

A tale of two Scandinavian cities

*A case study of public health innovation in
the Oslo and Copenhagen regions*

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Executive Summary

This thesis is a case study of public health innovation in the Oslo and Copenhagen regions. The two cases were chosen because they closely fit the ideal for a most similar systems design, as the Norwegian and Danish societies and political structures are very similar, yet their focus for innovation, at least insofar as it is presented in their strategy documents, differ.

This thesis aims to investigate whether Denmark and Norway have different approaches to innovation in the health sector, and if so, uncover why they have different innovation strategies, and the outcomes of these strategies as far as they can be identified. Differing strategies could entail focus on science and research based innovation versus user-driven innovation or service innovation, degree of involvement of the public versus private sector in innovation and so on.

Once these differences have been described, potential answers to why these differences exist will be presented.

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1 INTRODUCTION

1.1 Objective for the thesis

1.1.1 Research questions

In political debate, the Nordic countries are often brought up in conversation and debate as models for how societies should work. The stereotype often brought forth of Nordic people is that they are happy, wealthy, healthy, equal and progressive, all because of the success of the Nordic model of government.. And to a certain extent, all of those points are true. Some politicians, most notably US Senator Bernie Sanders in the last US presidential election, praise the Nordic model and seek to adopt the model, or at least parts of it, for themselves. However, what is sometimes lost in these discussions is the fact that the Nordic countries are not a monolith. While these five countries cooperate closely and are similar in a great many ways such as culture, history, political structure, values and language, they do differ from one another. In the grand scheme of the international scene, however, these differences are relatively minor. With cases as similar as the Nordic countries, those differences, however small they might seem, can be very interesting. Those differences form the basis of what this thesis aims to study, specifically in the field of healthcare. To be even more specific, this thesis will study the difference in innovation in the public healthcare sector in the capital regions of Denmark and Norway.

This thesis aims to investigate whether Denmark and Norway have different approaches to innovation in the health sector, and if so, uncover why they have different innovation strategies, and the outcomes of these strategies as far as they can be identified. Differing strategies could entail focus on science and research based innovation versus user-driven innovation or service innovation, degree of involvement of the public versus private sector in innovation and so on.

Thus, the research questions are as follows:

- In what way, if any do the conditions for innovation in the health sector differ among the capital regions in Denmark and Norway?
 - Do the fact that Norway has its regional health authorities as separate entities, while Denmark has their health authorities integrated in their regional administrations make a difference in terms of innovation strategy?
- Given different conditions, in what ways do innovation strategies differ across the regional health authorities?
 - Is the innovation in Copenhagen more focused on commercialization and the commercial medical industry?

1.1.2 Why is this important to know?

In the digitalized society, innovation is key for staying relevant. This is also true for the public sector in general, and also the health sector. Although public sector innovation has been investigated by several researchers, there is room for more research on the health sector in particular. As the health sector represents one of the largest portions of a nation's budget, investigating the attention and application of innovation in this sector is highly relevant in Norway and Denmark, as well as across borders.

Mapping out the innovation strategies and the causes of potential differences will aid in understanding if and why innovation is done differently in Norway and Denmark. This is especially interesting given that the two countries hold so many political and social similarities. Potential differences between the countries will provide insights into how politics and societal strategies influences the opportunities for innovation.

Furthermore, an understanding of the differences in strategy will likely help explain any differences in outcome. . The applied strategies in Norway and Denmark might lead to different results, both in terms of patents, increased public health, and other societal gains. While this thesis will not attempt to explore the outcomes of

innovation in any depth, it will be an aid for further research in this field. The applied methods and methodology in this thesis might be utilized for research in other countries.

The intention with this thesis is therefore to provide an analysis of the frameworks within where innovation can flourish, as well as to investigate, as far as possible, the actual outcomes of the applied innovation strategies in two similar countries.

1.2 Background

1.2.1 Helse- og omsorgsdepartementet and Helse Sør-Øst

Helse-og omsorgsdepartementet (Ministry of Health and Care Services, hereafter HOD) is the Norwegian ministry responsible for providing health and care services to the people of Norway (Regjeringen.no, 2013a). The ministry's area of responsibility covers essentially all areas of Norwegian health care:

- Public health, including proactive measures such as tobacco-, alcohol- and drug policy and promotion of physical fitness and proper nutrition. Furthermore, the ministry is responsible for protection against infectious diseases, radiation and environmental health hazards.
- Primary care, including administration of municipal doctors (primary care physicians), emergency rooms, nursing homes and school nurses.
- Specialist care, including hospitals, outpatient clinics, ambulance services. These responsibilities fall under the purview of the regional health authorities.
- Public dental care.
- Psychiatric care, both through primary care services and specialist care services.
- Healthcare for drug addicts.
- Ensuring reliable and safe access to pharmaceutical drugs.

(Regjeringen.no, 2013)

HOD is organized into eight departments, one of which is called “eieravdelingen” (ownership department) which is responsible for the regional health authorities. The ministry is headed by the Minister of Health and Care Services, a cabinet level position. The minister at the time of writing is Bent Høie of the Conservative Party (Regjeringen.no, 2013b).

Helse Sør-Øst (South-Eastern Norway Regional Health Authority, hereafter HSØ) is one of four Norwegian regional health authorities. The regional health authorities are responsible for the specialized health care for the citizens in its jurisdiction. HSØ is by far the largest of the Norwegian regional health authorities, covering 2.9 million citizens, or about 57% of the Norwegian population and 10 of 19 counties. It has 78 200 employees and, as of 2016, has a budget of NOK 78 billion (HSØ, 2017). HSØ operates 11 hospital trusts and 5 private, non-commercial hospitals. Among the 11 hospital trusts, two are not actually hospitals. One is the hospital pharmacy enterprise and the the other is Sykehuspartner. Sykehuspartner is responsible for IT services, human resources and procurement for the other hospital trusts.

The private hospitals are technically not state enterprises, and are thus exempted from some rules that govern, among other things, procurement. However, these hospitals cooperate so closely with HSØ that the hospitals can be considered part of HSØ (Storvik, 2017b). As such, they are able to apply for innovation funds from HSØ. HSØ has cooperates with five private hospitals: Betanien Hospital, Diakonhjemmet Sykehus, Lovisenberg Diakonale Sykehus, Martina Hansens Hospital and Revmatismesykehuset. These private hospitals often specialize in specific fields of medicine. Two of them, Diakonhjemmet and Lovisenberg, both located in Oslo, also function much like the public hospital trusts, in that they are local hospitals responsible for patients within its geographic jurisdiction (Storvik, 2017).

A distinction is made between Helse Sør-Øst Regionale Helseforetak (HSØ RHF), which is the central administration and Helse Sør-Øst Foretaksgruppen, the collection of health trusts under HSØ RHF. This thesis will deal primarily with the

RHF, and any reference to HSØ in this paper will refer to them, unless specified otherwise.

1.2.2 Sundheds- og Ældreministeriet and Region Hovedstaden

Sundheds- og Ældreministeriet (Ministry of Health, hereafter SUM) is the Danish ministry in charge of “ the administrative functions in relation to the organisation and financing of the health care system, psychiatry and health insurance as well as the approval of pharmaceuticals and the pharmacy sector.” (Sum.dk, 2016). SUM in its current form was established in 2015, at the creation of the second cabinet of Lars Løkke Rasmussen. The new ministry absorbed some of the areas of responsibility previously delegated to the Ministry of Social and Home Affairs (*Kgl. resolution af 28. juni 2015*).

The ministry is organized into one department with several sub-units, and is headed by the Minister for Health. The minister at the time of writing is Sophie Løhde of the Venstre - The Liberal Party of Denmark (Sum.dk, 2016).

Region Hovedstaden, Unit for Research and Innovation

Denmark underwent a major administrative reform in 2007, when its 14 counties (*amter*) were abolished and replaced with 5 regions (*regioner*). Furthermore, the number of municipalities (*kommuner*) were reduced from 271 to 98 (regioner.dk, 2016)

The regions have several responsibilities, chief of which is healthcare. The regions are the owners of public hospitals, and are responsible for physical and psychiatric healthcare. In addition, the regions have responsibilities within regional development, education, culture, tourism, environment and public transportation. The regions do not levy their own taxes, but are given block grants from the central government (Regionerne.2011).

Region Hovedstaden, or the Capital Region of Denmark, is the largest in terms of population served, yet the smallest in terms of area. As the name suggests, it

serves the northernmost area of Zealand (or Skjælland as it is known in Danish), including Copenhagen, plus the island of Bornholm, located just south of Sweden (Regionerne, 2011).

Region Hovedstaden's 2016 budget amounts to a total of 37.46 billion DKK ,(Region Hovedstaden. (2015a). Budget 2016 – 2019 2016 – 2019,) which roughly equals 45.71 billion NOK. (Exchange rate as of November 2016. The exchange rate has hovered around 1.25 NOK = 1.00 DKK for at least the past year (Norges Bank, 2017)). This is around 30% less than HSØ, but taking in account population, the expenditure per capita would be roughly equal.

The region includes seven major hospitals, 20 social service offices, 36.000 staff and has a user base of 1.7 million people. 3.600 scientific articles are published annually based on research projects done in the Capital Region, as well as 39 new registered inventions and 12 patent applications. In 2014, 800 partnerships were entered into with private-sector companies. This includes research, innovation and clinical trials. (Region Hovedstaden, 2015b)

1.3 Structure of the thesis

The thesis will follow a fairly simple structure. Above, the research questions and some background information about the institutions concerned have been outlined. At the end of this chapter, some important terms will be defined, as well as abbreviations used in the rest of the thesis.

The second chapter will mainly be concerning theory. Some general theoretical perspectives on innovation will be outlined, as well as more specific innovation theory in regards to healthcare innovation.

The third chapter will deal with methodology, and will discuss quantitative and qualitative techniques used in the thesis. The thesis will attempt to use several different levels of analysis, how this will be achieved will be discussed in this chapter. Concerns regarding validity, reliability and ethics will also be discussed.

The fourth chapter will summarize the analysis, the data collected and the results of interviews. This chapter will be subdivided by case and according to the levels of analysis as specified in the methodology chapter.

The fifth chapter will be the bulk of the analysis. Conclusions will be drawn based on the data gathered in chapter 4 and their implications will be discussed. Lastly, ideas or recommendations for further research will be outlined.

1.4 Definition of terms and notes on language

Due to the fact that a large amount the sources used in this thesis are written in Danish and Norwegian, a large amount of translation work has been necessary in the writing of this thesis. I have tried to be as consistent as possible, and I have used the preferred translation of terms used by Helse Sør-Øst and Region Hovedstaden wherever I have been able to find them. In other cases, I have either relied on my own knowledge of the English language or used a variety of online dictionaries where needed.

Health trust is a term used often in this thesis, and it would therefore be prudent to define it. "Health trust" used as a translation of "helseforetak", meaning an enterprise in the health sector. In the case of Helse Sør-Øst, it is important to note the difference between the Regional Health Trust (Regional Helseforetak, RHF) and other health trusts. The Regional Health Trust refers to the overarching health

authority in a region, in this case Helse Sør-Øst RHF. When health trust is used on its own, it refers to hospitals and other enterprises under the authority of HSØ RHF.

2 LITERATURE REVIEW AND THEORY

This chapter will present some literature and theory on innovation. Some of it is quite general, to lay the foundation for defining what innovation is, while other parts of the chapter is more specific theory for innovation clusters and health innovation.

2.1 Innovation

Before going into specific theories on innovation in the healthcare sector, a theoretical framework for innovation should be established. First and foremost is the definition of innovation. The first chapter of *The Oxford Handbook of Innovation* (2005) provides a good definition of what innovation is, in which Jan Fagerberg differentiates between the concepts of invention and innovation: “Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice”(Fagerberg, Mowery, & Nelson, 2005). Fagerberg goes on to explain that while inventions can be carried out anywhere, innovations are mostly (but not always) developed by firms.

Fagerberg goes on to explain the systemic view of innovation: while occasionally an invention created by a single person or actor can become an innovation, that is often not the case. Here he cites as an example, the brilliant inventor Leonardo da Vinci:

[...] although Leonardo da Vinci is reported to have had some quite advanced ideas for a flying machine, these were impossible to carry out in practice due to a lack of adequate materials, production skills, and -above all- a power source. In fact, the realization of these ideas had to wait for the invention and subsequent commercialization (and improvement) of the internal combustion engine. (Fagerberg et al., 2005).

This illustrates the idea that innovation is rarely a single invention in a vacuum, but rather more often a process involving multiple innovations used together. As such,

a systemic view of innovation involving several actors over a longer period of time is often more prudent when researching innovations. Linkages and connected actors feature prominently in much of innovation literature.

Fagerberg proceeds to differ between types of innovation. While many might think of innovation as new products going to market, there are several other types of innovation. Fagerberg quotes the highly influential Joseph Schumpeter when he lists five different kinds of innovation: new products, new methods of production, new sources of supply, the exploitation of new markets, and new ways to organize business (Fagerberg et al., 2005). For a layman, the latter four may not seem obvious, but finding new ways of production and distribution could have as substantial effect on society as introducing a new product. Henry Ford springs to mind as a good example of how innovation does not necessarily need to include a radical new product: while Ford's company was certainly not the first to make cars, Ford did considerably improve upon the way the cars were built. His moving assembly line cut production time on cars drastically, allowing one man to do the job previously done by four (Ford & Crowther, 2005). Furthermore, Ford's Model T introduced a concept that until that time was practically unheard of, but is now commonplace among virtually all cars on the market: customization. Ford did say that "Any customer can have a car painted any colour that he wants so long as it is black" (Ford & Crowther, 2005), but the Model T was still produced in a wide variety of body styles, colors and so forth, all while retaining the same core design in terms of chassis and engine (Alizon, Shooter, & Simpson, 2009). The Model T in itself was not a very remarkable innovation; the production and distribution methods were.

2.2 The innovation cluster

The thesis deals with limited geographical areas: both cases are areas centered around each nation's capital city, and both have a relatively large amount of high-tech companies as well as research- and educational institutions within their borders. Thus, the innovation activity in both cases can be treated as innovation clusters.

In the book “The Emergence of Organizations and Markets”, John F. Padgett and Walter W. Powell explain how and why high-tech clusters in life sciences can emerge. As stated in the introduction of one of the chapters in the book: “A critical challenge, then, is to explain the genesis of organizations and institutions, particularly why specific elements combine to make distinctive configurations possible only at particular points in time and space” (Padgett & Powell, 2012). If we are then, to treat the Copenhagen and Oslo cases as innovation systems or clusters, we would need some sort of basic knowledge as to how these occur.

As an example to study clusters or “spatial agglomerations”(Padgett & Powell, 2012), the authors use the commercial field life sciences in the United States. About 50 percent of US companies in the life sciences industry are located in three areas: San Francisco Bay Area (centered in the East Bay as opposed to Silicon Valley, south of San Francisco), Cambridge and Boston in Massachusetts, and northern San Diego County (Padgett & Powell, 2012). How an entire industry seems to be located in just three locations, two on the West Coast and one on the East, is a bit of a puzzle according to the authors. After all, when the field developed in the late 20th century, their two most valuable resources were (and still are) very mobile: money and ideas. At first glance, there are few barriers to establish companies anywhere, as long as you have enough of the aforementioned resources. As a case in point for the mobility of knowledge, the basic scientific discoveries upon which the life sciences are built were made at several universities in the US and abroad, so the clusters were not necessarily even based around the most prominent research centers at the time.

There are, however, some clues as to how it came to be that the life sciences were clustered in these three regions. First and foremost, perhaps, is timing. This is especially true for The Bay Area, as this region took an early lead in the 1970's-80's. But timing does not tell the whole story. Trends in biomedical patents by metropolitan areas point out that these were filed in many areas of the United States

from the mid-70's, and a lot of these metropolitan areas are and, were, more productive than the three clusters the authors focus on.

The New York/New Jersey metro was as of 1999 the leader in such patenting. Furthermore, Philadelphia, Los Angeles, and Washington D.C. and Baltimore were and still are major actors in biomedical patenting, on par or above what San Diego, Boston and The Bay Area can boast.

All these metro areas are home to major universities, research hospitals and other institutions that could facilitate the growth of major biotech clusters. Knowing all this, the authors ask four questions:

1. Why do we see so pronounced a pattern of spatial agglomeration in the emergence of new science-based companies and the creation of a new field?
2. Why does one community with a particular set of participants form and not another?
3. Why did very disparate organizations come together to form clusters in these three locales?
4. What was the developmental sequence that led to the institutionalization of biotech in these three clusters?

(Padgett & Powell, 2012)

The authors have some answers to these questions. They point to what they call two features and one mechanism: A diversity of organizational forms and the presence of an anchor tenant, as well as the mechanism of cross-realm transposition. Transposition as defined by the authors in this context is understood as “the status and experience garnered in one in one realm being converted into energy in another domain” (Padgett & Powell, 2012).

Firstly, diverse organizational forms can not only foster an environment in which new practices are allowed to form and flourish, but also in which the goals may

differ. Different practices, strategies and criteria for success may further lead to resiliency in the face of adversity, as organizations within a community react differently to prevailing conditions. Interaction among these organizations could then conceivably lead to refinement of strategies and the formation of best practices. As a hypothetical example of this, one could imagine how different companies in a cluster would react to a competitor making a breakthrough in technology. While one company might try to emulate its competitor and improve upon their research, another company might switch directions and spend their time and resources in other, unexplored directions. Evaluations of these differing strategies could then, over time, provide clearer answers for what the best practice is.

The second feature mentioned is the anchor tenant. The anchor, as defined by the authors, is an entity which facilitates in establishing networks and connections, and fosters growth in the community. Examples include universities, large firms, nonprofit institutes, venture capitalists, and the like. The anchor tenant is presented as a large, not highly specialized entity able to attract the interest of other actors, such as investors. This may have positive spillover effects for the other actors in the community. The analogy used by Padgett and Powell is of a large department store often used an anchor tenant in shopping malls. Other, smaller and more specialized stores located within the mall benefits by having the anchor tenant draw in more customers, leading to increased profits for all the actors in the network (the mall) (Padgett & Powell, 2012).

Finally, having both a diverse set of actors and an anchor tenant present will not yield the desired results unless experiences are shared between the actors. While being multipurpose may lead outside observers to conclude a lack of direction or expertise in any one field, establishing social connections between the actors in a network “creates a new channel that permits activities from one domain to cascade into others, possibly with re-organizing or tipping potential.” (Padgett & Powell, 2012). Practices, ideas and organizational models crossing into other domains or spheres can lead to reorganization, review, feedback and the creation of novel standards and practices. If these prove successful, other actors who may not have

been involved in their creation may aspire and subscribe to them and thus create new widespread practices, promoting and reinforcing them to widespread or mainstream practices.

Through their study of the three major clusters (Boston, San Francisco Bay Area and San Diego) in the field of life sciences, the authors confirm the importance of these factors to explain the clustering of actors within a particular field. Geographical proximity leading to shared expectations lead to norms for collaboration and the exchange of information. Having a diverse set of actors present meant that not only was knowledge shared through many different avenues, the knowledge exchanged was highly diverse. Employees working at several different firms in the area lead to the exchange of ideas and the formation of practices with roots in many different fields. Anchor tenants, such as universities or venture capitalists could function as incubators or advisers, leading to the formation of startups, often former employees of firms creating their own firms as competition to their former employers, using the experience gained at their former jobs to foster their own success. This combination of knowledge often created effects that were larger than the sum of its parts (Padgett & Powell, 2012).

2.3 Healthcare innovation

Thune and Mina writes in their 2016 article about three strands of literature on hospitals as innovation. While not setting out to formulate a theory on healthcare innovation themselves, the authors do come to some compelling conclusions regarding research in healthcare innovation.

The three strands the authors deal with are “health-care practitioners and their contribution to innovation”, “hospitals as innovative organizations” and “hospitals’ roles in innovation processes and systems” (Thune & Mina, 2016).

The authors conclude that the evidence base is highly heterogeneous. The research is conducted in a vast variety of different scientific fields, and has been published in many different journals, with little consensus reached. The papers are

written using a variety of methodologies, including quantitative data, literature review, qualitative and conceptual approaches as well as a mixture of any of the above. The kinds of innovations researched are also diverse, ranging from product innovation, process and procedure innovation, service innovation, and biomedical research.

Despite these disparate findings, the authors are able to draw some overarching conclusions.

First among these is the fact that further research is needed on hospitals as a selection environment for innovations and the relationship between hospitals as a selection environment and hospitals as innovation generators.

Secondly, a careful assessment of the opportunities and cost of increased innovation engagement with external partners is needed.

Thirdly, hospitals, especially research-intensive hospitals, have a strong capacity to fuel innovation activities done by external partners (evidence collection for example.) This, combined with strong ties between hospitals and university systems can provide strong incentives for these external partners to establish offices and research facilities in close proximity to these hospitals. As such, the location of hospitals can be a significant factor in determining the location of pharmaceutical and medical device companies.

Lastly, new IT investments and the emergence of big data can provide valuable opportunities for learning for those health-care organizations willing and able to take advantage of them.

To provide a more specific model for healthcare innovation, we can use an article written by Paul Windrum and Manuel García-Goñi. In their paper they present and apply their own framework for health service innovation. They call it a “neo-Schumpeterian model of innovation capable of studying interactions between service providers, patients and policy makers, and how these complex interactions

determine the timing, direction, and success of innovations in the public sector.” (Windrum & García-Goñi, 2008)

The authors make a case for why an innovation model for the public sector matters, namely that a number of issues arise in the study of public sector innovation, which are downplayed or ignored in studies of the private sector. There are actors present in public sector innovation that are less important or not present at all in private sector innovation, such as political actors and NGOs.

The authors clarify that their framework is not itself a theory, and so their framework is translated into a model of health services innovation by applying a theory of services innovation by Richard Barras (Windrum & García-Goñi, 2008). Windrum and García-Goñi briefly present Barras’ theory in which they emphasize two aspects, the first of which is the difference between “user-facing competences” and “back-office competences”. User-facing competences are essentially the services encountered by users, while back-office competences are the processes happening behind the scenes enabling those services to be provided to the users. In the context of health service providers, an example of user-facing competences would be the treatment that the patient receives, while back-office competences could include systems for the filing of medical records or the payroll system for the hospital. The second point they emphasize in Barras’ theory is that organizational and process innovations are tightly coupled within services (Windrum & García-Goñi, 2008).

In Barras’ paper, he presents a theory of innovation in user industries (service industries), called the “reverse product cycle” (Barras, 1986). He presents the cycle as being divided into three phases:

In summary, the three phases of the reverse product cycle consist of a first stage in which the applications of the new technology is designed to increase the efficiency of delivery of existing services; a second stage in which the technology is applied to improving the quality of services; and a third stage in which the technology assists in generating wholly transformed or new services. (Barras, 1986)

Barras later uses simplified terminology to describe these three stages: the first is improved efficiency, the second is improved quality, and the the third is new services. He also uses computer technology and its impact on three sectors or industries (insurance, accounting and local government) to exemplify his theory. In the 1970s, computer mainframes arrived on the market. These mainframes helped efficiency by being able to store large amounts of data such as insurance policy records, auditing record, and payroll information. This innovation improved efficiency as data storage became quicker, easier and more compact, thus saving costs. The 1980s saw further improvements, including most notably the growth of the Internet allowing systems used by the above mentioned sectors to be used online. This allowed for things like online insurance policy quotations and computerized management accounting. Barras claims that these innovations improved the effectiveness of the services, thus improving the quality. Thirdly, and this may perhaps demonstrate admirable foresight on the part of the author as the article was published in 1986, Barras envisioned that the 1990s would bring further proliferation of the Internet. This would prove to be correct, and as a consequence, services which previously required users to physically interact with the service providers would be able to be provided online. Barras states that it is often claimed that this type radical application of new technology does not, in itself, provide new services, but that it merely provides the same service in a new way. He, however, argues against that notion. While he agrees that the new way of providing services fulfill the same function, he believes that they must ble classified as a new service product.

“However, using an analogy with the contrast between a horse and a motor car as a means of transportations, these new service applications are so different in nature and mode of delivery from more traditional forms of services that they can meaningfully be described as new service products.” (Barras, 1986)

Using the example of computer technology innovating being applied in services, we can see what is meant by the distinction between back-office competences and

user-facing competences. The first two phases improves efficiency and quality, but the innovations themselves are only “seen” by the providers. The average customer of an insurance company will likely not notice the changes in how data is stored or how policy quotations are created. Thus, these innovation contribute to back-office competences. However, in the third phase, a new product is developed which can be used by the customer. Being able to purchase insurance in the comfort of one’s home on the computer is very much noticed by the customer, and thus qualifies as user-facing competences. Furthermore, as Windrum and García-Goñi note, the process innovations in the first few phases allowed service organizations to explore organizational innovations. With computer technology simplifying and speeding up tasks like filing and payroll, resources and manpower were freed up, enabling those organizations to restructure and improve the quality of service.

Barras claims that this reverse product cycle tends to parallel the stages of a conventional product cycle of capital goods, with computer industry mentioned as an example, and often with considerable feedback between the two processes as the technology is often adapted or improved based on the demands of the services using it.

On the basis of Barras’ theory, as well as similar frameworks previously established by Pier Paolo Saviotti and John Metcalf, as well as Faïz Gallouj and Olivier Weinstein, Windrum and García-Goñi present two models, one generic model and one operationalized model. The operationalized model is pictured below:

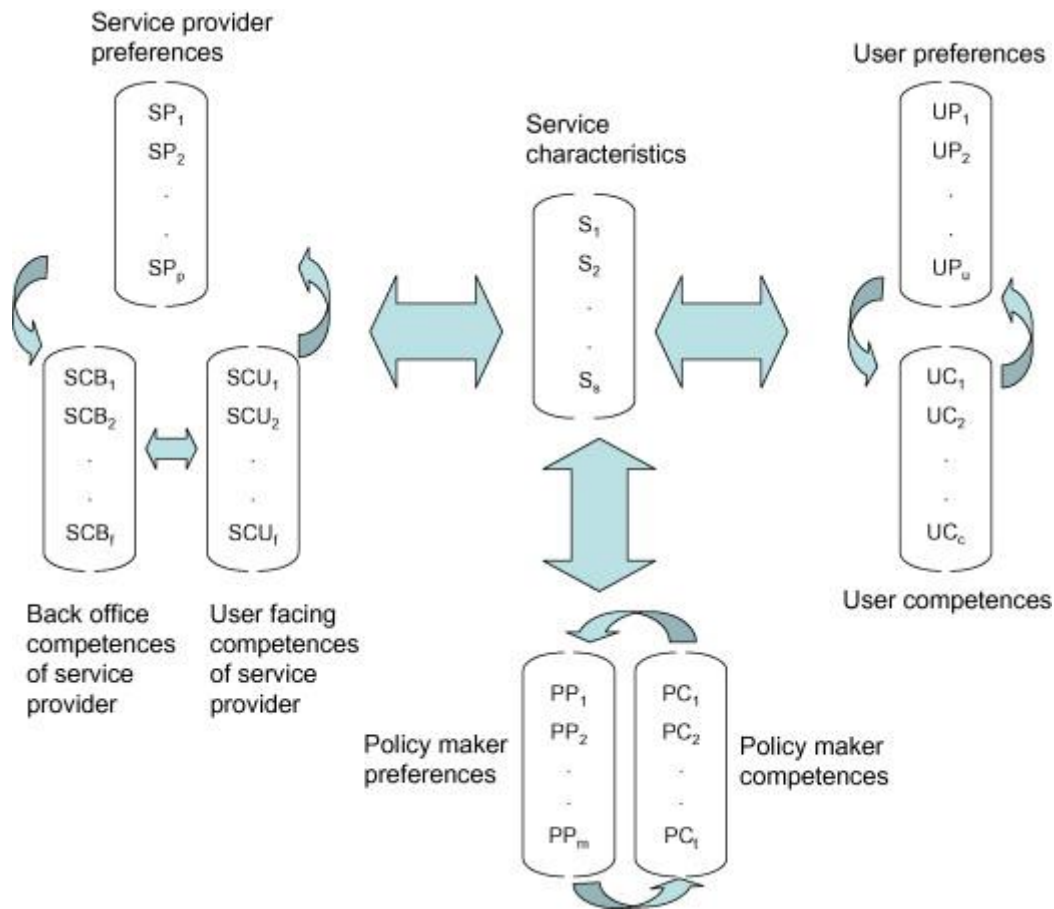


Figure 1: The neo-Schumpeterian framework for health services innovation (Windrum & García-Goñi, 2008)

They call this model a “neo-Schumpeterian framework for health services innovation” (Windrum & García-Goñi, 2008). The authors describe two distinguishing features about this framework. The first is the fact that the framework includes policy makers as well as service providers as users. The second is the fact that the framework encapsulates all five types of innovation as described by Schumpeter: organizational, market, input, process and product innovation (Windrum & García-Goñi, 2008).

Windrum and García-Goñi suggest that the first feature is vital because one cannot accurately understand innovation in public health services without considering the role played by policy makers. The policy makers have often, and perhaps rightly so according to the authors, been ignored or overlooked in the study of private sector innovation, but this cannot be the case when studying public health innovation.

Further, the authors argue that users are also integral in public health innovation. Patients' changing needs, demands and demographics form crucial information when both service providers and policy makers make decisions about innovation.

From this model, we can see that service characteristics is formed as a result of input from several actors. The preferences and the competences of the actors form feedback loops. This makes sense, as an actor's preferences will inevitably shape its competences and vice versa. Windrum and García-Goñi note that on the user side of the equation, the situation has changed over the past few decades. The authors note that in many developed countries, patients have been encouraged to take a more active role in their own health, in a move towards consumerization in healthcare. I will also suggest that as the Internet has become ubiquitous, patients now have easier access to information which may also improve user competences. This, of course, is dependent on the users practicing good source criticism, which may not always be a given.

Obviously, in addition to preferences and competences interacting within an actor, they also interact between actors. Service providers may sometimes acquire competences that is counter to their preferences, or they may be unable to acquire competences they want to acquire because of the policy makers' preferences, or user preferences may be altered by the competences of the providers. The authors use several examples to illustrate these situations. Some religions ban blood transfusions (user preference), which have led to clinical trials to find alternatives (provider competence). In some countries, stem cell research is forbidden (policy maker preference), counter to the wishes of many service providers and users (user and provider preference). And finally, introduction of new medical technology such as organ transplants or vaccinations (provider competences) are often met with resistance from users (user preferences) (Windrum & García-Goñi, 2008). The authors note that when the preferences between two (or three) actors clash, the relative power between the actors have an important impact on whether the innovation is implemented.

On the left side of the model, we can see that the input from the side of the service provider is made up of user-facing and back-office competences, as explained above. Windrum and García-Goñi posit that in their model, a difference between radical and incremental innovation is taken into account. While an incremental innovation would lead to a change in back-office competences, this would not be reflected in user-facing competences. This, they say, would not lead to a change in the overall service characteristics, apart from perhaps making them more efficient. A radical innovation, however, is one that would lead to change the service characteristics as well as affecting the preferences and competences of all the actors involved in the framework.

3 METHODOLOGY

3.1 Analytical framework

3.1.1 Most similar systems design with two cases

Seeing as Norway and Denmark are, or at least have the perception of being, very similar in infrastructure, society, culture, living standards and so on, the most interesting thing to study in these countries would be what is different between them. This type of research is well suited for a popular method used in comparative politics: Most Similar Systems Design (MSSD). A strict interpretation of the MSSD demands that countries studied should have a wide set of independent variables similar to each other and only vary in the dependent variable, which in this case would be innovation strategies (Meckstroth, 2016). In this case, there are various conditions that are different in the countries, including organization of regional health authorities, and the size and importance of commercial health industry. However, the surrounding framework in the sense of a large welfare state is similar in both countries. Thus, treating these countries as largely similar cases with a few key differences would be fair in the sense that the countries are very similar in culture, society, level of wealth, human development and such. Both countries have relatively small populations, they well-developed economies, they enjoy high standards of living and share a long history, having been in union for close to 400 years, leading to a lot of cultural similarities.

3.1.2 Level of analysis

While it is common for a research paper to focus on one level of analysis, either big picture (macro) or the finer details (micro), or sometimes in between (meso), this paper will attempt to use a combination of all three levels of analysis to aid in encapsulating the differences that occur in two systems as similar as Denmark and Norway.

In essence, this thesis will differentiate the two cases in terms of their overall vision (macro level). Are their end goals vastly different from one another? If so, how and

why? Is this a conscious choice or are these visions forced and formed by the circumstances and conditions that surround the decision makers?

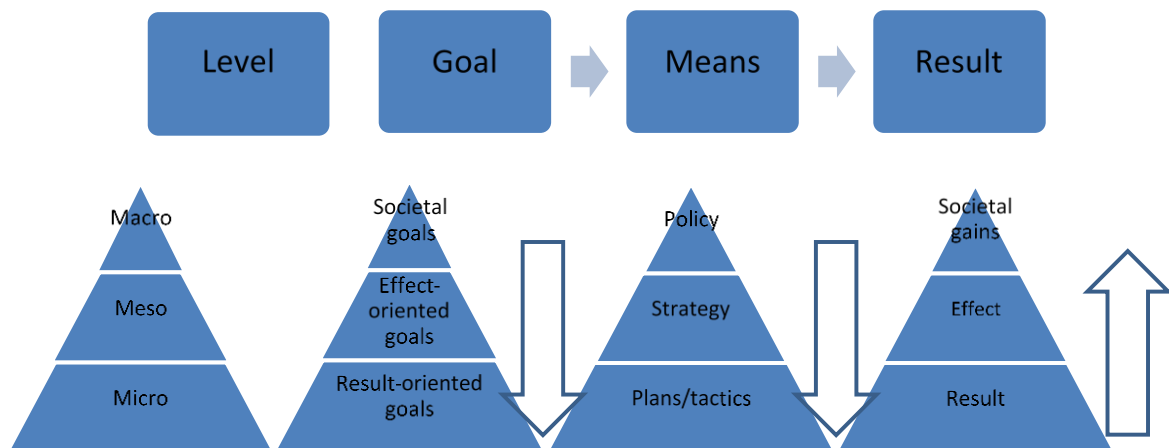
Having established the differences at the macro level, the next level of analysis would be differences on in strategies (meso level). Given the overall vision, what are the individual goals and achievements needed to accomplish the grand design? Do the two case subjects have different intermediate goals to achieve the overall goals, or perhaps the same intermediate goals to achieve different overall goals? And, as before, what are the deciding factors in forming strategies?

Finally then, the tactics (micro level). What are the concrete means to achieve the ends? Here, we will look at the tools and policies used to achieve what the decision makers have set out to, whether they are financial means (budget priorities, tax incentives, subsidies), infrastructure, or any other tools.

Another way to frame this would be to say that the societal goals would form the vision.

An apt, if somewhat contrasting, analogy might be warfare. The macro level goal in war is the overall goal, what is the desirable outcome of the war, be it the preservation of national sovereignty, territorial expansion, quest for resources or simply the defeat of a hated enemy. The meso level, the strategic level, consists of choosing what battles to fight, where to fight them, and how to best deploy your resources (troops, ships, guns) to win the war. The micro level, the tactical level, would be how to win those battles, what actions to take once the battle has been chosen and your resources deployed.

Pictured below is a model containing a series of pyramids. These pyramids provide a visual reference for the levels of analysis. At the far left are the levels in general terms: macro, meso, micro as described above. While the terms macro, meso and micro are well known, I was not able to find a figure that accurately illustrated what I had in mind, so this figure was created by myself.



The next pyramid describes the levels of goals. At the top are the societal goals: what function of society do we want to improve? What large-scale problem do we hope to fix? What demand in the market do we want to fill? The middle tier of the second pyramid contains the effect-oriented goals. What effects are needed to achieve the societal goal? The bottom tier shows the result-oriented goals. What specific results is needed to achieve the effect goals and thus the societal goals? Say for instance a government seeks to improve its population's general health. That would qualify as a societal goal. The effect-oriented goal could then be to

improve survival rates among cancer patients. The result-oriented goals in this case could be earlier detection, more effective chemotherapy or radiation treatment and a host of other results.

The third pyramid describes the means with which one can achieve the goals set out in the second pyramid. First is the policy level, where decisions regarding the overarching policy are laid out. The second level, strategy, describes what types of means are to be used to achieve the goals. These could, depending on the goals and the agents making the decisions, include tax credits, investments, recruitment, development of infrastructure and more. The bottom level is tactics. Once the strategy has been chosen, the specifics of how to execute them are decided here. How big should the tax credit be? How much should we invest? Where do we build new facilities?

As the reader will notice, there are arrows next to the three rightmost pyramids. Those arrows indicate in what order the pyramid should be read. For instance, effect-oriented goals must flow from societal goals, and result-oriented goals must flow from effect-oriented goals. Similarly, one cannot determine the specifics of a plan before having already decided the broader strategy. The decision to invest must be made before the decision about how much to invest.

The last pyramid has an arrow pointing upwards. This is because when evaluating the results of some action taken, it is helpful and sometimes necessary to look at the results on a micro level first in order to determine whether the overarching goals were met. A situation can be imagined where the societal goals are met without the goals on the meso or micro levels being met, and in those cases it is still important to determine whether the societal goals were met despite the lower level goals were met, or because of it. Unforeseen consequences and spurious effects need to be accounted for. The names of the levels reflect the names of the levels of the goal pyramid. The bottom level deals with the results based on the effect-oriented goals, and whether or not those goals were met. Similarly, the middle level deals with the results based on the result-oriented goals. Finally, the societal gains reflect whether the societal goals were met.

The positioning of the pyramids is not arbitrary either. The pyramids describe a process going from left to right, as indicated by the bottom arrow. In the simplest possible terms, the process can be described as deciding what to do, deciding how to do it, and finally evaluating the results.

3.2 Qualitative approach

3.2.1 Strategy documents

Most of the empirical evidence for this thesis will be from primary sources. Strategy documents written by the organizations studied form the bulk of the source material. The strategy documents are available for the broader public and one could argue that they represent 'the truth' when it comes to describing the policy and strategy. However, the Norwegian historian Knut Kjelstadli suggests that some caution should be shown when researching government documents:

The White Paper is something different than a private letter. In the public document, you don't say everything, but at the same time there is an inherent control with the fact that everyone can read it. [...] On the other hand, one must assess to what extent internal departmental documents in recent years have been affected by the Freedom of Information Act. The documents are more likely written in a way designed to be read by everyone (Kjelstadli, 1999)

Although the documents are outlining public policy and strategy, it is important to keep Kjelstadli's counsel in mind when analyzing the material. These documents could be written in a way meant to persuade or influence decision makers, and they can be interpreted in multiple ways.

The analysis of documents have been done with a certain caution, and partly in light of the above, interviews with key stakeholders was conducted in order to supplement and add to the official strategy documents. Later, even the interviewees claimed to disagree with the public documents, something which further emphasized the fact that such documents are open for interpretation. These disagreements have been commented on later in the thesis.

3.2.2 Interviews

In addition to the primary and secondary written sources used in this thesis, I conducted four interviews, one in Denmark and three in Norway. The interview in Denmark was conducted at the offices of Region Hovedstaden in Hillerød, outside Copenhagen. The interview with the Norway Health Tech was conducted at their offices in Oslo, while the two interviews with Helse Sør-Øst were conducted by telephone. In all cases, the interviews started and ended with pleasant conversation, and were both quite casual and relaxed in nature.

The three Norwegian interviewees were Kjetil Storvik, head of innovation at HSØ, Øystein Krüger, head of research at HSØ, and Bent-Håkon Lauritzen, advisor for market development at Norway Health Tech. The two Danish interviewees were Kirsten Danielsen and Carina Jørgensen, chief consultant and consultant, respectively, at the Center for Regional Development in RH.

The reasoning behind using such a small amount of interviews was that the interviews were to be used as a way to corroborate, expand upon or disprove information gathered through written sources.

The interviews were conducted in a semi-structured fashion, as defined by Steinar Kvale:

A qualitative interview is usually semi-structured; it has a sequence of themes to be covered, as well as some prepared questions. Yet at the same time there is

openness to changes of sequence and question forms in order to follow up the answers given and the stories told by the interviewees (Kvale, 2007).

I made three interview guides, one for RH, one for HSØ, and one for Norway Health Tech. About half of the questions were identical in the first two interview guides, with questions having a quite general nature concerning the operation of the two health authorities. The other half of the questions differed in each case, as they referred to specifics of their respective strategic plans. The interview guide for the interview with Lauritzen was quite different to the other two, as the different role Norway Health Tech plays in innovation is quite dissimilar to the other two organizations. The respondents were sent the interview guides well in advance, and were thus given the opportunity to prepare themselves. Follow-up questions were used frequently to both to clarify answers and also when one answer gave rise to another question.

The interviews were conducted in Norwegian and Danish, and the answers given have been translated to English by the author. As with any translation, there is the chance that something may have been lost. Furthermore, I am a native Norwegian speaker, but the mutual intelligibility between Norwegian and Danish is strong enough that I felt comfortable conducting the interview in Denmark with questions asked in Norwegian and answers given in Danish. When confusions did arise in terms of unfamiliar words being used, I asked the respondents to clarify or use a synonym. I have made every effort to translate the interviews as faithfully as possible. When faced with idioms, I have either used a direct translation or, when suitable, used English equivalents.

3.3 Validity and reliability

Validity describes whether results are internally and externally valid. Internal validity means that the results are valid for the sample and the research in question, whereas external validity refers to whether the results can be generally applicable

beyond the sample and research in question. Reliability, on the other hand, means whether the research can be reproduced. Internal reliability refers to whether other researchers are able to utilize the same methods and concepts as the original authors, and external reliability refers to whether another researcher would come to the same results using the same methods and methodology (Holter 1996).

In quantitative research, validity is identified by using statistical tools. However, in qualitative research, utilizing strict measures for validity is less relevant. According to Harriet Holter, we need to define validity on the basis of the methods we are using:

One example of the difference [between qualitative and quantitative research] can be found in the two approaches' relation to meaning or context. Whereas the quantitative analysis amongst other deals with 'stripping down' data for context, it is the opposite with the qualitative research. Here, it is about maintaining the frames of meaning. (Holter 1996, p. 22, author's translate)

In qualitative research, then, validity and reliability deals with quality assurance of the research conducted, if the logic of the arguments are sound and persuasive, and whether the methods and objectivity in the research have been followed (Holter 1996).

This thesis deals with two cases, the capital regions of Norway and Denmark, and I have not studied the two countries as a whole. Conclusions reached in this thesis will therefore only apply to the two regions and not the countries as a whole. While it is reasonable to expect that differences and similarities found in this thesis may apply to the countries and not just the regions, I will not make any such claims myself. Any validity beyond these two countries is even less certain.

As for reliability, much of the empirical data is based on publically available strategy documents, thus making the research easily reproducible. Some data was gathered through interviews, but the data was not classified or in need of anonymization and all interviewees have been identified. It could also be argued that the interviewees are representatives of quite transparent organizations, and the information gathered for this thesis could easily be gathered by other researchers.

4 EMPIRICAL DATA AND ANALYSIS

4.1 Country comparison at a glance

First and foremost, we know that Denmark is much larger in the biotechnology industry than Norway. The 2014 edition of the annual report written by Ernst & Young concerning the biotech industry gives the following statistics:

Denmark: 9 publicly traded companies with 2.5 billion US dollars in revenue and 541 million US dollars spent on R&D.

Norway: 9 publicly traded companies with 157 million US dollars in revenue and 59 million dollars spent on R&D.

(Wallach, 2014)

Bear in mind that these are just the companies that are publically traded, but it does give a decent indication of the status of the biotech industries in these countries. While Norway and Denmark have the same amount of publicly traded biotechnology firms, Denmark's are substantially more profitable, with much higher R&D expenditures.

As mentioned earlier, the regional health authorities are organized differently between the countries. Norway's system is organized in four regions independent of counties or any other administrative divisions: the Northern, Central, Western, and Southern and Eastern Regional Health Authorities. The latter is by far the largest in terms of employees, revenue and patients served, employing 75,000 people, with about half the national healthcare budget and covering about 56% of the population. 10 of Norway's 19 counties are administered by HSØ (Helse Sør-Øst, 2014).

In Denmark, the health authorities are organized as part of the regional administration. Denmark reorganized their administrative divisions in 2007, reducing their number of counties (or municipalities with county powers) from 16,

down to 5 and renaming them *regions*. In addition, the number of municipalities was reduced from 270 to 98.

Similar in all both models is that these regional health authorities own and are responsible for the running of hospitals in their jurisdictions.

Both countries follow what is called the Nordic model, which includes extensive welfare programs such as universal healthcare and free education, high public spending, corporatism and relatively high tax levels. All countries have national health ministries with overarching responsibilities for policy and legislation.

The WHO ranked all health care systems in the world in 2000, but has unfortunately not published a new report on this since to my knowledge. In this ranking, Norway and Denmark came in 11th and 34th respectively. However, both Denmark and Norway has had major reforms in their health care systems since that time. Therefore, these numbers indicate nothing more than that 15 years ago, these countries scored well, if not spectacularly so in terms of health care quality.

4.2 Innovation in Oslo

4.2.1 Goals

4.2.2.1 Societal goals

Helse Sør-Øst has published a report called “Plan for strategic development 2013 - 2020” (“Plan for strategisk utvikling 2013 - 2020”). This report lays out HSØ’s goals for the time period as well as how to achieve them.. The first section of the report is titled “Vision and values - the purpose of the strategy document” and lays out, in broad terms, what HSØ wants to achieve (Plan for strategisk utvikling & 2013 – 2020,). The document opens with a quote attributed to the user committee of HSØ that quickly summarizes HSØ’s goals: “...the patient’s needs will be the guiding principle for the structure and the content of the service” (Plan for strategisk utvikling & 2013 – 2020,).

From this quote, it is readily apparent that HSØ's primary goal is patient-centric. This patient-centric view shines through in the rest of the report. The vision for HSØ as stated in the report is to provide "Good and equal health services to anyone who needs it, when they need it, regardless of age, place of residence, ethnicity, sex and economic means" (Plan for strategisk utvikling & 2013 – 2020,). The report mentions "the three national values of "quality", "safety" and "respect"" (Plan for strategisk utvikling & 2013 – 2020,), that HSØ has converted into guiding principles for the organization:

1. Openness and involvement.
2. Respect and predictability.
3. Quality and knowledge.

Thus, the societal goal of HSØ, based on this report, is to continue to provide and presumably improve the quality of healthcare services to all citizens within their jurisdiction.

The interview conducted with Kjetil Storvik largely confirms these goals. When asked what the overall goals of HSØ are in terms of healthcare innovation Storvik says that "... what we define as the overarching goals is that innovation in HSØ will contribute to new and better solutions being implemented in the treatment of patients. That is the one crystal clear formulation of an overarching goal"(Storvik, 2017). As such, Storvik confirms what the strategic plan says. However, Storvik emphasized that this does not preclude any commercial-facing innovation. When asked whether HSØ mainly wished to innovate in ways that benefited patients or in ways that could be commercialized, Storvik said:

"Both. And they are partly connected, as those innovations with commercial potential will in turn contribute to better treatment of patients. There is no direct contradiction (between the two), but I believe that just about all innovation we are involved with will in some way improve the treatment of patients and part of that innovation has commercial potential"(Storvik, 2017).

He goes on further to say that “This is encompassed in what I said was our vision or overarching goal: new and improved solutions implemented in the treatment of patients. And that covers both that which is commercial and non-commercial”(Storvik, 2017). According to Storvik, then, while the primary focus of HSØ is indeed in the improvement of the treatment of patients, this does not mean that HSØ does not wish to innovate in ways that are have commercial potential. A more precise way to describe the view on commercialization would be that while the main goal is to improve treatment, commercially viable innovations can often contribute to that goal.

To get a better sense of the private sector of Norwegian health innovation, I conducted an interview with Bent-Håkon Lauritzen. Lauritzen is an advisor for marked development at Norway Health Tech, a health technology cluster based in Oslo. The cluster was formerly known as Oslo Medtech, but changed their name to reflect their ambition to be a national or even international actor, and not just be restricted to Oslo (Lauritzen, 2018). On their web page, they say that:

The cluster’s ambition has been to become one of the most innovative global health technology clusters by 2020 for a long time. Now we reposition the cluster and expand our areas and change our name that signalizes that we represent businesses across Norway (Norway Health Tech, 2018)

When asked about this ambition and what exactly is meant by it, Lauritzen brought up the fact that innovation is inherently difficult to measure. However, he felt that the best way to describe their ambition would be attractiveness, meaning that the cluster wants to attract partners from not just within Norway, but internationally as well. As to whether the ambition is on track to be fulfilled, Lauritzen said that he thought so. While he acknowledged that there are significantly larger actors in the field, especially in the United States what with its much larger markets, Norway Health Tech has become a very attractive cluster.

“We are one of the clusters who in the last few years have had the most success with grants from the EU, for instance. We currently have two projects going with a combined 80 million NOK in grants involving companies all over Europe. This increases our attractiveness significantly” (Lauritzen, 2018)

When asked about what goals NHT has for medical innovation in general, Lauritzen spoke of two main ambitions:

“You see, we have two main ambitions. One of them is on behalf of the health services, and that is for it to become more efficient and to increase its quality. That’s sort of the overarching goal. (...) On the other hand, we wish to create business out of those who provide solutions to the health services. And we have a very hairy goal, we want [health technology] to become a large industry in Norway and for it to become internationally competitive” (Lauritzen, 2018)

The first goal is largely identical to the goals envisioned by HSØ, namely improved patient care. This is not unexpected, as among the cluster’s 230 members, there are several public actors, including Oslo University Hospital, Østfold Hospital, Sunnaas Hospital, Oslo municipal health services as well as Helse Sør-Øst RHF itself.

However, the cluster also includes a large number of private actors, including start-ups in the cluster’s incubator program, consulting firms, law firms, biotech firms, medical device manufacturers and so on (Norway Health Tech, 2018). Thus, it makes sense for the cluster to have a goal of increased commercialization and indeed for the health technology sector to become a significant driving force in the economy. When asked if he envisions health tech to be able to fill some of the void left behind by the declining oil industry, Lauritzen said that this is absolutely something they envision:

“Yes, we absolutely believe that, and we have actively gone into programs to recruit unemployed engineers from the oil sector. There are quite a few engineers that have made the transition from the oil sector to the health sector, working in both product development and other engineering tasks there. [...] We have been pointed to as one of the four or five industries with a lot of international potential.” (Lauritzen, 2018)

So, while HSØ itself may not put an emphasis on commercialization, they do have partners who do.

4.2.2.2 Result-oriented goals

Having established the societal goal of improving the experience of patients being treated by HSØ, the report gets into more specific goals, which fit nicely in the category of result-oriented goals.

The report discusses a number of goals to be achieved within the plan period. Firstly, waiting lists should be reduced and missed deadlines are to be eliminated altogether. Secondly, the rate of infections incurred as a result of hospital stays are to be reduced to less than 3%. As of 2015 the rate was 13,7% for patients having undergone surgery and 5% for those that had not (Andersen, 2015). Next, patients are to receive their appointments simultaneously with the confirmation of a referral being received. Furthermore, all employees are to be involved in the review of the employee surveys and be involved in implementing measures in order to improve their own units. Lastly, HSØ seeks to create the economic latitude necessary to ensure necessary investments be made possible. (Plan for strategisk utvikling & 2013 – 2020,)

These goals are expanded upon further in the report, with a clear focus on patient welfare and treatment efficiency. The report states that health care services are to be provided in an effective manner, to be understood as medical decisions being made based on relevant, reliable and up to date knowledge and experience. Results are to be demanded and documented. Furthermore, these services must be safe, and as such risk and deviation management will be used to reduce the probability of medical errors. The report also states that user involvement is necessary, and that the experiences and opinions of patients and their families are important in order to develop quality healthcare for future patients. In order to accomplish this, users must take an active role in their treatment and their feedback, along with feedback from patient interest groups must be taken into account in the planning and evaluation of services (Plan for strategisk utvikling & 2013 – 2020).

The next goal is to improve routines and establish common practices to insure that patient experiences are uniform independent of treatment location. Continuity and coordination with a clear timeline and established pipelines for treatment along with interdisciplinary cooperation will ensure that patients experience a predictable and smooth course of treatment. As such, it is important to have good resource management to ensure that the right treatment is offered to the right patient in a timely manner. A number of factors must be taken into account when deciding upon the proper treatment, including the needs of the patient, the seriousness of the condition, and the expected health benefits and the efficacy of the treatment. Lastly, it is vital to ensure that services are distributed in an equal and fair manner in order to ensure that patients with similar needs receive the same quality of treatment (Plan for strategisk utvikling & 2013 – 2020,).

A large portion of the report is devoted to treatment and procedures. HSØ emphasizes quite strongly that patients and other users of their health care services are front and center in their long term plans. This does not necessarily mean that research and development is completely absent from this report. In fact, there is a section devoted to it. However, the section on research and innovation is limited to two pages in the 24-page document. What the report does say about its goals for research and innovation is reflective of the patient- or treatment-centric focus seen throughout. The report states that as a health authority, HSØ is required to conduct research, and that the research is to be for the benefit of the populace under its jurisdiction through the attainment of new knowledge and increased competence (Plan for strategisk utvikling & 2013 – 2020,). That knowledge and competence will be used to improve “prevention, diagnostics, treatment, habilitation and rehabilitation, training and mastering alongside innovation and commercial development” (Plan for strategisk utvikling & 2013 – 2020). Note that commercial development seems to be something of an afterthought, indicating that this is perhaps not an important part of the long term plans of HSØ.

There are some requirements and ambitions for this research. The research is to be in line with government guidelines in terms of focus, it is to keep a high level of quality, be broad and interdisciplinary and it is to be conducted through a

transparent process based on scientifically sound methodology. The report also gives a definition of what innovation in the health sector is: “Innovation in the health sector is a new or improved commodity, services, production process, mode of use or organizational form that forms a reusable concept, and can be commercialized in a marketplace.” (Plan for strategisk utvikling & 2013 – 2020,) Based on this, it would seem that HSØ emphasizes commercialization in that commercialization is required for something to be called an innovation.

However, according to Storvik, HSØ has never presupposed that all innovations should have a commercial potential. In general terms, Storvik say that commercialization is not required for something to be called innovation.

“I would say that anything that is new, useful and can be implemented to improve the treatment of patients, that is innovation”(Storvik, 2017). Storvik says that he would agree with the definition as given in the strategic plan if the part about commercialization was taken out. He especially emphasizes reusability, explaining that one of the challenges HSØ faces when funding innovation projects is that the health trusts facing a problem often carry out innovation projects with too narrow a scope. As a result, the health trusts come up with solutions that may work very well for their own health trusts with their specific problem, but with limited diffusion to other health trusts. Storvik says that it is important for HSØ that the health trusts cooperate on innovation and that new solutions are presented in more than one trust. (Storvik, 2017) This idea of innovation simply being something that is new, useful and with ability to be implemented in a useful way is something that also came up during the interview with Region Hovedstaden, as described further below.

When asked about the result-oriented goals from a commercial point of view, Lauritzen, said that at least from NHT’s perspective they don’t have any concrete quantitative goals. Rather, Lauritzen emphasized continued growth in the health tech sector. And as for the cluster itself, Lauritzen said the goal is for the members of the cluster to have a higher growth than the industry average, a goal which he says has thus far been reached (Lauritzen, 2018).

In short, HSØ's result-oriented goals are to provide its citizens quality health care services. Its innovation goals seem relatively modest, and are based in large part on improving the processes that users, whether they be patients or doctors, administrators and other employees, go through.

4.2.2.3 Effect-oriented goals

HSØ does not mention any concrete effect-oriented goals in the plan for strategic development in terms of what exact types of innovation HSØ wishes to promote. When asked about whether HSØ wished to promote any particular form of innovation, Storvik said HSØ are likely to move forward using a three-pronged approach to innovation: research-based innovation, demand-driven innovation and services innovation (Storvik, 2017). He says they are likely not going to promote any particular medical or scientific discipline, in terms of pharma or biotech. However, HSØ may formulate some challenges for its health trusts to respond to, in regards to the demand-driven prong. As an example, Storvik mentioned four topics that HSØ wanted its health trusts to respond to: increased patient security and reduction of patient injuries, reduction of wait times and increased utilization of capacity, labor saving and streamlining, and self-treatment of patients (Storvik, 2017).

When asked directly HSØ has any goals on a micro or effect-oriented level, given the societal goal of improving treatment, Storvik says that they do, but they are difficult to quantify. He says that the overarching goal of improving healthcare will be reached mainly by doing two things: "The first is to realize the potential for innovation in the health trusts, both through research and ideas from other employees, that's the one thing. The other is that we will implement new solutions that are developed by, or in cooperation with, the private sector"(Storvik, 2017). However, he also emphasizes that the goals for each individual health trust might differ from those made by HSØ RHF. HSØ by its nature as a central body has a slightly larger perspective than the individual health trusts. HSØ RHF receives mission documents from HOD, and it is their job to operationalize them, and pass on the tasks to the health trusts. HSØ RHF in and of itself does not innovate, the

innovation is done by the health trusts. According to Storvik, the clearest mission statement HSØ RHF has gotten from HOD is to stimulate the innovation cooperation with the private sector (Storvik, 2017).

4.2.2 Means

4.2.3.1 Policy

According to Storvik, HSØ's policy regarding innovation is one where no innovation is too small or too large. Storvik, therefore, partly disagrees with the definition of innovation as written in the strategic plan. He says that "The health trusts should be prepared to conduct innovation in services, products and technology, with and without commercial potential" (Storvik, 2017). This partially contradicts the definition from the plan, which states that innovation should have commercial potential, although Storvik adds that this condition for defining innovation has never been regarded as absolute (Storvik, 2017a). He elaborates by saying "You can have a fantastically good idea, which can have a large impact but does not cost anything. In which case we will say "just do it". I will not sit on my high horse and say "No, that is not innovation, it is too small and insignificant, it is just an improvement or a development" and so on and so forth" (Storvik, 2017). Storvik's view on innovation is thus a lot less narrow than the definition put forth by the strategic plan. Storvik presents his own view on innovation as such: "I say that anything that is new, useful and can be implemented to improve the treatment of patients, *that* is innovation" (Storvik, 2017). Storvik's definition of innovation is quite broad, and not dissimilar to Fagerberg's definition as stated above. In his view, an innovation can range from simple incremental innovation to large scale, disruptive innovation, and everything in between. Anything that can improve the treatment of patients.

However, Storvik does have a more criteria when it comes to projects that HSØ RHF will fund. The innovation projects that HSØ RHF wishes to fund lie somewhere in the middle of the road when it comes to the size of funding.

"My operational definition of innovation are those projects that we wish to give innovation funds to, the projects that are in the middle of the road. The projects

where you get (NOK) 500 000 to 750 000 from HSØ, and those funds constitute an important contribution to solve a relatively complex challenge” (Storvik, 2017).

Storvik goes on to explain that projects which require significantly less funds than NOK 500 000 are better off finding those funds in the health trusts’ own operational budgets, and those which require significantly more funds should find funds through other avenues, such as the Research Council of Norway.

4.2.3.2 Strategy

Following and in conjunction with the goals laid out in the plan for strategic development, a strategy is laid out. The strategy is laid out over several different sections, according to what goals they are meant to fulfill.

The first few sections deal with the treatment of patients. The last section deals with what is perhaps most interesting for this thesis: the strategy as it pertains to research and innovation. The strategy is outlined in bullet points, divided into one section for research and one for innovation.

First, HSØ presents a six-part strategy for their research. First is the attainment of a good balance between clinically relevant basic research and applied research. This will enable HSØ to develop ideas in basic research and apply this research in practice in the treatment of patients.

Second, HSØ will promote interdisciplinary research by developing research competence. The report says that measures will be put into place to improve existing competence, however it does not elaborate as to what these measures might be. The interview with Øystein Krüger sheds some light on this issue. According to Krüger, there has been a long discussion regarding strengthening research in professions where the research tradition is currently weak, but which may have a large presence in healthcare (Krüger, 2017). He points to professions traditionally associated with *høyskoler* (university colleges) as opposed to universities, for instance nurses and technicians such as radiographers.

“They (the above mentioned group) are in volume and in significance very important in specialist health care, but they have not developed a professional research activity compared to other professions” (Krüger, 2017).

This improvement of research competence is to be carried out through several means. Among them are traditional means such as conferences and network-building for those employees in question, as well as an emphasis on, when relevant, documenting how interdisciplinarity is maintained when applying for research funds. Krüger also goes on to explain how employees of HSØ that have backgrounds in natural sciences, but no background in medical science, cooperate with those that do. This, he says, is another form of interdisciplinary research (Krüger, 2017).

Third, HSØ will increase the use of resources for research and innovation, reaching five percent of the regional health budget. For reference, as of 2014, HSØ spent about 2.1 billion NOK on research and innovation, out of a budget of about 64 billion NOK (ÅRSRAPPORT 2015,). This is slightly more than three percent (3.2%). This number increased to closer to four (3.8%) as of 2015. The effect of increased use of resources is to be documented.

Fourth, HSØ will develop measures for mutual professional strengthening, efficient use of resources, increased international competitiveness and improve the possibilities for external financing.

Fifth, HSØ will strengthen research communities that are especially equipped for contributing to health research and collaborative research.

Finally, regional research funds will for the most part be subject to calls for proposals where the competition hinges on the quality and the feasibility of projects and measures (Plan for strategisk utvikling & 2013 – 2020,).

Next, the strategy for innovation is outlined in three parts. First, HSØ will stimulate a culture of development of ideas and innovation. HSØ will actively facilitate research being turned into concrete innovations for the improvement of the treatment of patients and the operation the health authorities.

Second, the report stresses that innovation must in large part be anchored in research. However, HSØ will also work to facilitate user-driven innovation, with an emphasis or preference for service innovation. Cooperation with the business world in addition to regional innovation funds will still be an important tool to exploit good ideas internally in the health authorities. A system for exploiting ideas in the intersection between innovation and improvement will be established.

Third, innovation will be coordinated with the other regional health authorities and other national actors in the field of innovation. Coordination and cooperation with universities and colleges will further aid in innovation. The commitment to innovation is to be judged in a Nordic and a European context.

(Plan for strategisk utvikling & 2013 – 2020,)

When asked what is meant by exploiting ideas in the intersection between innovation and improvement means, Storvik had the following to say: “That statement is not valid today in my opinion. I do not differentiate between innovation and improvement. I mean that an improvement can very well be an innovation. I would like to call my section “Section for Innovation and Improvement””(Storvik, 2017). Storvik later clarified that the last statement was made in jest, but nevertheless it does illustrate his point of view.

When asked why there are discrepancies between what the strategic plan says and what Storvik says, Storvik explains that the plan was written before his time at HSØ. As to why the definition of innovation used by the plan differs from what Storvik himself considers correct, he offers the following: “.... remember that the plan is called “Plan for Strategic Development 2013-2020” and that means that the plan was likely approved in 2013, and that the development of the plan happened in 2011/2012, and at that time the field of innovation was underdeveloped in HSØ, so I would imagine they just picked a definition from various sources” (Storvik, 2017). In Storvik’s opinion, then, it is apparent that the importance of, and the competence in the field of innovation has expanded since the plan was written and approved.

As to what is meant by judging the commitment to innovation in a Nordic and a European context, Storvik refers to the draft of the new innovation strategy. The new strategic plan for innovation says in part that “The Nordic countries have many similar challenges in the health sector, but choose in part different solutions. Thus, Helse Sør-Øst will emphasize cooperation with the specialized health services in the other Nordic countries in terms of exchange of experience and cooperation in innovation”

When compared to the section on RH’s innovation strategies further down, it is immediately apparent that HSØ places less emphasis on commercialization. Storvik, however, disagrees with this to an extent and emphasizes Inven2 as an important actor in commercializing innovation. Inven2 is a technology transfer office jointly owned by the University of Oslo and Oslo University Hospital. Storvik says that

“Inven2 was originally directed at commercialization of research based innovation with commercial potential. Now, Inven2 also handles user driven innovation with commercial innovation. Inven2 is probably the most successful TTO in the Nordic countries with regards to patenting, licensing and other commercial output.” (Storvik, 2017)

So, while the official strategy documents may not emphasize commercialization, that does not mean that HSØ as a whole disregards commercialization.

Under the second point of the innovation strategy, it is stated that there is to be cooperation with the business world. Furthermore, the same report states that in order to strengthen regional innovation, it requires development of ideas based in both science and clinical practices, new and improved treatment and service options and *potentially* commercialization (Plan for strategisk utvikling & 2013 – 2020,). The wording here further corroborates the idea that commercialization is not a very strong priority for HSØ. This, coupled with the contents of the rest of the strategy suggests that HSØ’s focus is primarily on the areas of service innovation and user innovation.

As to what means NHT uses to improve health tech innovation, Lauritzen described their role as something of a facilitator for innovation. A large part of what they do is to arrange meetings between different actors, with Lauritzen estimating that the cluster arranges upwards of 60 meetings and other events in a year. The subject and scope of these meetings and events vary and include everything from small meetings with 10-15 people in attendance, exemplified by Lauritzen by a meeting discussing EEA funded innovation grants in the Balkans, to large discussions with 150 people in attendance, for instance discussions about national acquisition strategies (Lauritzen, 2018).

The cluster also works to remove the barriers for innovation by identifying them and seeking financing through grants to remove these barriers. Among the greatest barriers, says Lauritzen, is acquisition processes and test facilities. Both are areas that Lauritzen himself works to improve.

Lauritzen also talked about ways in which to improve the cooperation between public and private actors health tech innovation. To improve this, Lauritzen said that there needs to be strategic thinking from the public sector to create more dynamic public-private cooperation. In his opinion, giving the public health sector a stronger mandate towards business development will improve the whole health sector. Long-term, developing a strong health tech industry will also have the effect of improving patient care, he said. According to Lauritzen, Norway has a lot of potential for building a significant health tech industry. One of the assets he spoke of is the the trust the public has in its health services:

"The public has trust in the health services. And we trust them with our personal information. A lot of the current development is in utilizing digital solutions, artificial intelligence and those sorts of things. Take diagnostics as an example. If you can start to build large models, you may be able to analyze data to find the diagnosis, and not just look at pictures. If you want to make those kinds of models, you are totally dependent on quantities of data, trust in the systems. And we have that in Norway. So that's an advantage" (Lauritzen, 2018).

Lauritzen points out that this mandate for business development can not just be a one-way street, that in order for business development to be successful, the private sector needs to realize that they need to work closely with the health service providers.

4.2.3.3 Tactics

It is tougher to go into detail on the micro-level, as the tactics used to execute the strategy is often not handled at the top level, or specified in the strategy documents. Thus, finding specific problems and their solutions is a tough task.

Bent-Håkon Lauritzen does provide one example of a specific problem with a specific solution:

“[...] We have seen that many companies working in product development just contacts some medical professional in a hospital and asks him he can take a look at the product and give feedback. In those cases it can be a bit random whether or not you reach the right professional environment. [...] And we have seen examples of companies with long development cycles because they haven't had a professional enough partner within the hospital, so what we are doing is to improve the whole structure of testing a new medical aid” (Lauritzen, 2018)

One effort that Lauritzen talks about in order to improve the test facility situation is a network called Nordic Proof, a network that is administered by NHT. Its members include the largest hospitals in the Nordic countries, including OUS in Oslo, Karolinska in Stockholm, Rigshospitalet in Copenhagen and HUS in Helsinki. The purpose of this network is to create a “one-point stop” for Nordic companies looking for facilities to test their products and solutions. This is done by facilitating cooperation between the innovation units at these hospitals and building infrastructure for testing. (Lauritzen, 2018).

4.2.3 Results

As it turns out, the results are the most difficult point to describe in both cases. In both the Norwegian and the Danish case, the timeframe of the strategy plans made it so that few, if any, results are readily available, at least in the form of official documentation. However, I did ask the Storvik to comment on what, if any, results were available. He had some answers during the interview, and some were clarified in later email correspondence.

4.2.4.1 Effects

Storvik's answers are in relatively general terms, and it is difficult to say whether any results achieved come as a direct result of the previous innovation strategy. Nevertheless, they are worth mentioning here.

Firstly, there is a marked increase in innovation activity within the health trusts. There has been an increase in applications for regional innovation funds, with all health trusts participating, ever since HSØ started awarding innovation funds in 2010 (Region Hovedstaden, 2017)

Secondly, there is a great diversity and breadth of innovation, ranging from cancer vaccines to technical aids (Storvik, 2017) Storvik also emphasizes the involvement of support personnel in addition to medical personnel in finding solutions to problems, something that both the 2013 strategy plan and Øystein Krüger emphasized.

Thirdly, Storvik describes an innovation network that has been established. This innovation network functions as a forum for all the heads of innovation in the health trusts, as well as participation from external partners like the Research Council of Norway, Innovation Norway and Inven2. It should however be noted that in the interview, Storvik mentioned that only three of the health trusts under HSØ actually have dedicated heads of innovation: Østfold Hospital Trust, Sunnås Hospital and Oslo University Hospital. In the other health trusts, those responsibilities are typically handed by some sort of innovation advisor working for the research units.

Storvik notes that not having a head of innovation could hamper service innovation, as that type of innovation may be neglected by conventional research units (Storvik, 2017).

Finally, there is a web-based innovation tool that has been introduced by HSØ. This tool shares information between the health trusts about what projects are underway in each of the trusts. This will, according to Storvik, lead to increased cooperation and prevent health trusts undertake similar projects concurrently and independently of one another (Storvik, 2017).

4.2.4.2 Results

Storvik had the following to say about what results have been gathered:

“This is something of a tender spot. We do [collect results] on several levels, but maybe not well enough ... All projects that receive funding from us are supposed to deliver a report at the end of the project ... We did a stunt about a year or year and a half ago where we contacted every project that had received funding over last few years and asked them for a report of what had come of the project and what the value of the project is. But it ends up being a sort of self evaluation. No one wants to report that their project was a failure. No one says “Thanks for the funding, but we haven’t accomplished anything”. So it’s very subjective and everyone embellishes their report and says it’s gone well” (Storvik, 2017).

Storvik concludes that they lack any good way of evaluating individual projects. He says that the problem is linked to a lack of resources, and that if he could, he would hire someone to do follow-up and guidance for the projects funded by HSØ.

“Projects often deviate from their original ambitions, and there could be very natural reasons for that, and not necessarily with anyone to blame. But in those cases I would love to have someone who could intervene in these projects, help them along, restructure the project and so on” (Storvik, 2017).

This person would be very valuable to the team, as there currently are only two employees in HSØ Innovation, Storvik and one other employee. With such limited

resources, it is challenging to do comprehensive follow-up work on projects, according to Storvik.

4.2.4.3 Societal gains

As to what societal gains have been made as a result of the innovation strategy is a tougher question to answer, as the end of the timeframe for the strategic plan is still two years away at the time of this writing. However, in correspondence with Storvik, he did inform me of the current status of innovation in HSØ today. According to his email, in the last few years, the innovation activity in the health trusts has been significantly strengthened, and there has been a steady increase in applications for regional innovation funds, with all health trusts in the region participating.

He also pointed to a report written in 2017 that highlights a few of the projects financed by HSØ RHF, underlining the breadth of innovation activities in the health trusts. Among the projects mentioned in the report is research into immunotherapy to fight cancer, a cheap and easy way to detect methanol in blood, a syringe that detects whether it has been correctly inserted, a cloud-based web solution for patients to book appointments and many more (R. Helse Sør-Øst, 2017). Once again, it is too soon to actually be able to say whether these projects will lead to any large-scale societal gains, but they do exemplify the breadth of innovation activities undertaken by HSØ RF. Time will tell if any of these projects will have large impacts.

4.3 Innovation in Copenhagen

Region Hovedstaden have published two papers titled “Copenhagen - hele Danmarks hovedstad” (“Copenhagen - capital of all of Denmark”) and “Regionale løsninger på regionale udfordringer” (“Regional solutions to regional challenges”). The former is subtitled “Regional growth and development strategy” and the latter is subtitled as the former’s action plan. These two documents are very valuable

sources for this thesis, as they provide great insight into RH's goals and the means they plan to use to achieve those goals. Consequently, these two documents will provide much of the basis for the next few sections. While the goals set in "Copenhagen - hele Danmarks hovedstad" are lofty and long-term, the action plan is geared towards the years 2015-2016, which is very fitting, as this thesis is published in 2017.

4.3.1 Goals

4.3.2.1 Societal goals

It seems that the overarching goal of Region Hovedstaden is to create a biomedical Silicon Valley of sorts. In strategy papers written by Region Hovedstaden, RH has formulated a regional growth and development strategy. These papers, "Copenhagen - hele Danmarks hovedstad" (Copenhagen - all of Denmark's capital) and "Regionale løsninger på regionale udfordringer" (Regional solutions to regional challenges), include their goals for how they want to grow Copenhagen into a regional healthcare innovation center for Northern Europe. Through what they call lighthouse projects, they aim to sharply increase the amount of research, testing, patents and innovation in the health technology sector in Greater Copenhagen by 2025. The strategy as a whole seems to be aimed at forming a large hub for medical research in Greater Copenhagen that can attract scientists from all over the world, and place Copenhagen on the map as an international leader in healthcare innovation. It is, however, noted that the competition in this field is tough.

An interview with two employees of RH reveals a slightly different view on the overall goals of RH. With respect to innovation in the health sector, Danielsen says that: "...we do not have a concrete vision for innovation, but... we aim for better treatment of patients, more motivated employees, better economy and growth. And I would say it is in that order" (Danielsen & Jørgensen, 2017). While the two strategy documents focus a lot on growth, specifically how Greater Copenhagen can develop into a bigger actor in the field of health innovation and medical research, Danielsen presents a more patient-centric view. This seems to harmonize more with what

HSØ projects as their goals. However, Jørgensen does emphasize the importance of growth: “Because we work at the Center for Regional Development, our task will always be to have a growth perspective, and even if the primary focus is on treatment, there will almost always be growth perspective present in one way or another” (Danielsen & Jørgensen, 2017). This is perhaps not unexpected. As healthcare in Denmark is, like in Norway, a public good, having a patient-focused overarching goals makes sense. Yet, as Region Hovedstaden is not limited to provide a single service, but also to function as a regional authority, much like Norway’s counties, it is also understandable that a focus on regional development is present.

4.3.2.2 Result-oriented goals

The strategy documents say little if anything about any result-oriented goals. However, Danielsen and Jørgensen could shed some light on this issue. Firstly, they say, that one great focus of RH is home treatment. According to Danielsen: “You could say that, and I should be careful about what I say, but you could say that the ambition is hospitals without patients” (Danielsen & Jørgensen, 2017). Jørgensen and Danielsen agree that the prevailing trend is towards fewer and shorter hospital stays. As an example, they mention maternity wards: “Just look at births, I mean, you just go in, you give birth, and then you go home” (Danielsen & Jørgensen, 2017).

4.3.2.3 Effect-oriented goals

As an extension of the vision of a hospital without patients, Danielsen and Jørgensen mention concrete examples of what kind of innovation they are interested in. Among them are what they call a *chemo pump*. Essentially, it is a mobile chemotherapy unit that can be carried in a backpack. Danielsen explains why this is something they are excited about: “That chemo pump has clearly given cancer patients an increase in quality of life. They can be at home, while receiving treatment that used to be very intrusive” (Danielsen & Jørgensen, 2017). But

Danielsen also explains that while such a device can bring about great positive change for patients, it is also beneficial for the government's bottom line. Having patients be able to treat themselves can be a large help in freeing up funds for the hospitals. "By having one oncology department use the chemo pump, that department saves 6 hospital beds a year. How much money is that?" (Danielsen & Jørgensen, 2017). Danielsen and Jørgensen both agree that while innovation should benefit patients, it is also beneficial or even desirable that those innovations can be able to pay for themselves.

4.3.2 Means

4.3.3.1 Policy

In "Copenhagen - hele Danmarks hovedstad" two "rammevilkår", which can aptly be translated to "framework conditions", are outlined. These framework conditions fit nicely into our models as policy.

Those framework conditions are: 1) effective and sustainable mobility and 2) (developing a) competent workforce and internationalization (Region Hovedstaden, 2015b).

The first framework condition is centered on creating a strong and well-developed infrastructure as well as an efficient system of public transport. Region Hovedstaden sees ease of access to the region, both for people and for goods, as a key to growth. However, this focus on infrastructure must coincide with a focus on the environment. The paper points to the fact that transportation is responsible for a large part of the CO₂ emissions in the capital region and that the region is supposed to be "fossil free" by 2050 (Copenhagen et al.,). Each year, approximately 1500 people in the capital region develop serious illnesses as a result of pollution, and half of all dwellings afflicted by noise pollution is located there. Thus, a key part of the policy is developing eco-friendly ways to accomplish the development of infrastructure, including a focus on public transportation, as well as bicycle and pedestrian paths. Denmark is geographically well suited for bike paths, and there already exists a strong bicycle culture in Copenhagen

(Copenhagen: Bike city for more than a century.). The capital region contains the largest airport in Denmark, Kastrup, with direct flights to many major cities around the world. Thus, maintaining and even increasing the amount of routes served by the airport is key to improving the ease of transportation to and from the region.

The first framework condition is summarized in two main goals. The first is a goal of growth: “The congestion will be reduced and the international accessibility will be increased in order to ensure that businesses will have strengthened access to markets and labor force and an increased productivity.”(Copenhagen et al.,)

The second goal is about quality of life: “Citizens should be able to commute between their homes and places of work and education across the region without wasted time in a fashion that contributes to a healthy, attractive and climate-friendly capital region.” (Copenhagen et al.,)

The second framework condition deals with a competent workforce and internationalization. The paper states that all people, regardless of background or age should have access to relevant and attractive education possibilities which can help them gain skills that the labor market demands. The paper claims that, in all likelihood, the capital region will have a shortage of educated workers in the near future as in the run-up to the financial crisis. (While the paper does not specify it, it is reasonable to assume it refers to the global financial crisis of 2008.) The paper states that as a shortage of competent workforce is a barrier for attracting investments and creating new jobs, small and medium sized companies will have a larger need for internationalization and guest workers.

To combat these challenges, the paper states that not only is there a need for more people to get relevant training and education, but also to improve the quality of existing education programs. Not only will the improvement of education levels stimulate job creation, the accompanying growth will also improve the public health and quality of life, especially for those with lower levels of education. The paper does make it clear that the focus will be on skills that are demanded by the job market, with the focus being on getting more people in private sector jobs and enabling entrepreneurs to establish new companies.

In addition to creating more homegrown skills, it is also vital to attract talented workers from abroad. Those skills that can't be found at home need to be found elsewhere in the world, and thus, it is necessary to make Greater Copenhagen an attractive place to work or study. The paper suggests this can be accomplished through cooperation with businesses as well as creating a support program for businesses and their workforce.

The second framework conditions is also summarized in two points, once again with one goal for growth and one for quality of life. The first goal is that "The business community has access to competent Danish and international workforce and that the access to a competent workforce and internationalization makes it attractive to establish businesses and invest in the capital region."

The second goal is that "More young people will complete an education that gives commercially relevant skills as to improve their chances at getting a solid footing in the labor market, and that Greater Copenhagen will be an attractive place to live for the employees of international companies." (Copenhagen et al,)

These goals underline the need for a competent workforce, composed of both foreign and domestic workers, in order for the region to thrive and grow.

Aside from these policies of how to enable growth in the region, Danielsen and Jørgensen also adds a view on what is defined as good innovation in the context of RH, and the terms they use are strikingly similar to what Kjetil Storvik of HSØ use: *Nyt, nyttigt, nyttiggjort* (Danielsen & Jørgensen, 2017). As a matter of fact, HSØ uses the same terms, essentially verbatim, on their website on innovation - *ny, nyttig og nyttiggjort* (Helse Sør-Øst, 2018). This term is found in the new innovation policy developed by RH, called "Region Hovedstadens Innovationspolitik 2020 - Nyt, nyttigt, nyttiggjort (Region Hovedstadens Innovationspolitik 2020 Nyt, nyttigt, & nyttiggjort,). The policy adds that this definition of innovation is a translated version of the English language definition "new + value adding + implemented", but makes no mention of where this definition was found other than the language of origin.

4.3.3.2 Strategy

These framework conditions described above are expanded upon and developed into more specific strategic means in the next section of the paper. The paper describes four sections they call growth subjects (væksttema). One of these four growth subjects is what they call “sund vækst”, a pun referring to both healthy growth and growth in health.

There are multiple challenges for “healthy growth” outlined in the paper. Although the paper states that Greater Copenhagen is good at medical and clinical research, other cities and countries are doing a strong push in those fields. This, combined with the fact that Greater Copenhagen is a relatively small region far away from big growth markets, can hamper the region in the fight for attracting investors, scientists, talent and research projects to the area. Furthermore, OECD has, in their analysis from 2009, suggested that the region struggles with commercializing research (Copenhagen et al.,).

Both strategy papers describe ways to overcome those challenges. The first paper says that the presence of large scientific communities is vital to make a metropolitan region competitive. As such, one of the goals of Greater Copenhagen is to attract leading scientists, firms and at least three top universities (examples mentioned are Harvard, Stanford and MIT) and preferably also a scientific institution from China to establish themselves and invest in the region by 2025 (Copenhagen et al.,). The cooperation between Copenhagen and the above mentioned institutions will involve, among other things, establishing new university degrees within medical sciences, public-private innovation in health technology, developing the region as a natural center for scientific health start-ups.(Copenhagen et al.,).

The 2025 goal, as formulated in the paper, is somewhat vague. However, the paper goes on to describe more short term and detailed goals, specifically referring to plans for investments in the years 2015-2017. Highlights include making hospitals available for use by firms to test out new models and services, further developing the Copenhagen Healthtech cluster (CHC) to promote growth, implementation, large scale public-private partnership projects, and attraction of international

investments. Furthermore, RH wants to establish Greater Copenhagen centrally in the EU consortium EIT Health and establish a new intersectoral research center for health technology. This is to be done in cooperation with Copenhagen University, Technical University of Denmark and the Copenhagen Municipality. Further, RH aims to develop and implement streamlining IT solutions that can shift time spent away from documentation and registration, allowing for more time to be spent on clinical research instead.

The paper goes on to describe how RH wants to establish and coordinate an inter-regional project with participating universities to promote business cooperation, education of new scientists and tear down barriers to increase cooperation across the Øresund strait with Region Skåne in Sweden. Finally, RH aims to improve infrastructure and transport by investigating the potential for investments in bike lanes, reduced air and noise pollution and education. The other strategy paper, Regional solutions, outlines similar strategies.

The first is called the Copenhagen Science Region. The project's aims include developing Copenhagen into an international hub for scientific communities, specifically focusing on green, healthy and smart growth. (Region Hovedstaden, 2015b). It is a joint project with several municipalities in the Capital Region participating, along with several science and education institutions, research parks, businesses, public institutions and others.

The project contains three initiatives. The first initiative is the joint goal-oriented branding of Copenhagen Science Region and the results from Copenhagen Science city to achieve as much effect as possible, both internationally and domestically.

The second initiative is the identification of challenges, opportunities and needs for physical development of science cities and other strong scientific communities in the region. This will involve establishment of infrastructure that supports the meeting and cooperation of scientists, students and business people.

Lastly, RH aims for development of joint strategic commitments and cooperative efforts within research, innovation, education and entrepreneurship within healthy, green or smart growth (Region Hovedstaden, 2015b).

The project is further built upon other keystones. One of them is research in health technology. This is to be conducted through a center for interdisciplinary research. In addition, RH wants to attract international human and financial capital and develop research clusters in the Greater Copenhagen.

The paper lists some expected results from these initiatives. These are:

- Five percent increase in yearly issued patents by 2025.
- 40 new top researchers internationally recruited by 2025.
- Research positions for PhD graduates increased by five percent by 2025.
- Three percent increase in external research funds yearly up until 2025.

(Region Hovedstaden, 2015b)

The second project outlined is concerned with the Copenhagen Healthtech Cluster (CHC). The project's aims are to make Greater Copenhagen into an international hub for development of health and welfare solutions by 2025 (Region Hovedstaden, 2015b). CHC gathers healthcare professionals and researchers that can offer businesses the best conditions to develop, test and commercialize health and welfare solutions that can improve quality of life for citizens and create jobs and growth in Greater Copenhagen (Region Hovedstaden, 2015b).

This project, as with the one above is built upon some key initiatives. Among these are identifying and deploying opportunities for healthy growth by developing, implementing and expanding new solutions that can assist hospitals and municipal social and senior care. Specifically, the aims are to reduce malpractice, reduce and prevent hospitalization, ensure speedy return home for patients and take advantage of citizens' own resources.

Next, RH wants to facilitate cooperation between hospitals, social and senior care, and businesses, by having a systematic dialogue between firms, hospitals and municipalities concerning concrete possibilities for healthy growth. Next, supporting the establishment of specialized testing environments and further develop existing development and testing labs. RH will also develop a citizen centered data platform for healthy growth (Region Hovedstaden, 2015b).

As before, RH lists some expected results from these initiatives:

- In the timeframe 2016-2018, the CHC will initiate between 9-12 concrete opportunities for healthy growth. Those opportunities will contribute to the following goals:
 - A 10 percent increase in employment in the field of healthy growth by 2025.
 - A 50 percent increase in the amount of public-private cooperative tests of solutions in health and welfare technology by 2025.

(Region Hovedstaden, 2015b)

4.3.3.3 Tactics

As stated above, in the tactics section for HSØ, it is tougher to go into detail on the micro-level, as the tactics used to execute the strategy is often not handled at the top level, or specified in the strategy documents.

When asked about any such tactics, one measure that Danielsen and Jørgensen talk about is something they started in 2017, an idea contest that Jørgensen is in charge of. This contest is based on an earlier contest held in 2014. While the contest in 2014 was held only for employees at Rigshospitalet, in 2017 every hospital and unit in Region Hovedstaden was invited to send in ideas for innovations to RH. RH would then review them, return them back to the hospitals and ask them to narrow the list down to three ideas based on a list of criteria. Those criteria relate to the central theme of innovation earlier mentioned by Danielsen and Jørgensen: *nytt, nyttig, nyttiggjort*.

While not in any way an exhaustive list of tactics available to RH, this idea contest works as an example of what can be done to execute the above stated strategy.

4.3.3 Results

As stated earlier, results are tough to evaluate due to the timeframe of this thesis. However, as before, an attempt will be made to address the results based on the information given by the interviewees.

However, what Danielsen and Jørgensen could tell me, is that generally, reporting is moving in a leaner direction. Whereas before, reports were often thick and cumbersome, reporting is now done in a more summarized fashion. According to Danielsen:

“It’s like “has the money been spent and has the money been spent according to its purpose?” in one evaluation and then you have another evaluation that deals more with the contents of the project, and that can sometimes be summarized in a Powerpoint” (Danielsen & Jørgensen, 2017).

According to Jørgensen, this is done because thicker reports just aren’t read. Summarizing and presenting the results in a more summarized fashion increases the likelihood that the report will actually be read (Danielsen & Jørgensen, 2017).

4.3.4.1 Effects

In follow-up correspondence with Danielsen regarding any concrete effects from their innovation projects outlined in their strategy, she had the following to say:

“REVUS implements a strategic direction in relation to healthy, green, smart, and creative growth. Therefore, we do not measure REVUS as such in Region

Hovedstaden. For all regiones, the effects are measured in terms of employment numbers and growth, but you have to work long-term in terms of effects, so you measure three years after an enterprise has ended their participation in a project. Therefore, there are as of yet no numbers, and there likely won't be any for our region alone" (Danielsen, 2018)

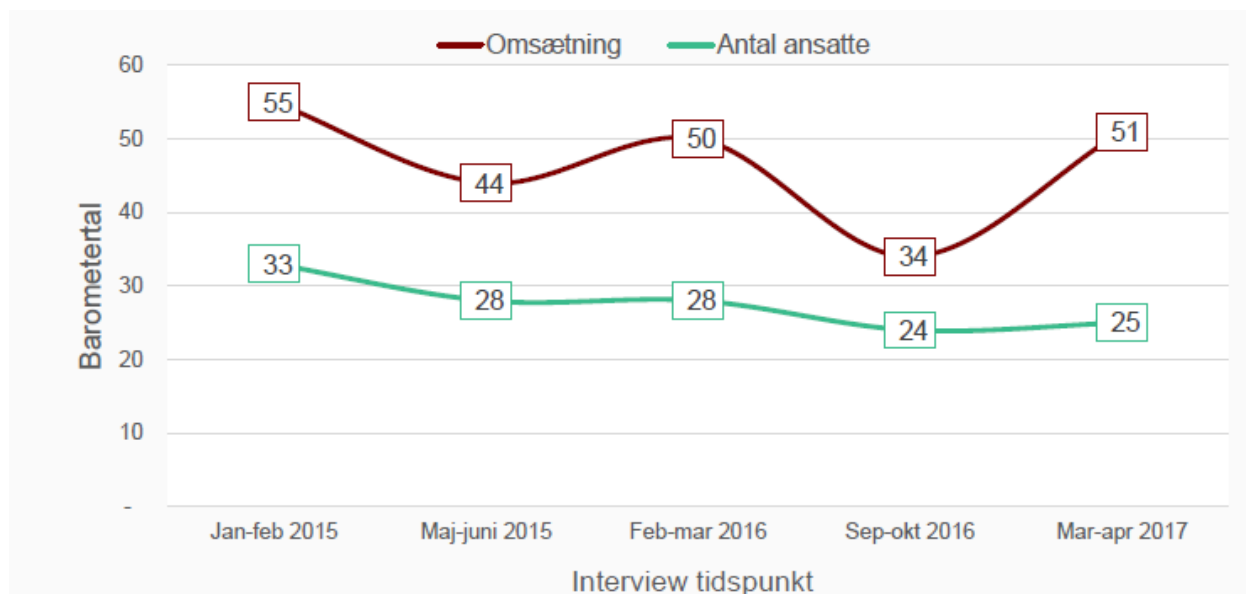
As such, it is difficult to point to any specific effects, at least in terms of any quantitative data as of yet.

4.3.4.2 Results

One piece of data Danielsen did point to, was something called the "Vækstbarometer" ("Growth barometer"). This barometer is a semi-annual survey conducted by Region Hovedstaden, with over 800 businesses in the region as respondents. The barometer asks the businesses about their expectations for future growth (Region Hovedstaden, 2017).

Danielsen did warn against equating the growth expectations to results of RH's innovation efforts, but the barometer can, at least, provide some insight into the outlook of businesses in the region.

The latest survey available was from spring/summer 2017. The survey uses an index where the share of respondents with negative expectations is subtracted from those with positive expectation, giving a range of -100 to 100 points. Thus, -100 means that all respondents had negative expectations, 0 means an even split and 100 means all respondents had positive expectations (Region Hovedstaden,). The expectation for increased revenue scored 51 points, while the expectation for increased number of employees scored 25 points. Both of these numbers are increases from the previous survey held in the fall of 2016, with revenue expectations increasing 17 points from the previous score of 34 and employment expectation having a much more moderate increase of 1 point from the previous 25. However, when compared to the numbers for the spring of 2016, revenue expectations are only up by 1 point, while employment expectations are down by 3 points. This can be seen in the figure taken from the spring 2017 survey below.



(Region Hovedstaden,)

As can be seen from the figure, although numbers are slightly higher than from the previous survey, a downward trend is visible in terms of employment expectations over the past two years. The revenue expectations have fluctuated more, but are still lower than in the first survey held in early 2015. However, as long as these numbers remain positive, these businesses are on average positive to the future.

Further below in this survey, the numbers are broken down by sector, in four broad categories, one of which is the health sector. The numbers for this sector are 51 points for revenue expectations and 26 employment expectations, almost identical to the survey as a whole. The change from the spring of 2016 is 1 point up in revenue expectations and no change in employment expectations.

As such, there is little change in expectations among businesses over the past few years. But, as Danielsen noted, these numbers reflect the expectations of growth, and does not necessarily reflect upon the innovation efforts made by RH.

4.3.4.3 Societal gains

As for societal gains, Danielsen pointed to results of the idea competition started in 2014 at Rigshospitalet. That competition had by 2017 grown to include four hospitals, two businesses as well as one administrative center, with 86 ideas in the competition. In 2018, the goal is to reach 100 ideas. The reason she pointed to the competition was the fact that the winner of the 2014 project, a solution for chemotherapy that can be used at home, or even at work or school, has already started to show some important benefits that may in the long term benefit the society as a whole. Those benefits include hospital beds being freed up, as well as a specific example of a high school student with leukemia who was able to go to school while receiving chemotherapy, a process which previously required the student to miss class for extended periods of time (Danielsen, 2018).

5 Comparison, conclusion and further research

On the basis of the empirical data above, this section will compare the two regions and draw some conclusions on the basis of the research questions. As in the analysis section, I will compare the two cases on all three parts: goals, means and results. After that I will write some concluding remarks on the two cases as a whole. Lastly, I will make some comments on the potential for future research in this area.

5.1 Comparison

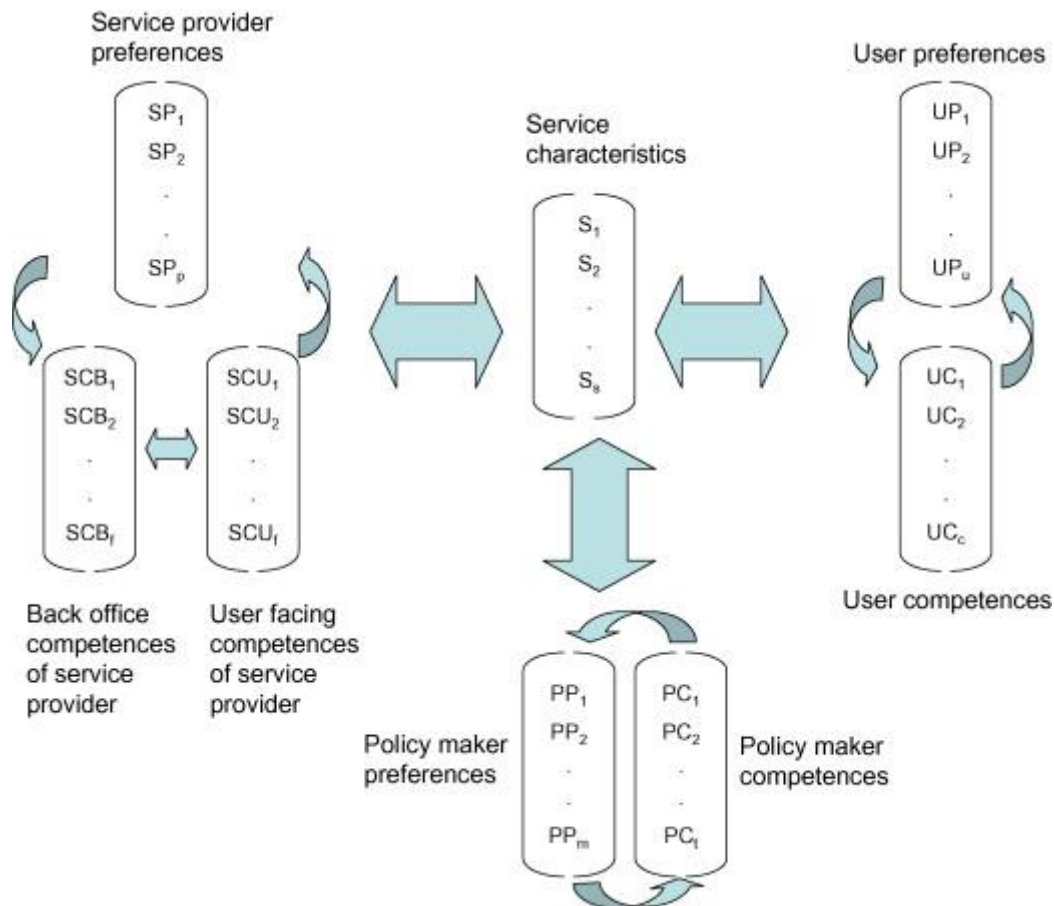
5.1.1 Goals

It is readily apparent that Helse Sør-Øst and Region Hovedstaden, at least as their goals are presented in their strategy documents, have quite different goals for their respective organizations. While HSØ has a very patient-centric view, as stated right at the start of their strategic development document, RH is interested in developing the Copenhagen area to an international research center, hoping to attract investment and researchers from all over the world to the capital region. HSØ's goals are to improve the experience of their patients, and thus direct their innovation in the direction of process innovation and user innovation. RH, on the other hand, wishes to expand upon their already significant biotech industry, which can in much larger degree be commercialized and used to help the Danish economy. This is not as easily done in the case of HSØ, as processes are much harder to commercialize and often much harder to replicate. The differences in approach can in part be explained by the conditions under which the two organizations operate. Norway does not at present have a very large presence in the biotech industry, or in the medical industry as a whole. Norway's economy has been, and still is largely dependent on natural resources, while Denmark does already have a substantial biotech industry. It would therefore make sense for the Danes to invest further in their strengths.

However, interviewees in Norway have expressed optimistic views for the future of Norwegian health technology as a revenue generating industry. As Lauritzen points out, engineers from the petroleum industry are being recruited into the health sector, and can provide valuable expertise in the field. While Storvik does not believe that health can be anywhere near as important an industry as petroleum, he had the following to say when asked whether health can help fill the gap left by oil:

“Absolutely, absolutely. Just think about it, there are 70.000 employees in the corporate group, and think about all the education those 70.000 employees have. Doctors, nurses and other support staff. And the tradition has been that this group of employees develop solutions for internal conditions, so to speak. To solve problems internally in the HSØ corporate group. You have to expect that some of this will spill over outside our organization and contributes to ripples in society as a whole to a much larger degree than today”. (Storvik, 2017)

There is much discussion in Norwegian society today as to what we will do once the oil runs out. While it would be naïve to believe that health can replace the massive industry that petroleum represents for the Norwegian economy, there is reason to believe that health can at least contribute to filling the gap.



These goals can be expressed in terms of the framework by Windrum and García-Goñi. At least in the short term, it would make sense that a focus on patient treatment will yield improvement in user facing competences. A direct focus on improving patient care, such as shortening wait lines, shortening hospital stays, enabling at-home treatment and such is likely to have a more immediate impact on user facing competences. Economic growth as a goal, while certainly visible to the public in the long run, may take longer before the effects are visible to the man in the street. That being said, it is reasonable to assume that at least a portion of products developed will be consumer facing and not business facing, thus certainly qualifying as user facing competences.

Interesting to note is that the elements of health innovation most emphasized in Norwegian strategy documents seem to be mostly user facing competences. Improved efficiency in turnaround, getting patients out of the hospitals quicker, faster diagnostics, and self-treatment of patients are all user facing competences,

as can be argued are reductions in infections related to hospital stays. While individual patients may not notice a decreased risk of infection, the patients in aggregate may. The information gleaned from the interview with Storvik, however, presents ambitions for improved back office competences in addition to the aforementioned user facing competences, at least to a larger degree than do the strategy documents. This is in terms of ambitions for increased efficiency among staff, and so forth.

5.1.2 Means

One striking similarity in terms of innovation policy between Norway and Denmark is their near identical definition of innovation. While the official (and according to Storvik, badly outdated) Norwegian definition, as laid out in “Plan for strategisk utvikling 2013 - 2020” emphasizes the role of commercialization, Storvik disputes this importance and gives a definition almost identical to the official Danish definition: *nytt, nyttigt, nyttigjort* (new, value adding, implemented) in Danish and *nytt, nyttig og kan tas i bruk for å forbedre pasientbehandlingen* (new, value adding and can be implemented to improve the treatment of patients) in Norwegian. Granted, Storvik’s definition may be slightly more verbose, but the sentiment is the same.

Definitions aside, there are some interesting differences and similarities between the means HSØ and RH uses in their health innovation.

HSØ’s strategy document puts a lot of weight on how to strengthen existing research. It lists several ways in which to do so, such as finding a balance between basic and applied research, promotion of interdisciplinary research, increased use of resources for innovation and research, the development of measures for mutual professional strengthening, increased international competitiveness, improving the possibilities for external finance and strengthening research communities. As for means for how to improve innovation, the strategy document mentions stimulating a culture of ideas and innovation, having innovation anchored in research and

coordinating between regional health authorities and other national actors such as universities and colleges. Thus, the strategy document puts a lot of emphasis on improving the research and innovation efforts by HSØ.

RH's strategy document on the other hand, while talking about research and innovation, seems to use a different approach. While mentioning efforts to improve research and innovation, the whole document as a whole seems to take a much more growth-focused approach. The means mentioned in the strategy to improve innovation include such measures as improving mobility through improved infrastructure, with an emphasis on reduction of carbon emissions. Copenhagen, which already is a bicycle-heavy city, has according to the strategy a goal of being "fossil free" by 2050. Further, the strategy goes on to describe ways in which to improve workforce competence in the region. This includes both attracting skilled labor from abroad, and improving the education domestically. Further, the strategy outlines ways in which Copenhagen can develop into an international science hub, as well as facilitating cooperation between hospitals and businesses. Common for all the above mentioned initiatives is a consistent mention of growth as the stated envisioned result.

From looking at these strategy documents, it is apparent that both HSØ and RH wants to strengthen their innovation and research communities, but that RH has a heavier focus on growth.

5.1.3 Results

As stated above, the most difficult question to answer in this thesis is the question of results. As both cases are largely based on strategy documents covering a time period that it not yet over, it is very hard to give a concrete answer one way or the other as to the results of the innovation efforts of either region. Storvik was able to identify a few promising results from recent years, including a marked uptick in innovation activity, as well as the establishment of a new innovation network between the health trusts in the region.

Danielsen and Jørgensen had just about the same amount of information to share, but did refer to positive growth expectations among businesses in the region, as well as increasing participation in the idea competition.

5.2 Conclusion

Although at first glance the most interesting thing to point out might be the differences between HSØ and RH, the most striking result of the interview is perhaps the similar, near identical attitude towards and definition of innovation in the healthcare sector as given independently by employees of both organizations. The idea of innovation being something that is new, useful and with the ability to be implemented productively was offered by the interviewees from both HSØ and RH. This should, perhaps, not come as a surprise, as both organizations are government run health authorities with no mandate for profit.

This agreement between the interviewees on what constitutes innovation carries over into their attitudes on what the focus of their respective regions' innovation should be. Interviewees of both Helse Sør-Øst and Region Hovedstaden put a strong emphasis on improving patient treatment. This is again, not a big surprise given the mandate the health authorities have. At the same time, interviewees from both organizations also spoke of ambitions for economic growth opportunities in the health technology sector.

This is contrasted to a certain extent by the strategy documents which forms the bulk of the empirical data. While HSØ's strategy documents focuses heavily on improving patient healthcare, RH's strategy documents focuses heavily on growth aspects. This is not to say that HSØ's strategy ignores commercialization or that RH's strategy ignores patient healthcare, but the difference is noticeable when reading through the documents.

The reason for the apparent contradiction between the strategy documents can be hard to ascertain. However, a few assumptions can be made. As stated early in this

thesis, a degree of caution should be used when using public strategy documents written by government organizations. This is not to say that they should not be believed, but rather that the authors emphasize certain aspects of their strategy with the knowledge that the strategy documents will be available for public consumptions. Perhaps the Norwegian public is less open to accepting profit motives in healthcare. That is not to say that anyone quoted in this thesis has advocated a for-profit healthcare system, but perhaps the suggestion that the research and innovation in the health sector can be utilized for economic growth is less palatable to the average Norwegian. This can be tied into the earlier mentioned framework by Windrum and García-Goñi. If the difference in acceptance of health as an arena for economic growth between the Norwegian and Danish public is in fact real, then this can, due to the interactivity of the framework, affect the service provider preferences. However, whether the discrepancy between strategy documents and information given by interviewees can be explained by public opinion is little more than speculation, interesting as though it may be.

Another reason for this difference of approach can perhaps be found in the difference of mandates between the Helse Sør-Øst and Region Hovedstaden. While I have argued that the two organizations are largely similar in their areas of responsibility, there is a key difference. HSØ is a health authority, with the mandate of providing health care for the citizens in its region. Region Hovedstaden also has that mandate, but it is also a regional authority, analogous, but not identical to Norwegian counties. Therefore, RH has a mandate for economic growth in its region, a mandate which is not found in the same way in HSØ. As a side note on this issue, a reform is underway in Norway to reduce its 19 counties to 11 regions, to be completed by 2020. This name change from county to region is not accompanied by a change in area of responsibility. Unless any such change will be announced, it is unlikely that the mandate for HSØ will change.

The last reason for why the Danish strategy is more growth-focused than the Norwegian one has to deal with pre-existing conditions. At the time of this writing, commercial health technology is a much larger industry in Denmark than it is in Norway, with Denmark having a longer tradition for producing products in this

sector. Norway's main export has, for the past half century or so been petroleum, with large parts of the economy centered on oil extraction and its peripheral and supplying industries. While it is uncertain what the future holds for Norwegian petroleum industry, it seems like Norway must find other industries to replace it. In that regard, it should be interesting to see what the next long-term strategy documents released by Helse Sør-Øst has to say about commercialization in the health technology sector.

5.3 Further research

As stated above, the hardest question to answer has been what the results of these innovation strategies by Region Hovedstaden and Helse Sør-Øst have been. I have not been able to find much in terms of satisfying answers, so perhaps an interesting topic for further research would be to map out these results.

Another topic of further research could be whether discrepancies exist to any sort of large degree between stated goals in strategy papers and the goals in practice. While these discrepancies might be exaggerated by myself, a wider study comparing strategy documents with actual priorities by the actors responsible for executing the strategy could provide some interesting answers.

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