for innovations to succeed. This by building devices and technical infrastructures, institutionalising norms and rules, generating and disseminating images, models, and representations, and enacting practices, routines and habits. Another article, "Implementing organisation and management innovations in Swedish healthcare", highlights 12 different cases of innovation within healthcare, with the aim to create a hypothesis of what factors are needed for an innovation to become successful.

There are several other articles analysing digital transformation within the HC industry and how to conduct marketing of innovations in different sectors. However, very few touch upon the platform phenomena in regard to the HC sector and even less evaluate the difficulties of launching platform innovations in highly regulated markets such as the Swedish HC sector. Hence, even if though it exists some theories that contribute with insights of how to ease current difficulties of implementing platform products in the Swedish HC system, we consider that these theories are not sufficient enough. In order to understand all of the fundamental aspects, the platform theory was therefore chosen, as it better describes why and how platforms can be successful in different markets.

2.1. Platform theory

There are many definitions for a modern platform today. However, a modern platform always consists of three different elements: a core technology that serves as a foundation, additional technology applications that integrate or connect with the platform core, and finally the intercommunication between the core and the additional applications. Further, a platform serves as a great foundation for product developers to develop and offer a great variety of products to different market segments at reduced cost (Hannah, 2016). Moreover, platform theory often incorporates that hardware products and software products work together in electronic devices. For the builder of the platform - the platform

leader - the platform can also act like a giant opportunity for differentiation (Glimstedt, 2018).

Factors that are of high importance for a platform to become successful are the direct and indirect network effects. A strong *direct* network effect is built by having a large number of users. The more people using the platform, the more valuable it gets which can lead to a "winner-takes-it-all-outcome". This since it prohibits other platforms to emerge since actors want to be present where most other actors already are present. A strong *indirect* network effect is dependent on the number of complementary products that are offered on the platform in order for the users to gain sufficient value from the platform. The more complementary products offered on the same platform, the stronger the indirect network effect is. Strong direct- and indirect effects can in turn lead to creating lock-in effects, benefitting both the platform leader and its partners (Glimstedt, 2018).

Hence, the more partner companies and users that adopt the platform, the more valuable it gets due to a growing set of complementary innovations. This creates a cumulative advantage for existing platforms; as they grow in adoption, it becomes harder for rivals and new entrants to create a similar platform. The growing number of complementary products offered on the platform can thus act as a barrier to entry. Hence, the fundamental aspect of platform theory is the cumulative advantage of innovation (Gawer et al 2013). Companies can, by becoming platform partners, develop new innovations both quicker and to a larger extent, contributing to new products, services and technologies (Glimstedt, 2018).

There are however some critics to the platform theory that should be considered. For instance, network effects could act in reverse; instead of building value quickly, value can get destroyed at an exponential speed (S. Evans, 2016). Imagine a platform with a lot of users that suddenly lose its good reputation because of a tiny mistake. This might lead to some users leaving the platform. In the same way that the first users joining the platform led to a significant increase in users during a short period of time, the loss of a few number of customers could have the same exponential effect but in a negative aspect – one lost customer could quickly result in thousands of lost customers. Other criticisms could also be highlighted, but the platform theory is still a relevant theory to take into consideration when building a platform product.

2.2. Theory of market failure

The theory of market failure has different definitions depending on whether the theory refers to market failure within political economics or business economics. In political economics, a market failure occurs when a market is not Pareto efficient (Gregory, 2009). This happens when it is possible to reallocate resources so that one individual could be better off, without making another individual worse off. In this type of market failure, it

exists a central belief that the state can intervene to solve the problem (Dollery, 2001). Market failure has thus been a way to legitimise state intervention as it is assumed that they have the knowledge and capacity to re-establish market conditions.

According to theories guiding public innovation policy, governments thus need to intervene when the market mechanisms fail to support important innovations (Steinmueller, 2010). Furthermore, theories on 'national systems of innovation' (Nelson, 1993) states that "the prevalence of innovation market failure and underinvestment in technology implies the need to establish a long-term institutional framework for the support of basic research, generic-enabling research, and commercialisation (Martin and Scott, 2000)".

Market failure, from the political economics perspective, can further be described as a situation where services and goods are not allocated in a desirable way, leading to a social welfare loss. This often happens in non-competitive markets, where information asymmetry and negative externalities exist. However, too much or inaccurate governmental structure can also lead to market failure due to inefficient allocation of resources (Weimer et al. 2004). This is called *government failure* and can occur in the context of public economies, caused by an inadequate government intervention that would not exist in a free market. The idea is based on the policy argument that even if a particular market may not have perfect competition required to ensure social welfare optimality, government regulations could still make issues worse, rather than better (Orbach, 2013).

When, on the other hand, viewing market failure from a business economics perspective, it is more accurately defined as a condition where the belief of new innovations resulting in better outcomes to customers proves to be wrong. For example, a market failure arises when the initial condition (e.g. high up-front fixed investments and low initial demand) blocks an innovation's breakthrough, which hinders customers from absorbing the benefits of new innovations in the longer perspective.

2.3. Innovation theory

2.3.1. Disrupting vs. sustaining innovation

A disruptive innovation refers to a product or service, or even a concept, that creates value in a new way, either by disrupting an already existing market, or by creating a completely new market (Christensen, 1995). For a new idea to actually become an innovation, it must satisfy current customer needs and create a demand from customers within this existing or new market.

A sustaining innovation on the other hand, refers to an innovation that instead of creating a completely new value network, improves and grows the existing one. An example of a sustaining innovation is a new car model. This since its basic functions stay the same, but new features are introduced which makes the car perform at a higher level, hence creating more value for customers (D. Anthony, 2007).

2.3.2. Radical vs. incremental innovation

Both disruptive and sustaining innovations can be either radical or incremental. Radical innovations refer to innovations that both disrupt a market, while at the same time force the market players to offer new business models. These innovations are often very hard to pursue. One example of a radical innovation is the first cloud model, which succeeded in launching a completely new CRM (customer relationship management) software, while at the same time created a new business model - the SAAS (software as a service) business model. This innovation completely transformed how business was conducted in the tech industry (Christensen, 1995).

A more common type of innovation is an incremental innovation, which refers to a series of gradually changing improvements to existing products, services or concepts that facilitate for the market player to keep its competitive position. This type of innovation is the easiest and most cost-efficient innovation to implement (D. Anthony, 2007). Incremental innovation also reduces risk in comparison to radical innovation. It further allows a process of creating human capital and competences which might lead to making better products. Gmail is an example of an incremental innovation where the product was first launched to deliver emails in an easy way. Over time, Gmail released better services and more features leading to a product handling much more than only emails.

2.3.3. The innovation matrix

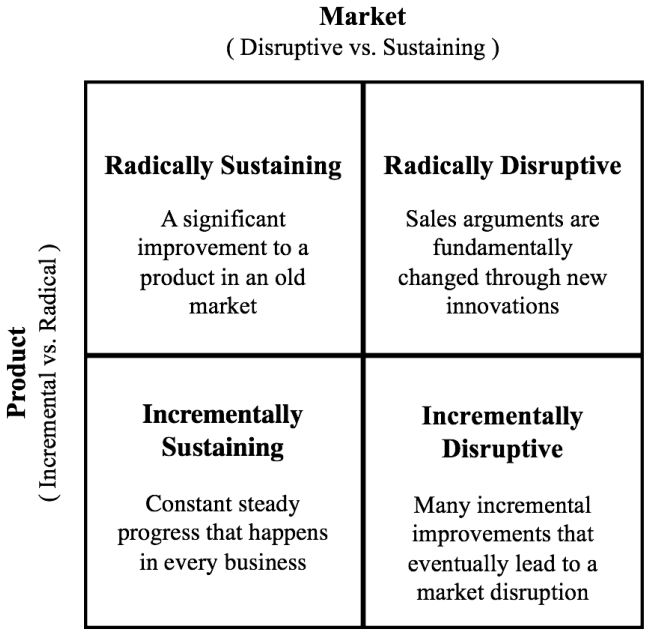


Figure 1. An illustration of Christensen's innovation matrix

The innovation matrix can be used to portray the different types of innovations explained above.

- *Radically disruptive* innovations tackle new technology while at the same time create new business models. Firms that introduce radically disruptive innovations thus have no clear competitors. A practical example of a radically disruptive innovation is the transistor radio. Initially, the sound quality of it was significantly worse than the existing, bigger radios. A lighter radio however appealed to the younger generation, who enjoyed the ability to bring the music wherever they went. When the quality of the portable radio improved, it thus became a radically disruptive innovation; it managed to tackle new technology while at the same time created a new business model by forcing radio providers to rethink their current business model to keep their competitive advantage.
- *Radically sustaining* innovations are improvements in an already existing market, creating a new value for customers within this market. A practical example of a radically sustaining innovation is an upgrade in the manufacturing process of a component that increases computing power while simultaneously decreases energy consumption, at no extra cost. This improvement happens in an already existing market, but it increases the customer value since customers get a more valuable product for the same amount of money.
- *Incrementally disruptive* innovations are gradual improvements to products and services that translates into a disruption of the market. A practical example of an incrementally disruptive innovation is the first iMac computer, which over time consolidated multiple variations of desktops into what finally became one entity

with outstanding improvements – a product that significantly disrupted the market.
- *Incrementally sustaining* innovations are small, continuous changes to products or services within an already existing market. Examples of incrementally sustaining innovations are cost cutting- or feature improvements in existing products or services (Leifer, 2000).

Even if few management theories have had as much influence as Christensen's theory of disruptive innovation there is still some skepticism in regard to how well the theory actually describes what happens in business and markets. For example, it has been a discussion regarding the circumstances of the theory, i.e. in what market conditions the theory is truly applicable in order to correctly predict markets and innovation.

2.3.4. Diffusion of innovations

The diffusion of innovations model is defined as the process where an innovation gets communicated via different channels, and how different members in the system react to the new innovation (Rogers, 1962). Rogers (1962) describes the innovation-diffusion process as "an uncertainty reduction process", and he proposes attributes of innovations that help to decrease uncertainty about the innovation. Attributes of innovations include five characteristics of innovations: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. Rogers further states that "individuals' perceptions of these characteristics predict the rate of adoption of innovations". Also, Rogers notes that although it exists a lot of diffusion research on the characteristics of the adopter categories, there is a lack of research on the effects of the perceived characteristics of innovations when it comes to the rate of adoption.

The theory identifies the different aspects that influence the *rate* of adoption of an innovation. In Rogers' diffusion of innovations model, often described as the "S-curve", he indicates how different individuals adopt new innovations at different rates depending on their personality type, described below:

- *Innovators* are individuals who are eager to experience new innovations and are not afraid to take risks. They want to be the first to try a new innovation and thus try new types of technology quickly, even though there is a high risk of failure.
- *Early adopters* appreciate new innovations and technologies, but want someone else to have tested it before them. Hence, they are more risk averse than innovators, but still take on new innovations fairly quickly.
- *Early majority* individuals take more time to adopt a new innovation. They however usually adopt new types of technology before the majority of the population.
- *Late majority* individuals adopt an innovation later than the majority of the population. They are quite cautious with trying new products or services and need

some proof of evidence that the products or services actually are successful before they try them themselves.

- *Laggards* adopt a new product or service later than everyone else. They like tradition and do not appreciate disruptive changes. They are usually very skeptic to new innovations and need a push in order to buy a new product or service.

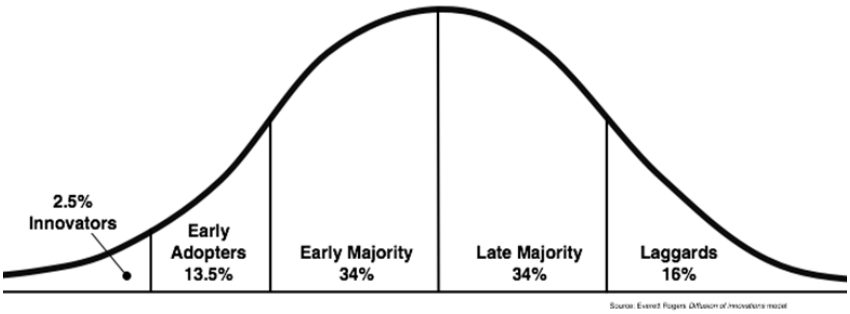


Figure 2. An illustration of Rogers' diffusion of innovation model

Concerning diffusion, the insights from the literature on market failure point to certain limitations of Rogers' diffusion of innovations model. Rogers shed light on the *individual consumer's* decision to adopt an innovation, which Rogers analyses as a rational time-dependent learning process. Contrasting Rogers' influential work, the market failure literature tries to uncover the public and private *organisations'* decision processes, which require an analysis that goes beyond Rogers' diffusion of innovations model. In short, Rogers' diffusion of innovations model addresses how individuals take decisions, hence in a B2C market. However, in the B2B-setting, the adoption criterion extends to organisational and socio-institutional factors, many of which are based on lock-in and path-dependency (David, 1985), industry structure, and unique market regulations, which often override rational argument. Hence, Rogers' diffusion of innovations model cannot alone be applied to describe organisational decision processes.

Other studies developed from Rogers's curve is for example Wejnert's (2002) framework, with an array of variables to examine what factors influence an actor's decision to adopt an innovation. The framework categorises variables into three major components; the innovation itself, characteristics of innovators that influence the probability of adoption, and the characteristics of the environmental context and the structural characteristics of the modern world. These latter characteristics incorporate four sets of variables: political conditions, societal culture, geographical settings and global uniformity. Hence, there are several ways to explore Roger's curve of diffusion and this thesis aims to analyse its dilemma through an appropriate angle of the theory as well.

3. Methodology

3.1. Research design / approach

3.1.1. Single-case study of Siemens Healthineers with a comparative outlook towards Norway

The chosen research approach is a qualitative methodology (Holme & Solvang, 1997) based on a distinct case (Gerring, 2004) with Siemens Healthineers being the object analysed. The reason for choosing this methodology, and not using a statistical study is due to the fact that it is a market with few players. There are currently four MedTech suppliers fighting for market shares and only ~20 possible buyers, being the different counties. Hence, due to the low number of MedTech suppliers acting in the market, a qualitative methodology based on a specific case was seen as the most accurate methodology (Yin, 2014).

The case company chosen is Siemens and more specifically their MedTech division Healthineers. However, the methodology chosen is not a single-case study, but a comparative case study (Perchard et al. 2017), where the Norwegian HC industry works as the comparative variable. According to Perchard (2017), single case studies are too narrow and also subject to individual bias and thus not optimal when analysing a complex phenomenon. Hence, the single-case of Siemens Healthineers is further nuanced with a limited, comparative outlook towards Norway. The comparative approach sheds light on how different variables together form a causal chain of events (Falleti et al. 2009) and gives another perspective of the topic. This allows us to provide additional answers to our research questions, which all are necessary, however not individually sufficient explanations (Bloch, 2011). A complete comparative analysis would execute the same case analysis on two separate cases. However, this is not possible to do in this thesis, given the scope and timeframe. Instead, in-depth interviews have been held with people holding deep insights in the Norwegian HC system, which works as a substitute for an individual, comparative case study.

3.1.2. Case selection

Siemens Healthineers is seen as a theoretically relevant case as they today cover more than a majority of the hardware equipment supplied to the Swedish HC industry. Even if the case study analyses one company solely, it can thus be argued that Siemens can act as a demonstrator for the whole market, considering their significant market share. However, as explained in section 3.1.1, a single-case study often provides a narrow and subjective perspective, subject to individual bias (Perchard, 2017). Due to the complexity of this phenomena we thus chose to further test the empirical data findings through a comparison with the Norwegian HC industry, as its structure significantly differs from the structure

of the Swedish HC sector. The comparative case study sheds light on other necessary, but not individually sufficient explanations (Bloch, 2011), which were needed to get the full nuance of the complex matter of hospitals not being able to absorb the expected benefits of platform innovations.

Table 1. An illustration of case selection

Method	**Example**
Typical	Google, Airbnb
Diverse	Apple
Deviant	Siemens, Norway

Above, a table of three different case methods can be observed. If Airbnb and Google are viewed as *typical* cases of digital platforms, Apple can be viewed as a *diverse* case. This since Apple is fairly similar to a typical case (e.g. in terms of consumer services), but they differ in terms of their dependency on hardware as a platform (the smartphone). Siemens is also dependent on their hardware products; however, they are seen as a *deviant* case since the *outcome* of their digital platform deviates from the outcome of Airbnb's, Google's, and Apple's digital platforms. While all of the mentioned actors' digital platforms have led to success, this is not the case for Siemens. Siemens Healthineers' platform strategy and their digital platform Teamplay has turned out to be hard to implement in the current HC market. The outcome hence deviates from the typical outcome of digital platforms. Other ways in which Siemens can be viewed as a deviant case is when it comes to their customer base (B2B) as well as the selling process (public procurements). This thus also explains why the Norwegian HC industry can be viewed as a deviant case as well, since they meet the same criteria.

The reason for choosing two deviant cases in this analysis is because we deliberately want to problematise prevailing literature. Deviant cases do not support the universal theories' predictions (George & Bennett, 2005; Levy, 2002) since their outcomes contradict prior theoretical expectations. This is why Siemens Healthineers was chosen as the case company, and the Norwegian HC industry was chosen as the comparative case - to question the prevailing theories of platform strategy. In this way, these two cases shed light on the *platform risks* and *market failure* highly permeating this thesis.

3.1.3. Narrative approach

The research approach permeating this thesis can also be described as a narrative approach where the 'sequence of events' (SOE) methodology (Leblebici et al. 2004) is used. Lawrence Stone (1979) defines a narrative approach in the following way: "Organising the material in a chronologically sequential order and focusing the content into a single coherent story." Narratives are hence the constructing of past events into a coherent whole that explains each element in a meaningful way (Griffin, 1993). The

narrative approach is undertaken in the result presentation (section 4) of this thesis, which means that this section is written as a story, with a logical timeline from point A to point B. The narrative methodology is used to create causality and make it easier for the reader to grasp the purpose and the results, even though it is a highly complex subject. Incorporating all complexities at different levels provides a compelling story (Griffin, 1993). Instead of a statistical approach whereas numbers are used to provide insights of which variable is of highest importance, this research approach instead sheds light on how different variables impact each other and how the causal relationship of variables leads to an outcome (Leblebici et al. 2004).

Another word for complexity is *multiple temporalities*. The thesis touches upon different temporalities; one being the public procurement and another one being the strategies of the MedTech suppliers. Explaining why and how an event occurs requires a causal logic which is based on "time" and on temporal processes (Griffin, 1993). Narratives are hence by definition temporal in an explanatory logic. The thesis also attempts to provide a *thick description* (Bechky, 2006), meaning that it explains as many factors as possible that might have an impact on the subject. These factors gradually appear when conducting in-depth interviews with different stakeholders, perceiving the subject from different perspectives. Hence, the main method features are the periodisation of events and the narrative aspect of it, where the narrative becomes the evidence of the findings (Froeyman, 2009).

3.1.4. Data collection

The qualitative methodology is divided into two parts: primary and secondary data, described below.

Table 2. An illustration of the primary and secondary data

Primary Data	**Secondary Data**
In-depth interviews	Scientific articles
Company presentation	Management consultancy reports
	Company home- & webpages

Data collection was mainly done through primary research, primarily in terms of in-depth interviews; face-to-face as well as telephone interviews. Another primary data tool used was a company presentation conducted by Siemens Healthineers. Secondary data was collected in order to get a broader and more objective perspective (Yin, 2003) of platform strategy and its implications. The secondary data mainly comes from scientific articles and management consultancy reports, as well as company home- and webpages of MedTech suppliers.

Interviews were conducted with different stakeholders within the Swedish MedTech- and HÇ industries, such as MedTech suppliers, end-users (hospitals), public procurement experts, and health economic experts. This in order to gain diversity (Yin, 2003) and the full spectrum of this complex industry. The chosen method was semi-structured interviews (Kvale & Brinkmann, 2014), with a predetermined interview schedule, but with an ability to adapt and add additional questions when needed. The questions were open-ended, to prohibit the risk of guided answers, in order to increase the reliability in the responses.

3.2. Primary data

The primary data collection consists essentially of in-depth interviews with stakeholders having both different backgrounds and professions. This in order to generate an overview and an objective picture (Yin, 2003) of the required information necessary to fulfill the research purpose. Since platform products within the Swedish HC sector and the MedTech industry is of complex art, in-depth interviews were considered the most appropriate method in order to understand and interpret the results correctly.

A company presentation by Siemens Healthineers was also used as a primary data tool in order to get the necessary domain knowledge of what a platform strategy actually is within a MedTech context. Furthermore, the company presentation was used to understand Siemens Healthineers' strategy until today as well as their strategy going forward, in order to better analyse the transformation process.

3.2.1. Qualitative methodology: interviews

Table 3. An illustration of interview subjects

MedTech suppliers	End-customers (hospitals)	Public procurement experts	Health economics experts

Interviews were conducted with the interview subjects to be seen in the table above. The main objective with these interviews was to gain the full spectrum of information concerning the challenges for the benefit absorption in the Swedish HC industry, as well as potential internal and external changes that could alleviate these challenges. Interviews with the MedTech suppliers regarded their historical strategy as well as their transformation towards a software- and platform driven strategy. Interviews with the end-customers (hospitals) regarded what their impression of the work conducted by MedTech suppliers was, as well as their thoughts of the ongoing platform revolution. The public procurement experts were interviewed to gain knowledge of how the public procurement process worked in Sweden and Norway and if there was any chance for the process to become more efficient and allow platform products to be procured. Finally, interviews with health economics experts were conducted to gain more knowledge about the

healthcare sector and what benefits a platform product potentially could bring. Please see examples of interview guides in Appendix 8.4 and 8.5.

Below, a table incorporating the interview subjects' position, age, and gender, as well as the number and length of interviews with each interview subject can be observed.

Table 4. An illustration of the characteristics of interview subjects

Profession	**Age**	**Gender**	**# of interviews**	**Length**
Business Development Manager - Cloud & Digital Platform, *Siemens*	42 years old	Man	2	60 min; 60 min
International Sales Manager and Sales Director Imaging, *Siemens*	40 years old	Man	2	60 min; 30 min
Business Manager, *Siemens*	49 years old	Man	1	60 min
Sales Manager, *Siemens*	54 years old	Man	1	45 min
Professor Emeritus - Department of Health Management and Health Economics	65 years old	Man	2	60 min; 60 min
Research Fellow, Ph.D. Business Administration, *SSE*	42 years old	Woman	1	45 min
Digital Advanced Visualisation Leader, *General Electrics*	31 years old	Man	1	30 min
Procurement Manager, *Region Uppsala*	37 years old	Man	1	60 min
X-ray Clinic Operations Manager, *Södertälje Hospital*	55 years old	Woman	1	60 min
Vice President Concept Exploration, *Elekta*	54 years old	Man	1	60 min
President and CEO, *Elekta*	58 years old	Man	1	30 min

3.2.2. Qualitative methodology: company presentation

A meeting was also conducted with three key employees from Siemens' MedTech division Healthineers. The meeting acted as an introduction to the MedTech industry, to Siemens as a company (See Appendix 8.1) and more specifically to Healthineers (See Appendix 8.2). Besides an introduction of Healthineers, their platform product Teamplay (See Appendix 8.3) was presented. This further led into a discussion regarding the opportunities and challenges of the implementation of a platform product, as well as the digitalisation trend currently seen within the Swedish HC industry. Furthermore, an overall plan of what would be investigated in the thesis was discussed where it was decided that the more specific research questions would be defined in a later stage, after having collected more data.

3.3. Secondary data

The secondary data serves as a complement to the primary data and provides relevant background to the research field. By using more than one source of data collection, the evaluation and analysis become more reliable. It further deepens the understanding of the results gained from the primary data collection. The gathering of information from different sources hence creates a 'triangulation' effect and a more reliable study (Yin, 2003).

The main sources of secondary data used in this study were management consultancy reports, scientific articles, and homepages for MedTech suppliers. These types of documents are referred to as secondary data since the information and data is collected by another person than the authors of this thesis (Saunders, Lewis & Thornhill, 2009). Secondary data thus requires a more detailed source criticism and examination of possible dissemination.

3.3.1. Management consultancy reports and scientific articles

In order to gather objective information and gain an overview of platform innovation in the MedTech industry, as well as the digital transformation within the HC sector, reports provided by management consultancy firms (e.g. Accenture) analysing the industries and its trends have been studied. Scientific articles regarding especially platforms and digitalisation have been read as well, in order to gain a more academic theory-driven approach, (e.g. "Industry Platforms and Ecosystem Innovation" by Gawer & Cusumano (2013)).

These two sources were used to understand the ongoing discussions within the industry and help formulate the interview questions to be asked in the in-depth interviews. The reports also confirmed and increased the reliability of the primary data findings.

3.3.2. Company homepages

The last source of secondary data is MedTech suppliers' homepages (e.g. Siemens Healthineers, General Electrics and Philips). These websites were primarily used to understand MedTech suppliers' strategies for managing the ongoing industry trend of digitalisation. Furthermore, by studying different competitors' homepages, it became easier to compare different marketing communication strategies and what a future platform might look like.

3.4. Execution

The primary data in terms of in-depth interviews and company presentations was collected during February and March 2019. In order to gain an overview of the entire spectrum, the in-depth interviews were conducted with different stakeholders, who held different views of the challenges for platform innovations to be absorbed by the Swedish HC industry. The approach used was "Grounded Theory" which is a systematic methodology involving the construction of theories through methodically gathering and analysing data. As the data was collected through interviews and other sources, possible answers and explanations in order to analyse the research question was grouped into categories becoming basis for new hypothesises. This in order to find the most contributing theories, providing an explanation to the research question (Turner et al. 1986). In total, the interview process consisted of fourteen interviews with eleven persons. As Siemens is the case company of this thesis, we also listened to a company presentation held by key employees from their MedTech division Healthineers in the beginning of the data collection process. All interviews were transcribed in order to more easily be analysed afterwards.

The secondary data was collected before and during the in-depth interview collection. This to gather some background information in order to ask the interview participants the correct questions, but also to be able to analyse the answers afterwards in a professional manner.

3.5. Sample selection

The strategies of sample selection for this qualitative thesis is based on particularly two approaches: *Judgement* and *Convenience* (Marshall, 1996). Judgement sampling implies that interview subjects should be chosen based on their expert knowledge. Convenience sampling argues that interview subjects who are most accessible should be prioritised, which was critical in our sample selection as the players in the market are few. These two strategies were thus used to choose the interview subjects and to ensure validity and reliability. Moreover, the strategies of sample selection helped us reach answers to our research question in an efficient way.

3.6. Validity and reliability

3.6.1. External validity and reliability

Ensuring external validity and reliability could be quite challenging in a thesis that builds on a qualitative methodology, compared to a thesis built on a quantitative methodology. Therefore, the theoretical sampling chosen for this thesis is, as explained in section 3.1.2, a deviant case, as well as an element of comparative analysis. This theoretical sampling assures both the (external) validity and the reliability, which is further explained below.

Researchers within the quantitative approach - which focuses on data collection from large population and statistical analysis for theory-testing - elaborate on criteria of external validity. This in order to determine if causal relationship from construct X to construct Y is *generalisable* to other settings, and in other times. Within the quantitative tradition, high external validity comes with robust sampling, e.g. large random sample from a broadly defined population in a random sampling setting such as an experimental setting. Compared to quantitative research, validity and reliability are more challenging aspects in designing a qualitative research, especially when the number of cases being studied is highly limited (even limited to a single case). A general conclusion is that case-research typically answers research questions that address "how" and "why" in unexplored research areas particularly well. By contrast, the research strategy is ill-equipped to address the questions "how often," and "how many," and questions about the relative empirical importance of constructs (Eisenhardt & Graebner 2007; Edmondson & McManus, 2007). Therefore, Eisenhardt and Graebner (2007) conclude that case-research builds theory that later on can be tested in a statistical analysis.

Yin (2014) takes a different stance by arguing that cases are not most useful as “stepping stones” towards statistical analysis, but as elements in comparative research strategy, which he calls *natural experiments,* (e.g. Kogut and Zander (2002)). There is also a consensus that single-case analysis of deviant cases typically confronts theoretical ideas with careful analysis of the empirical evidence in iterative interplay between theory development and the facts. Thus, the deviant analysis will not be truly inductive. (Liphart, 1971, Smelser, 1976, Mahoney, 2003).

3.6.2. Internal validity and reliability

To ensure internal validity and reliability, two perspectives have been taken into account: the interviewers and the interviewees. These two perspectives have continually, throughout the data collection, been reviewed and examined, to make sure that no confirmation bias or other imperfections have affected the results of the data collection.

3.6.2.1. Interviewers

The interviewers are the authors of this thesis, being us, who conducted all interviews together. In order to make sure that we perceived the interview subjects correctly, the both of us participated in all interviews. Furthermore, each interview was recorded and we could hence go back to the interviews if we were uncertain regarding any response. To prepare ourselves for the interviews, we studied literature regarding interview methods, to get insights in the best ways to conduct interview schedules and study guides. Furthermore, we conducted several interviews with the most important interview subjects (Maxwell, 1992). This in order to ensure consistency and follow up on questions that had come up after analysing the interview results. Finally, we always validated data received from one interview subject with another interview subject, to make sure that their answers were not biased.

3.6.2.2. Interviewees

The interviewees are of highest importance when it comes to validity and reliability, since the result presentation is based on their responses (Cho et al. 2006). The interviewees were carefully selected. From Siemens, the people with most knowledge regarding their future platform strategy were interviewed, as well as a salesman in order to get a better view of the customer relationships and the selling process. When it comes to professors and experts, a background check was conducted before the interviews, to ensure that they had sufficient knowledge about the topic and hence could provide meaningful insights. We also used the method of recommendation to get in contact with most of our interview subjects. Before each interview, we structured an interview guide, to make sure that the interviews revolved around the topics of our interest. This also prevented interviews from leading into other topics that were more favorable for the interview subjects to discuss. This in order to ensure the validity of data; the interview guide helped us measure what we intended to explore.

Lastly, many interviews were conducted with employees at companies, who thus might have an interest of portraying the company in an advantageous way. However, in this case, the case company was in need for help, in order to make their platform strategy successful. Since they were in search for a recommendation, it was of key importance that the interview subjects portrayed the company in a correct and neutral manner. No interest of misrepresenting the company should thus have permeated the interviews. This can hence be seen as a strong argument for the reliability of data.

4. Results: narrative process

4.1. The Swedish MedTech- and healthcare industry

4.1.1. The MedTech industry

MedTech is a wide area including different products and solutions, with the purpose of facilitating the work and processes within the HC industry. Today it exists over 900,000 different MedTech products worldwide and these products and solutions are used to facilitate diagnostics, treatments and reliefs of different diseases. The purpose is hence to create products resulting in better health and a higher life-quality for patients all over the world. MedTech solutions thus enable human beings to live both longer and more active lives (swedishmedtech.se, 2019).

Sweden has for long been a pioneer when it comes to innovative MedTech solutions. Due to the pervading innovative climate, Sweden has become a stronghold for MedTech companies, both Swedish and international ones. Although Sweden is a fairly small country, only accounting for 0.5 percent of the worldwide MedTech market, Swedish MedTech companies account for as much as 4 percent of the global revenues within the industry (swedishmedtech.se, 2019).

MedTech suppliers play a key role when it comes to introducing new solutions to solve the current challenges of an aging population and an increase in chronic diseases. A platform product that potentially can help patients to recover faster does not only decrease patients' suffering, but also saves time and money within the HC industry, hence leading to higher social welfare. The MedTech industry is thus a crucial part of the solution to current, as well as future, problems and is thereby a central stakeholder for the HC industry as a whole (swedishmedtech.se, 2019).

4.1.2. The Swedish healthcare industry and the budget system

The Swedish HC sector is today divided into ~20 counties, where healthcare devices are procured on a county-basis (Procurement Manager at Region Uppsala, 2019). Each of the ~20 counties are seen as a separate "silo", and thus receives a set budget from the government, allocated for hardware equipment. The amount of the budget is primarily based on last year's budget (Procurement Manager at Region Uppsala, 2019). Since the budget is primarily based on last year's spending, becoming more cost-efficient in order to decrease this year's spending, would only result in a smaller budget next year. This translates into a situation where no economic incentives for hospitals to become more cost- and process efficient, currently exist.

4.2. Siemens Healthineers and their strategy focus until today

Siemens Healthineers is today the leading MedTech supplier when it comes to diagnostics imaging and laboratory diagnostics. They are the market leader within radiology, especially digital imaging products and solutions, with more than a 50 percent market share in digital imaging (International Sales Manager at Siemens, 2019). They are seen as a premium supplier, offering products with the highest quality, thus enabling them to sell for higher prices than competitors. Their main focus is on hardware products, which account for more than 50 percent of their revenues. In addition, they provide auxiliary services in terms of reparations, software updates, education and ongoing communications to enable long-term customer relationships (siemens-healthineers.com, 2019).

Siemens Healthineers in Sweden is a pure selling company, providing hardware products mainly to the public HC sector. The sales process is primarily done through public procurements, where hospitals belonging to different counties provide specifications of what they are looking for in new equipment. If Siemens Healthineers, as well as other MedTech suppliers, believes that they can meet the specifications, they make a tender including what they can offer and to what price. The hospitals can in turn evaluate and choose which offer is the most attractive one, depending on price, quality, and how well the offer meets the stated specifications (International Sales Manager at Siemens, 2019).

Today's marketing communications are primarily based on Key Account Management, where the sales division for Siemens Healthineers have regulatory meetings with the hospitals in order to influence their specifications to match Siemens' offerings (Kokk, 2019). Siemens thus spends a lot of time and effort on customer relationships, since this is a fundamental requirement for making sales and profits. This selling effort can begin already 2-3 years before the public procurement has begun. This contact is important to maintain with all levels: nurses, technical management, physicists, the purchasing department, as well as the chief officers at higher levels. This in order to convince *everyone* that their products are the best in the market (Sales Manager at Siemens, 2019).

Siemens established its competitive edge by hardware excellence. Each product was seen as a (more or less) standalone function in the value chain of medical care. The benefits of new products were generally realised and optimised through co-development with the users. Clinical relationships were therefore always critical to the success (International Sales Manager at Siemens, 2019). Furthermore, it has always been Siemens Healthineers' strategy to continuously participate in clinical studies. This participation is sometimes even a requirement demanded by the hospitals in their specifications. Siemens has thus always worked closely with the research departments at hospitals and they occasionally provide monetary support to these departments. MRI is especially a huge area for research

projects and the sponsorship to scientific studies and methodology development is a profitable marketing tool (International Sales Manager at Siemens, 2019).

4.3. The platform revolution

4.3.1. The emergence of the platform revolution

As indicated above, Siemens Healthineers (and other MedTech suppliers) have previously established their competitive edge by developing excellent hardware solutions. However, hardware can neither evolve or change and can hence not meet customers' different and dynamic requirements. For this reason, the future revolves around software, which is, conversely to hardware, greatly flexible and can be tailored to customers' requirements (Business Development Manager at Siemens, 2019). Customers nowadays demand imaging products that can be updated continuously. Thus, the evolving and flexible nature of software is the main reason why software is increasingly outperforming hardware products when it comes to differentiation.

Furthermore, as mentioned in section 4.1, the HC industry is currently under stress due to an aging population and an increase in chronic diseases (Accenture, 2018). This has made the market eager to find new solutions for better and more efficient treatments and processes. Moreover, the healthcare expenditures are currently too high to be sustainable. Hence, products that can lead to radical cost-reductions are highly requested by the sector. Lastly, the demand for more customised treatments has grown - treatments that better match individual patient needs (Agamenonne, 2016). This new demand for efficiency solutions has put pressure on MedTech suppliers to develop their strategy; from a product-oriented strategy, towards a platform- and software-oriented strategy.

It exists a widespread agreement that two of today's megatrends – platforms and digitalisation – can provide potential solutions to make the HC system both more effective and more efficient, and thus mitigate the increasing challenges mentioned above (Business Development Manager at Siemens, 2019). The change towards digitalisation can be seen both internally, for MedTech suppliers, and externally, for other stakeholders within the HC industry. Both Siemens' executives and other companies' executives are gradually moving from talking about products to discussing digitalisation (Business Development Manager at Siemens, 2019). However, everyone tries to figure out how to invest as wisely as possible, in order to leverage the wave of digitalisation. The industry hence understands the importance of digitalisation, but few knows where to invest to utilise it. As a response to the search for digital solutions, three of the industry's main suppliers – Philips, General Electrics (GE), and Siemens Healthineers – have each developed digital platforms.

4.3.2. Siemens Healthineers' platform Teamplay

In order to meet the challenges within the Swedish HC industry, Siemens Healthineers has developed a platform called Teamplay (International Sales Manager at Siemens, 2019). This platform brings together healthcare hardware- and software producers with their customers, such as hospitals and clinics. The purpose of the platform is to act like a marketplace where offerings are consolidated at one place. This in order to provide a solution that can facilitate for the Swedish HC industry to become more efficient. Siemens Healthineers wants to develop partnerships with mainly software producers and together create applications that can be provided on the Teamplay platform (Business Development Manager at Siemens, 2019). These software producers, as well as Siemens, can on the platform offer integrated applications that facilitate the day-to-day work at hospitals. For example, one application might enable hospitals to send their imaging pictures to an AI-system which can analyse the pictures more accurate, time-efficient and cost-minimising than a human doctor would be able to do (Business Development Manager at Siemens, 2019). For these AI-applications to be trusted, it is important to provide clear descriptions of their usage area as well as any potential side effects (International Sales Manager at Siemens, 2019).

Not only does Healthineers want to offer a platform with several applications, they also want to provide a service where the different applications could be combined, in order to create an even greater value than what the applications could offer individually (Business Development Manager at Siemens, 2019). This would increase the value creation even further and create additional lock-in effects on the platform, since hospitals would have to connect to this platform in order to have access to the entire market offerings.

Through Teamplay, Healthineers desires to become the first supplier who significantly enhances efficiency for the HC industry, and thereby differentiate themselves from other competitors. The platform can thus act as an added value to the hardware products, which still will be the main revenue driver for Healthineers. The platform, as well as the existing applications, have until today been offered for free. Siemens is however currently looking at alternative revenue models for the platform, so that it not only will be an added value component, but rather a revenue driver itself (Business Development Manager at Siemens, 2019).

Even though the hardware products are and will be Siemens' greatest source of revenue in the near future, few people talk about what will happen ten years from now. Ten years from now, Siemens Healthineers hopes that platforms will be the buzz and not the hardware. As the hardware products are already highly developed, further differentiating the product offerings becomes difficult. Less room for differentiation results in that hardware products progressively are looked upon as commodity products, which is one reason for why Siemens' and other MedTech suppliers' margins recently have become

tighter. Siemens' competitive advantage of offering equipment of highest quality is thus expected to gradually disappear. This is the underlying reason why Siemens have to rethink their strategy to become more software-oriented (International Sales Manager at Siemens, 2019).

4.4. Platform risks: challenges with implementing platform innovations

4.4.1. Internal challenges for MedTech suppliers when moving from a product-oriented to platform-oriented strategy

By definition, a platform strategy constitutes a new kind of innovation, which in many ways forces MedTech suppliers to go beyond their previously dominating business strategy. Moving from optimised standalone hardware products to the provision of digital platforms and software solutions involves a major strategic leap, one that requires companies to upgrade their competencies and leave outdated ideas about the foundation of their competitiveness behind (Accenture, 2018).

The process of going from a product-oriented to a platform-oriented strategy thus incorporates internal challenges for MedTech suppliers, due to the significant readjustment to their business model being required. Firstly, all employees need to be convinced that this new strategy will result in better outcomes, something that turns out to be quite difficult (Business Development Manager at Siemens, 2019). This since many of the decision-makers at executive levels are too comfortable with the previous product-oriented strategy and are hence not willing to make changes in order to become more software-oriented. Secondly, platform strategy requires MedTech suppliers to conduct a far-reaching organisational adaptation of their organisational structure, which thus translates into a long-lasting impact for the organisation as a whole. This transformation does not happen over a night - it incorporates severe challenges for all levels within the organisation, and is thus a process that needs full commitment for a longer period.

4.4.2. Revenue model challenges for MedTech suppliers

Until today, platform have been given out for free, due to the fact that no individual hospital would be able to afford an expensive platform product in the current segmented HC structure (Procurement Manager at Region Uppsala, 2019). Giving out the platform for free is not sustainable in the long-term perspective, and is the reason for why Siemens and other MedTech suppliers now are examining different alternatives of lucrative revenue models.

MedTech suppliers' vision is thus to earn money on the platform, and not only see it as a complementary product to their hardware products. Two significantly different revenue models are of consideration for Siemens Healthineers as of today. Either the platform

itself could cost money - probably quite an expensive amount - or Siemens could choose a revenue-model where the platform is provided for free, but the applications on the platform cost money (Business Development Manager at Siemens, 2019). The latter revenue model could further be configured in different shapes. Either the hospitals pay once for buying an application, or it is a pay-per-use model, where each medical examination costs a predefined amount of money. Furthermore, Siemens plans to earn a predetermined percentage on all transactions made through Teamplay (International Sales Manager at Siemens, 2019).

Lastly, the platform could further act like a marketing communications tool in terms of appealing customers to Siemens' hardware product portfolio. If customers are satisfied with Siemens' platform, they are more likely to also choose Siemens' hardware equipment (International Sales Manager at Siemens, 2019).

Finding a revenue model that is beneficial for MedTech suppliers, while simultaneously acceptable in the Swedish HC industry is thus one important challenge for MedTech suppliers today. This is something that Siemens Healthineers allocates much time of their daily work to (International Sales Manager at Siemens, 2019).

4.4.3. Challenges with the structure of the Swedish healthcare industry

A final challenge with the implementation of a platform innovation concerns the fact that the HC sector is a strictly regulated market with a lot of bureaucracy and monitored processes (X-ray Clinics Operation Manager at Södertälje Hospital, 2019). The segmentation into ~20 counties within the Swedish HC industry significantly impedes MedTech suppliers' efforts to implement their platform innovations in the industry. These ~20 counties are today seen as individual silos, executing procurements individually and there is not much cross-county cooperation currently seen in the market.

Since procurements today are performed individually, the budget is not sufficient for non-recurring and expensive products, such as potentially expensive platform products (Procurement Manager at Region Uppsala, 2019). Moreover, there is no national budget provided by the Swedish government for investments allocated to the entire HC industry, which makes radical changes hard to implement (X-ray Clinics Operation Manager at Södertälje Hospital, 2019). Furthermore, the budget provided by the government comes with a clear specification of what the money should be used for. As of today, the budget provided can only be used for purchasing hardware products; software products are currently not incorporated in the budget specifications (Procurement Manager at Region Uppsala, 2019).

Another challenge caused by the segmentation of the HC industry regards the allocation of benefit- and value creation. Since the counties / hospitals are seen as individual silos,

they only care about what benefits they individually could achieve, and not what benefits other counties or hospitals might experience (Procurement Manager at Region Uppsala, 2019). The benefit- and value creation from platform innovations could hence occur for a hospital different from the one that actually paid for the product. This uncertainty of the allocation of benefit- and value creation is thus making hospitals highly unwilling to invest (Business Manager at Siemens, 2019).

4.4.4. Comparative study with the Norwegian healthcare industry

In 2002, the Norwegian HC industry was completely reorganised. The previously county-controlled HC sector was centralised and taken over by the Norwegian state. Since 2002, it thus no longer exists a severe county-segmentation. Instead, four regional areas have been established, which from that point are fairly strictly controlled by the state. Every year, the regions are provided with a number of guidelines and goals that they have to obey to. The state also provides a budget to each region, which is used for pre-specified investments that the hospitals are required to implement during the coming year. In this way, the government can implement nationally benefitting investments, resulting in higher social welfare for the whole country (Professor Emeritus at Department of Health Management & Economics, 2019).

However, even though the HC sector in Norway might be organised in a more beneficial way for a platform to be carried out, the Norwegian sector still experiences slow diffusion of platforms (International Sales Manager at Siemens, 2019). This is primarily due to the resistance from medical professionals. Technology, digitalisation and AI-systems disrupt existing business models by providing cheaper and faster solutions than what could be provided by today's business models. This disruption of business models might thus make professionals feel threatened when it comes to the existence of their current jobs, explaining the significant resistance (Professor Emeritus at Department of Health Management & Economics, 2019).

Even in Sweden, the slow diffusion of platforms is to some extent confirmed to be due to the resistance from medical professionals (Business Development Manager at Siemens, 2019). However, radiologists and other professionals are still needed - they are not going to be replaced by algorithms. Rather, they will have time to do more interesting tasks and assignments. For example, nurses will have the time and ability to perform the duties previously only done by doctors. This since AI-systems can analyse the “simple” data, allowing healthcare professionals to analyse and spend time on more complex assignments (X-ray Clinics Operation Manager at Södertälje Hospital, 2019).

Professionals, such as doctors and radiologists, especially within the ‘older generation’, are against innovations including AI-systems and algorithms (X-ray Clinics Operation Manager at Södertälje Hospital, 2019). This since they cannot see algorithms as a

compliment to their work, but rather a threat to it. Their argument is that algorithms could not fully be trusted and hence should not be used to detect what disease a patient has. Even though radiologists use technology when analysing images today, they are still the ones personally conducting the final judgment, and can thereby feel comfortable with taking on the responsibility for their findings. If algorithms on the other hand do the final analysis, radiologists and professionals - particularly from the 'older generation' - feel uncomfortable since they have not personally executed the analysis but are still responsible for its outcome. Instead, some regional authority, e.g. the Swedish Health Board (Svenska hälso- och sjukvårdsnämnden) should be responsible if an algorithm provides an incorrect result, and not the doctors (X-ray Clinics Operation Manager at Södertälje Hospital, 2019).

4.5. Summary of empirical investigation: our main findings

In short, the Swedish HC industry today faces several challenges including an aging population, an increase in chronic diseases and a cost structure that is not long-termly sustainable. MedTech suppliers, and their innovative products, have for the last decades been viewed as increasingly important for the HC industry per se. This since MedTech solutions are believed to facilitate the work and processes within the industry, and thus make it become more efficient.

The increasing demand for a more efficient Swedish HC system has forced MedTech suppliers, such as Siemens Healthineers, to rethink their strategy focus. A digitalisation trend has recently disrupt the HC industry, forcing MedTech suppliers to exchange their previous hardware-oriented strategy to a more software-oriented strategy. This has resulted in a platform revolution, where MedTech suppliers currently are in the process of launching new platform innovations, in order to become the leading player in the market.

However, there are several challenges currently preventing hospitals from absorbing the potential benefits of these platform innovations. The empirical data highlights the internal challenges of going from a product-oriented strategy towards a platform-oriented strategy, as well as the structure of the current Swedish HC system. The comparative study with the Norwegian HC industry further emphasises the challenge regarding the resistance among professionals - especially among the 'older generation' - towards digital AI-solutions. These challenges will be further analysed and discussed in the sections below, in order to understand what internal and external challenges are needed to alleviate these challenges.

5. Analysis and discussion

Our research began with the observation that digital platforms occupy an important position in the contemporary landscape of business strategy. Numerous "success stories" continue to capture the imagination of business strategists. Management consultancy firms produce various advertising materials of their digital platforms and business schools try to become more relevant by publishing studies on digital platforms. What is common in the prevailing literature, whether it is published by business strategists, management consultancy firms or business schools, is the aim of addressing the superior possibilities and benefits of platform innovation. The message is that platforms change the ways firms compete; it changes business models, the internal and external relations, as well as the creation of value- and network effects. Furthermore, the vast majority of literature highlights the importance of incorporating platform strategies in today's businesses in order to remain competitive. There is hence a great interest for platform strategy, where the belief is that platforms create a first-mover advantage in terms of lock-in effects. This first-mover advantage can hence create a "winner-takes-it-all-effect".

As earlier mentioned, prevailing literature does however not pay much attention to the strategic risks of going down this specific route, what we call *platform risks*. This insight resulted in the objective of this thesis: to shed light on the potential risks of platform innovations, further translating into an existing market failure. The market failure is created since the Swedish, public HC industry currently cannot absorb the expected benefits of platform innovations, which leads to an inferior situation for the whole society. Hence, more specifically, the purpose of this thesis was to examine the reason for this market failure - the challenges for the Swedish HC industry to absorb the promised benefits of platform innovations - and what actions are needed to mitigate these challenges. The two research questions thus resulted in;

(1) What are the key challenges for the Swedish, public healthcare industry to absorb the benefits of platform innovations? and
(2) What internal and external changes are needed to alleviate these challenges, in order to facilitate the absorption of benefits for the Swedish, public healthcare industry?

Lastly, our intention was to go beyond the prevailing literature on digital platforms formation and platform strategy, by studying the diffusion of platform innovation. Since Rogers' famous "S-shaped" diffusion curve is originally modeled on individuals, it can only be applied to B2B-settings as a metaphor. Rogers' concept was, in this thesis, hence further developed to fit an organisational context. This resulted in the insight that it would be necessary to supplement Rogers' diffusion of innovation model with the concept of *market failure* in our empirical examination. Combining these two theories provides a

more accurate analysis of the challenges for the Swedish HC industry to absorb the benefits of platform innovations. We supplement these two theories with theories for *platform strategy,* as well as another conceptualisation of the innovation theory: *the innovation matrix.* These theories are all used to interpret and analyse the result presentation in order to answer the research questions of this thesis.

The case was selected on theoretical grounds (rather than randomly). Siemens Healthineers fits the criteria of a *deviant* case to the extent that it has different traits than *typical* cases*,* in terms of different institutional settings and customer dynamics. Simply put, our sampling (Siemens in the regulated HC industry) made it possible to go beyond prevailing literature and find nuances to established findings. Choosing the deviant case of the Norwegian HC industry as a comparable variable further nuanced the analysis when answering our two research questions, seen below.

5.1. What are the key challenges for the Swedish, public healthcare industry to absorb the benefits of platform innovations?

5.1.1. Market failure and platform risks

The main findings of this study confirm that the challenges for the Swedish HC sector to absorb the benefits of a platform product is associated with market failure and platform risk. Our argument is that specific institutional mechanisms (e.g. the non-existing budget for software gadgets), as well as the fragmented structure of the HC industry, significantly impedes Siemen's efforts to provide a platform solution. If the technological solution is in place on the supply side, and the public sector on the demand side fails to secure the diffusion of the platform technology, there is a good reason to discuss market failure. This since society cannot reap the benefits of innovation (Steinmueller, 2010). When hospitals cannot absorb the benefits of these platform innovations - innovations that would make the industry more efficient - the social welfare is not as high as it could have been, and a market failure can be argued to exist.

The market failure originates from the segmentation into ~20 counties in the Swedish, public HC industry today. The empirical data suggests that this segmentation led to an uncertainty of the benefit- and value creation allocation as counties / hospitals are viewed as separate silos. This makes it difficult to anticipate the allocation of value creation, since the benefit of platform solutions is generated to the HC industry as a whole, and not to specific individual silos. This uncertainty of the allocation of benefit- and value creation can thus be described as a market failure, since it results in an inferior social welfare.

From the perspective of the MedTech suppliers, the diffusion process (the spread of a new product or service in the market) can rather be viewed as a platform risk. Even though the MedTech suppliers offer a platform in line with what the literature of platform strategy

describes as a successful platform (Glimstedt, 2018), they still fail with their implementation, highlighting the potential risk that comes with platform innovations. The risk is not isolated to a single missed business opportunity since a platform strategy requires MedTech suppliers to significantly change their organisational routines. The skill-base and the changed structure of the supply chain associated with the transformation towards a software-oriented platform strategy will necessarily have long-lasting impact on the organisation as a whole. It will thus be both hard and costly to reverse the business model, if the market failure of hospitals not being able to absorb the platform product benefits becomes a steady state of affairs.

Was this outcome inevitable, a causal effect of the structure of the Swedish HC system and the mechanisms of public procurements? We took this possible conclusion on trial by introducing an element of comparison with the Norwegian HC industry. Our findings suggest that the Swedish HC system did not alone produce the outcome, because Norway experiences slow diffusion of platforms as well, despite its nationally integrated HC system. Hence, our limited comparison suggests that other causes and mechanisms, e.g. the resistance to digital change and algorithms, are further explanations to this market failure. To summarise, our study shows that the mechanisms of the Swedish HC sector cannot alone explain the market failure, and does therefore not lonesome provide a *necessary and sufficient explanation* (Bloch, 2011).

5.1.2. Empirical findings from the comparative study

The empirical data from the comparative study with the Norwegian HC industry highlights another challenge, namely the resistance from medical practitioners. The data suggests that this resistance originates for two reasons: (1) the general scepticism towards digital AI-solutions, especially among the 'older generation', and (2) the concern regarding risk-allocation. These two factors contribute to a severe resistance to change, further explained below.

The first challenge of the general skepticism towards digital- and AI-solutions (e.g. analysis of illness performed by algorithms) relates to fear of job-losses for medical professionals, since algorithms can perform their assignments both less expensive and at a faster pace. The empirical data through in-depth interviews also suggests that particularly the 'older generation' is the ones being resistant towards digital- and AI-solutions. This since they are comfortable with the current business model, not willing to incorporate more digitalisation and AI-solutions into their work processes. Secondly, there is a concern regarding risk-allocation, which also prohibits platform products to enter the Swedish HC industry. This originates from professionals' aversion of being responsible for an analysis conducted by algorithms and not by themselves. The skepticism could also be legitimated from the perspective of the security of patients, as well as in terms of the question of responsibility (see deep-dive in section 5.2.1).

Furthermore, the HC sector is overall strictly regulated and risk averse, and often avoids using new, untested innovations and technology.

5.1.3. Innovation theory analysis

We gained further insight into the causal relationship by exploring the way Siemens shaped its platform innovation in relation to the targeted market. To this end, we explored the platform strategy from the perspective of the innovation matrix, a taxonomy that helps researchers to distinguish different approaches of innovation. We arrived at the conclusion that Siemens' approach best can be described as a *radically disruptive innovation*, meaning that the platform product in one critical move renders existing systems, organisational practices and obsolete business models.

However, due to the highly regulated Swedish HC sector and its complex structure, a radically disruptive innovation is not favorable to implement. Even though Rogers' (1962) diffusion of innovations model is modeled for individual behavior, the personality types described in the model can work as metaphors for organisations as well. Using Rogers' terminology, and the personality types in the model as metaphors, the strictly regulated and risk-averse public HC industry can arguably be described as *laggards.* This since the HC industry often avoids the use of new, untested innovations and technology, and often adopts these innovations later than other organisations. The skepticism towards new innovations and technology, seen for the majority of the Swedish healthcare decision-makers, mainly the 'older generation', further emphasises this metaphorical comparison (Knowles & Hansson,s 2018).

Considering this metaphorical comparison, Siemens' way of shaping the platform innovation as a radically disruptive innovation does hence not seem to be optimal considering the characteristics of their target market. According to the innovation matrix (Christensen, 1995), this could thus be a further explanation to the challenge for the Swedish HC industry to absorb the benefits of a platform product. When combining the theories from our theoretical framework, we draw the conclusion that a market failure occurs since the platform product is shaped as a radically disruptive innovation and the target market organisations metaphorically can be characterised as laggards.

5.2. What internal and external changes[3] are needed to alleviate these challenges, in order to facilitate the absorption of benefits for the Swedish, public healthcare industry?

The changes needed to alleviate the challenges described above can be discovered by shedding light on the causal linkages between (a) the radically disruptive approach to

[3] Please see the definition list on page 5 for an explanation of what "internal" and "external" changes mean in this context.

innovation, (b) the low ability on the demand side (Swedish public HC sector) to appreciate and with certainty understand the value of the platform offering, and (c) market failure. These three pillars form a causal chain - a sequence of events (Leblebici et al. 2004) - that contributes to the increasing platform risk of the prevailing market failure becoming a steady state affair.

To mitigate this platform risk, two approaches can be considered: (1) changing the market dynamics, and (2) changing the business model for platform products.

5.2.1. Market dynamics approach

If the first approach is undertaken, the needed changes can be argued to exist on a political and juridical level. In short, on the basis of our results, we speculate that the changes needed are (1) centralising the Swedish HC sector and facilitating the public procurement process, (2) incorporating budget specifications of software products, and (3) shifting the risk-allocation with regards to potential mistakes caused by algorithms. These three changes to the market mechanisms can potentially result in a more favorable atmosphere for platform products to be absorbed, as is further discussed below.

(1) A structural change to the Swedish HC industry is of key importance. By centralising the HC sector, collaborations between counties become easier and more efficient, particularly the public procurement process. Further, the allocation of benefit- and value creation would in this case no longer be a problem. This since a centralisation results in an umbrella view, implying that the benefit- and value creation is viewed from an overall country-basis, rather than on an individual county-basis.

(2) The current budget system also needs to change. A budget specification for software products need to be allocated to each region, similar to the allocated budget specification for hardware products. This change is crucial in order for MedTech suppliers to be able to earn revenues on the sale of a platform product. If MedTech suppliers cannot earn revenue on their platform innovations, they have to reverse their far-reaching organisational adaptation, which will both hard and costly. To mitigate this platform risk, a budget allocated for software products must therefore be in place.

(3) To manage the challenge of resistance towards digital- and AI-solutions, changing the structure for risk-allocation is of key consideration. The responsibility for potential mistakes caused by algorithms must be shifted from individual doctors to a higher, regional level. One suggested solution gathered in the empirical data collection was to let the regional authority the *Swedish Health Board* (Svenska hälso- och sjukvårdsnämnden) take on the responsibility instead of individual doctors. This would thus increase the willingness for radiologists to use digital- and AI-solutions since they would no longer carry the burden of a potential algorithm mistake. Another potential solution to the risk-

allocation problem is to provide clearer descriptions of the platform applications' usage areas and their potential side effects. This would hence decrease the risk factor for doctors, and make the trust for AI-applications reach the same level of trust as is existing for pharmaceuticals today.

5.2.2. Business model approach

The other, contrasting approach regards the business model for platform innovations and is analysed based on the innovation matrix. The fact that medical practitioners reacted with a degree of suspicion and resistance to change is perhaps not just a negative reaction to AI as a substitute for human work-processes. The resistance to change could rather be interpreted as a cautious reaction to the lack of transparency concerning what benefits the platform innovations actually provide, as well as the transparency of the shape of the platform innovation. This lack of transparency comes with the *radically disruptive* approach in which platform innovations have been introduced, which indicates an "everything- or nothing" approach.

Arguably, shaping platform products as *incrementally disruptive* innovations (Christensen, 1995) instead, would increase the degree of transparency since it incorporates a step-by-step process, allowing the medical practitioners to comprehend, evaluate, and co-develop parts of the system sequentially. This would result in a reduced uncertainty and resistance to change. To conclude, since the target market - the public HC industry - can be metaphorically characterised as laggards, MedTech suppliers need to shape their platform products as incrementally disruptive innovations, for this market failure to be alleviated. This way of changing the business model could thus be another mechanism for creating a more favourable atmosphere for platform products to be absorbed within the Swedish, public HC industry.

6. Conclusions and implications

6.1. Conclusions

To conclude, contrasting the prevailing literature of platform innovations, the situation for MedTech suppliers within the context of the Swedish, public HC industry highlights the existence of *platform risks*. The challenges for the Swedish HC industry to absorb the promised benefits of platform innovations can furthermore be described as a market failure, since it results in an inferior outcome for the society.

Our study highlighted, as the main challenge, the imperfections of the HC industry structure in Sweden. However, our conclusion bears on the old truth that complex cases, once we study them in greater detail and in a comparative perspective, rarely can be explained by a single cause. Rather, the outcome results from combinations of a larger number of *neither necessary nor sufficient causes*. The comparative study of the Norwegian HC industry highlighted two other important challenges: a skepticism towards digital AI-solutions, and a concern regarding risk-allocation.

Moreover, when analysing the result presentation with the theoretical framework of this thesis, some internal and external changes needed to alleviate these challenges were discovered. These internal and external changes highlighted two different approaches: (1) changing the market dynamics, or (2) changing the business model for platform innovations.

6.2. Implications

Platform strategy is seen as an increasingly important "success factor" for businesses in many industries. The Swedish HC industry is no exception. This is the underlying reason why Siemens and other MedTech suppliers have dedicated time and effort to the design of a cloud-based platform product. However, as this thesis points out, there are many challenges preventing MedTech suppliers from introducing their platform products to the market, in particular the structure of the Swedish HC system. Studying platform theory within the Swedish HC industry is hence of great importance for MedTech suppliers with an ambition to become pioneers by entering the market before competitors, and thus leverage the first-mover-advantage. Not only is it of interest for MedTech suppliers to study platform theory and its implications, it should be important for all businesses with an aim to remain competitive in their industry. Lastly, as the main purpose of launching a platform product to the HC market is to make the Swedish HC industry become more efficient, studying this phenomenon and its implications should be of interest for everyone using, and tax funding the Swedish healthcare. It is also of interest for other countries facing the same problems.

The market dynamics approach mentioned above particularly have implications for the Swedish governmental- and regulatory system. This since the empirical data showed that it is primarily these bureaucratic systems that currently prevent platform products to enter the Swedish HC industry. The business model approach on the other hand, has implications for MedTech suppliers and their way of introducing platform products to the market.

As a conclusion, our study has implications for many levels. It has implications for the individual patient, for medical professionals within the Swedish HC industry, for businesses with an ambition to remain competitive in their industry, and all the way up to the highly bureaucratic political system currently existing in Sweden. It thus has implications for an individual, corporate, societal and national level.

6.3. Critique and limitations

The results of this thesis are based on data collected from several sources, validating the findings. However, some critique and limitations should be pointed out. Most interviews held with MedTech suppliers were with employees from Siemens Healthineers, since they are the chosen case company of this study. This means that ideas and innovations were mainly based on what they had been developing and not what their competitors might have in mind. One interview was conducted with a direct competitor to Siemens, but this one interview did not nearly provide as much information as was received from the five interviews held with the interview subjects from Siemens. Hence, more effort was taken to understand Siemen's platform strategy compared to their competitors' strategies. Two interviews were also held with employees from Elekta, currently working with platform innovations as well, but since their main market is the US market and not the Swedish market, this created some limitation of how much information we could use from these interviews. Moreover, most interviews were held with men above average age, which could have distorted the results. However, many different stakeholders within the Swedish HC industry have been interviewed, which gave a desirable nuance to the thesis.

Even though the interviews were conducted with several stakeholders, with different backgrounds and perspectives, some stakeholders have been excluded, e.g. politicians, authorities and patients. These stakeholders were excluded due to the limited timeframe of this thesis. Including interviews with these stakeholders could potentially have affected the conclusions and hence what internal and external changes are needed to facilitate Swedish hospitals' absorption of platform products.

Furthermore, since the information received in some interviews were confidential, we had to exclude certain material that could have further nuanced the thesis. As a solution to this absence, we conducted more research to find secondary data stating similar

conclusions. Further, in order to understand the Norwegian HC system within a reasonable timeframe, in-depth interviews were conducted instead of a separate, comparative case study. This was thus a limitation to the comparative case study, however the results provided should not be affected.

As always when using a qualitative method with interviews as the primary source, critique can be appointed to the formulation of questions as well as the interpretation of the responses. To mitigate this critique, the same questions were repeatedly asked, to ensure that the responses were understood in a correct way.

Finally, the thesis is based on three theories: the platform theory, the theory of market failure and the innovation theory. Several other theories could however also be applicable for analysing this topic, e.g. Wejnert's (2002) framework for innovation. These alternative theories could potentially have led to other conclusions, e.g. that other strategies are more applicable for introducing innovations in a complex market like the Swedish HC industry.

6.4. Future research

This thesis is conducted as a case study, based on the chosen case company Siemens Healthineers and their platform Teamplay. As mentioned in section 6.3, the time restriction did not allow us to make a similarly deep analysis of Siemens' competitors' platform strategies, which hence could be further investigated in any future research. This in order to gather more data and thus be able to reach better and more precise suggestions of changes that could alleviate the challenges that the Swedish HC industry today experiences.

The study is limited to the Swedish market, due to the fact that the HC industry as well as the governmental system differ significantly on a country-to-country basis. Incorporating several geographies would have resulted in a highly complex thesis, which would be hard for the reader to grasp. Instead, we suggest that future research could include examinations of other geographical areas, since these might experience other challenges and other potential solutions.

Due to our time restriction and the scope of the thesis, only the most important and most frequent mentioned challenges were considered when analysing the research questions. Hence, more challenges and solutions could be of consideration when analysing this problem area. We thus suggest that future research should be conducted on this topic, to further analyse platform risks and platforms as market failure. This could shed light on other internal and external changes that could potentially alleviate the challenges of benefit absorption within the public HC industry.

Lastly, as mentioned throughout the thesis, platform strategy is not only interesting for the MedTech- and HC industries, but for an increasing number of industries, and will probably be of interest for many more in the near future. Hence, on a final remark, platform risks and platform innovations as market failure can thus be explored in the context of other industries as well.

7. References

Agamennone, C (2016). Healthcare as a Platform. Retrieved: 23-03-2019 https://stories.platformdesigntoolkit.com/healthcare-as-a-platform-5e427a8d4fd

Bechky, B. A. (2006). Talking About Machines, Thick Description, and Knowledge Work. *Organization Studies, 27(12),* 1757–1768.

Bloch, E D. (2011). Proofs and Fundamentals: A First Course in Abstract Mathematics. *Springer. 8–9*. ISBN 978-1-4419-7126-5

Brian., Dollery, (2001). The political economy of local government. Northhampton

C. Godfrey, P., Hassard, J., S. O'Connor, E., Rowlinson, M., & Ruef, M. (2016). What Is Organizational History? Toward a Creative Synthesis of History and Organization Studies. *Academy of Management Review*, *41* (4), 590-608.

Cho, Jeasik., & Trent, Allen (2006) Validity in qualitative research revisited. *Qualitative Research, 6(3),* pp. 319-240.

Chrisensen, Clayton M., & Anthony, S., & Berstell, G., & Nitterhouse, D., (2007). Finding the right job for your product. MIT Sloan Management Review. 48. 38.

Cusumano, A. Michael (2011) The Platform Leader's Dilemma. *Communications of the ACM, 54(10),* pp. 21-24.

David, Paul, (1985), Clio and the Economics of QWERTY, *American Economic Review*, 75(2), pp. 332-37.

Det Svenska Sjukvårdssystemet (2016) Retrieved: 05-03-2019 https://www.kliniskastudier.se/forskningslandet-sverige/det-svenska-sjukvardssystemet.html

Economides, Nicholas, (1996), The economics of networks, *International Journal of Industrial Organization*, *14(6),* pp. 673-699.

Edmondson, A., & McManus, S. (2007). Methodological Fit in Management Field Research. *Academy of Management Review, 2,* pp. 1155-1179.

Evans, S. D., & Schamalensee, R. (2016) Retrieved: 26-03-2019 https://hbr.org/2016/05/why-winner-takes-all-thinking-doesnt-apply-to-silicon-valley

Eisenmann, T., Parker, G., & Van Alstyne, M (2011). "Platform Envelopment." *Strategic Management Journal* (32), pp. 1270–1285.

Froyeman, A (2009). Concepts of Causation in Historiography, Historical Methods: A journal of Quantitative and Interdisciplinary History, 42(3) pp. 116-128.

Gawer, A., & Cusumano, M.A. (2002) Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation. *Harvard Business School Press,* Boston.

Gawer, A., & Cusumano, A. M, (2008) How Companies Become Platform Leaders. *Mit Sloan Management review, 49(2),* pp. 27-35.

Gawer, A. and Cusumano, M. A. (2014), Platforms and Innovation. J Prod Innov Manag, 31: 417-433.

Gerring, J (2004). “What is a case study good for?” *The American Political Science Review, 98,* pp. 341-354.

Glimstedt, H (2018). A Critical Review of the Core Concepts. I Andersson, Per; Movin Staffan; Mähring, Magnus; Teigland, Robin; Wennberg, Karl (ed) *Managing digital transformation.* Göteborg: Brand Factory, pp. 65-96.

Griffin, L (1993). Narrative, Event-Structure Analysis, and Causal Interpretation in Historical Sociology. *The American Journal of Sociology, 98,* pp. 1094-1133.

GE Health Cloud Platform (2019) Retrieved: 28-03-2019 https://www.gehealthcare.com/en/products/health-cloud-platform

Hannah, D. P., (2016). Value Creation and Capture in a World of Bottlenecks. SSRN Electronic Journal.

Hannah D. P., & Eisenhardt M. K. (2015). Origins and outcomes of firm strategy in nascent ecosystems. *Stanford University: Department of Management Science and Engineering*

Holme, I. M., & Solvang, B. K. (1997). Forskningsmetodik: Om kvalitativa och kvantitativa metoder. Lund, Sweden: *Studentlitteratur.*

Inköp och Upphandling (2019) Retrieved: 04-03-2019 https://www.sll.se/om-regionstockholm/upphandling/

Jaret, P (2018). Delivering on the promise of healthcare innovation: interview with Rasu Sheresta. *Medical Solutions.* 30 November.

Katz, M., & Shapiro, C, (1985), Network Externalities, Competition, and Compatibility, *American Economic Review*, 75 (3), pp. 424-440.

King, A., & Baatartogtokh, B., (2015). How Useful Is the Theory of Disruptive Innovation? MIT Sloan Management Review. 57. 77-90.

Kjellberg, H., Azimont, F., & Reid, E.R. (2015). Market innovation processes: Balancing stability and change.

Knowles, B; & Hanson L. V (2018). The Wisdom of Older Technology (Non)Users. *Communication of the ACM, 61,* pp. 72–77.

Kvale, S., & Brinkmann, S. (2014). Den kvalitativa forskningsintervjun. 3rd ed. Lund, Sweden: *Studentlitteratur AB*.

Kvale, S., & Brinkmann, S. (2015). Interviews: Learning the Craft of Qualitative Research Interviewing. *3rd Edition, Sage Publications, Thousand Oaks, CA*

M. Eisenhardt, K., & E. Graebner, M. (2007). Theory Building From Cases: Opportunities and Challenges. *The Academy of Management Journal, 50,* pp. 25-32.

Mankiw, N. G (2009). Brief Principles of Macroeconomics, S*outh-Western Cengage Learning.* pp. 10–12.

Marshall, M. N. (1996). Sampling for qualitative research. *Oxford, England, United Kingdom: Oxford University Press, (1)* pp. 522-525.

Martin, S., & Scott, J., (2000). The nature of innovation market failure and the design of public support for private innovation, *Research Policy*, 29(4-5), pp. 437-447.

Martin, P. Y., & Turner, B. A., "Grounded Theory and Organizational Research," *The Journal of Applied Behavioral Science*, vol. 22, no. 2 (1986), 141.

Maxwell, J (1992). Understanding and Validity in Qualitative Research. *Harvard Educational Review, 62(3)*, pp. 279-301.

Offentliga Upphandlingar (2019) Retrieved: 08-04-2019 http://www.konkurrensverket.se/upphandling/om-lagstiftningen/upphandlande-myndigheter-och-enheter/

Orbach, B (2013) "What Is Government Failure." *Yale Journal on Regulation Online*, *30*, pp. 44-54.

Parker, G; Van Alstyne, M (2017). Innovation, Openness & Platform Control, *Management Science, 65*, pp. 2973-3468.

Perchard, A., G. MacKenzie, N., Decker, S., & Favero, G., (2017). Clio in the business school: Historical approaches in strategy, international business and entrepreneurship, *Business History, 59(6)*, pp. 904-927.

Pfitzer, D., Hipp, R., Zeigler, M., & Giese, T., (2018) Digital MedTech Transformation.

Research and Exploration (2019) Retrieved: 28-03-2019 https://www.philips.se/healthcare/innovation/research-and-exploration/digital-health-platform

Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students. *Edinburg Gate Harlow, United Kingdom: Pearson Education Limited,* (5), pp. 256-318, 480-501.

Schulz, F., Kalla, S., Heinke, M., & Förthmann, M (2018). The race is on - Taking advantage of digital platforms for medical technology. Retrieved: 03-03-2019 https://www.accenture.com/_acnmedia/PDF-77/Accenture-Medical-Technology-Digital-Platforms.pdf

Seawright, J., & Gerring, J. (2008). Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options. *Political Research Quarterly, 61(2)*, 294–308.

Shah, N., & Leblebici, H (2004). The Birth, Transformation and Regeneration of Business Incubators as New Organisational Forms: Understanding the Interplay between Organisational History and Organisational Theory. *Business History, 46,* pp. 353-380.

Steinmueller, W. E (2010). Economics of Technology Policy, *Elsevier,* ch. Chapter 28, pp. 1181-1218.

Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. Geoffrey (2016). Pipelines platforms and the new rules of strategy. *Harvard Business Review*, pp. 54–60, 62.

Weimer, D., & Aidan R. V (2004). Policy Analysis: Concepts and Practice. Prentice Hall.

Wejnert, B., (2002). Integrating Models of Diffusion of Innovations: A Conceptual Framework. Annual Review of Sociology pp. 297-326.

Yin, R. K. (2003). *Case Study Research: Design and Methods.* 3rd ed. Thousand Oaks, California USA: Sage Publications, pp. 83-106.

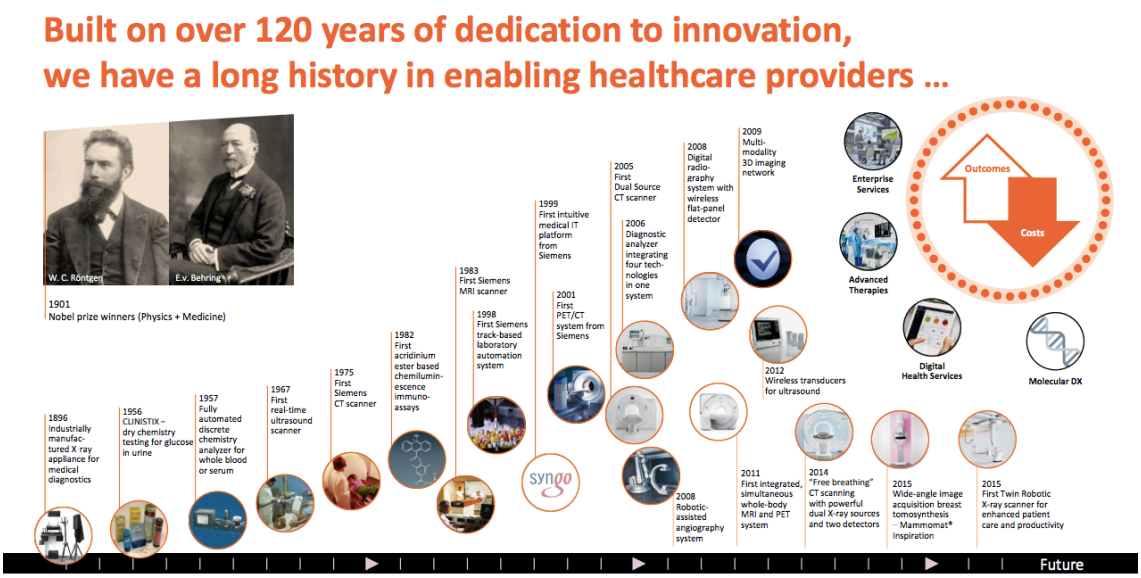
Yin, R. K. (2014). Validity and generalization in future case study evaluations. *Evaluation, 19(3),* pp. 321–332.

Øvretveit, J., Andreen-Sachs, M., Carlsson, J., Gustafsson, H., Hansson, J., Keller, C., Lofgren, S., Mazzocato, P., Tolf, S. and Brommels, M. (2012), "Implementing organisation and management

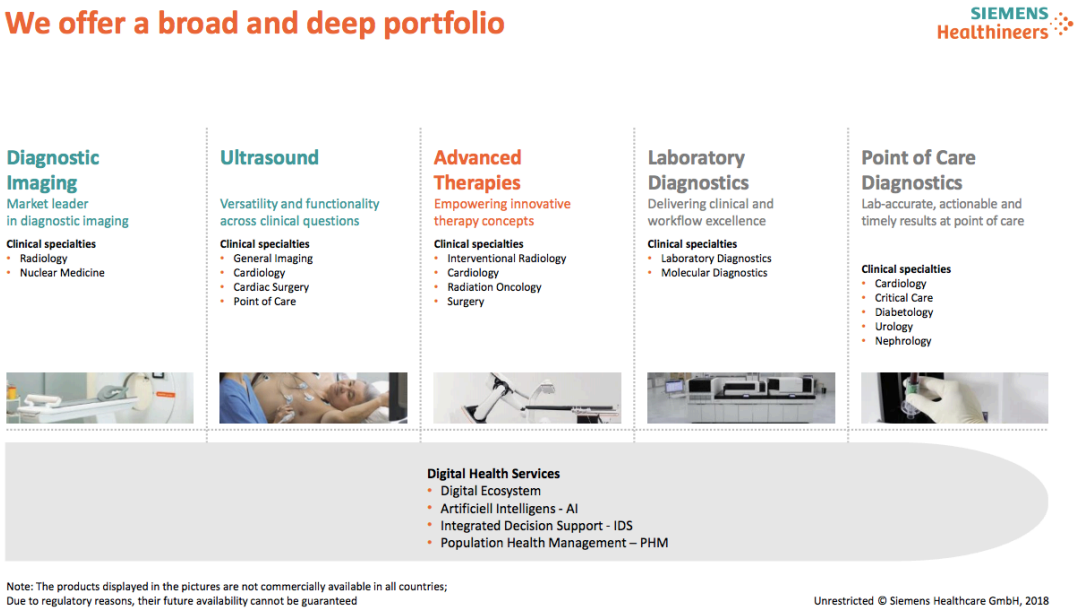
innovations in Swedish healthcare", *Journal of Health Organization and Management*, Vol. 26 No. 2, pp. 237-257

8. Appendix

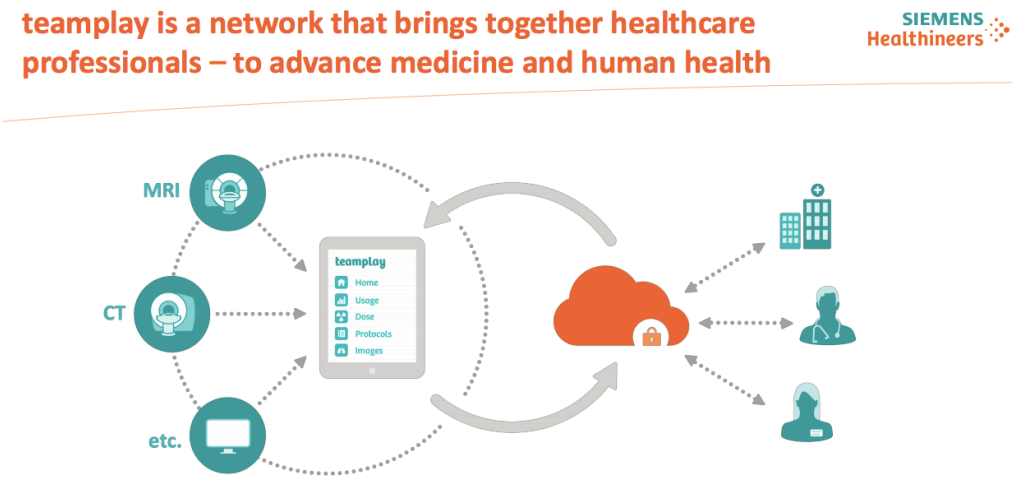
8.1. Built on over 120 years of dedication to innovation



8.2. We offer a broad and deep portfolio



8.3. Teamplay is a network that brings together healthcare professionals – to advance medicine and human



8.4. Interview guide Siemens

TODAY

- We first want to understand your role in the organisation, the regional sales processes within the MedTech division in Sweden. What do Healthineers in Sweden look like today? (Describe in detail).

- At present, Siemens is quite product oriented regarding their products in the MedTech industry. Can you describe your strategy today? What is your primary function? What is the commercialisation process like? What role does Siemens products play in healthcare today?

- What have you been up to until today? What has the development of Healthineers been like until today? What is the purpose of the division?

- What does the value chain look like today from your product to delivery to healthcare? How are the devices integrated today? What does the system look like in the hospitals for the devices that Siemens is trying to integrate? Where are you in the value chain?

- What marketing communications do you use today?

- What does the sales process look like today?

- Can you describe the public procurement process?

- Who are your biggest competitors and what do they do? How far have they come in the development of a platform strategy?

THE CHANGE

- What do external and internal changes look like? What changes have you seen that have led to your desire to develop a platform strategy? What changes have you seen from the surroundings? What led to internal changes? How do you want the ecosystem to look like and change over time? What have been the trends in the industry? What do you see as changes regarding pressure on cost minimizations and marginal pressure? What changes have you seen in the MedTech industry?

- What will your process of change look like? You are strong in X-rays today, but a little weaker in clinical care. Do you agree with this? Is this your strategy or will it change for the future?

- What will you do in the future?

FUTURE

- How will your strategy change in the future? What should your product range look like in the future? How will your offer change (service vs. product)?

- How open should the platform be? Which actors should the platform integrate? How can these parties contribute to your desired outcome? How do you want the platform to integrate your software and hardware? What will the ecosystem of the platform look like? How can different stakeholders benefit from the platform?

- How do you create value for your own purpose? How will this platform help you generate more revenue? How will the platform help you reach your goal of "better outcome at lower costs"?

- How should you implement the platform and why in this way? What outcomes do you want to achieve? How should you succeed in developing a competitive platform? What resources and changes are needed, internally as well as externally?

- How do you think you will prove the effects that the platform is intended to generate?

- What should the value chain look like in the future? Will it resemble a circle rather than a line?

- What marketing communications do you want to use? How do you think you will reach all stakeholders? Who defines your stakeholders? What values will the platform generate for these stakeholders?

- How do you think the sales processes should look like?

- What do you see as incentives for public health to procure this platform, since financial incentives are not as relevant to public health care?

- Will you focus most on public or private sector in the future?

- What partnerships are you thinking of and why? What do you want to get out of these partnerships?

- How should you address the challenge of law regarding personal privacy?

SUMMARY

- Suggestions on others to interview? In public procurement? Customers? Consultants?

- Can we mention your name?

8.5. Interview guide - Norwegian Healthcare economics expert

First interview

- The healthcare Norway went through a restructuring in 2000 to become more state controlled. Could you please explain this process and what the difference for Norwegian healthcare was before and afterwards?

- How has this change facilitated for public procurements in Norway?

- What do you think about this kind of platform innovation?

- What has the benefits and the disadvantages been for the healthcare in Norway?

- What do you think are the most important factor for why there is a resistance towards this kind of restructuring in Sweden? What needs to be done in order to make it work in Sweden as well?

- If the system in Sweden does not change, do you have any suggestions on how this type of platform could be incorporated?

- Do you have a platform today within Norwegian Healthcare? Why / why not?

Second Interview

- During the last interview, you talked about how the professionals work against technological change due to the threat of losing their jobs. Can you tell us again about this resistance and how to possible get through this?

- When speaking to Swedish MedTech suppliers, they told us that the resistance towards a platform product also seems to be the difficulties of deciding who is going to be responsible if anything goes wrong. What is your view on this matter?

- Can you tell us more about how hospitals today are viewed as companies and what impact this has had for the Norwegian healthcare?