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Enhancing Primary Healthcare Innovation: Creation and Diffusion in Finland

SITRA

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Executive summary

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This report is composed by the request of Sitra to identify innovation models that can be implemented in the Finnish primary health care infrastructure. The Health, social services and regional government reform will rebuild the entire Finnish healthcare system, enabling competition in the industry. For primary health care service providers to succeed, they must innovate in order to gain competitive advantage and sustain their market position. Hence, our objective is to provide understanding of innovation process models to be utilized by Finnish private and public healthcare organizations. Primarily through literature review and interviews, we have aimed to answer the following three research questions:

1. What is the current situation of innovation processes in Finnish primary health care?
2. What drives innovation in health care?
3. How can innovation processes be applied in Finnish primary health care after the reform?

Each organization has a procedure as to how internalize innovations, however, the processes are faulty as they do not produce innovations in a manner that the executive group would hope for. There are barriers of innovation, which can be subcategorized into three following levels: knowledge- there is not enough knowledge regarding innovation and the mix/collaboration of personnel does not allow cross-boundary innovation; organization- organizations do not facilitate the optimal environment for both in-house and outside innovation; healthcare sector- the healthcare sector provides industrial related problems such as innovations typically have long ROIs. As well as innovation creating is an issue, so is the distribution of existing innovation to other organizations, creating a stain where the efficiency of innovation creation and distribution is low.

In order to overcome the mentioned barriers, it requires an optimal ecosystem for innovation culture to flourish within organizations. Complementary knowledge from various fields needs to be developed and diffused in order to come up with innovations in the first place. This however, requires that the socio-political infrastructure i.e. legislation, market and resources allow it. Organizations can then direct innovations by giving guidance and openly encouraging experimentations. As the optimal ecosystem for innovation is created, it acts as a driver for quality innovations in the wanted sector.

The upcoming reform in Finland should lead to an increased amount of innovation if it works out as planned. In a working healthcare infrastructure, patients will choose those service providers, which are able to produce the highest quality to price ratio. Service does not include only treatment of the patient, but also everything surrounding it, such as utilization of IT. In order to achieve the highest quality to price ratio, healthcare service providers are required to polish their innovation creation and diffusion processes.

Key words: Primary healthcare innovation, innovation creation, innovation diffusion

Language: English

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Introduction

Background

To whom are we doing the project

This report is made for SITRA, the Finnish innovation fund operating under the supervision of the Finnish parliament. SITRA aims to advance Finland's economic prosperity, and due to the pending structural changes in Finnish health care, organisations are interested in innovation models that could be used to improve the costly but not optimally organised industry.

Why is this research current

Finland has a Nordic social welfare model, that has a broad scope of social policies and benefits. These include free and subsidized health care, and hence a large proportion of GDP is spent on these policies and services. The system is based on decentralized responsibility of health services and public hospitals, and the fundamental idea behind the Finnish health care system are low cost levels and high levels of tax financing. Public financing originates from the central government and local municipalities, covering over 75% of total health expenditures. Despite being heavily tax funded, the Finnish health system includes private resources as well as public ones. Also, private healthcare, excluding occupational services, amounts to 6% of national healthcare expenditure. (Aslani et al. 2015, p.183)

Trends like the ageing population, shortage of local healthcare manpower, inefficient usage of resources and increasing expectations not to mention budget limitations threaten the health care systems in the Nordic countries. To solve these challenges, healthcare resources should be used more effectively. Therefore, policy makers have considered new innovative strategies such as prevention and incentives, technological development, diffusion of integrated IT

systems, privatization of the healthcare systems, and increasing public awareness through the media. Innovation is the driving force for value creation and improvements in health systems. However, health care innovation can be challenging, often resulting in failure due to the complexity of innovation in the healthcare sector. In order to enhance innovative activities within the Finnish health care system, large structural changes are being implemented. (Aslani et al. 2015, p.183)

On July 1st 2017 Finland will establish new regional governments which will take over a lot of the responsibilities that are currently assigned to the communes. The aim behind this "Health, social services and regional government reform" is to create efficiency into the public sectors traditionally inefficient and bureaucratic services. This would be achieved by giving the private sector the possibility to provide services for the regions, while also giving citizens the right to choose their service providers. The resulting competition between public and private service providers would drive costs down and improve quality, like it has in manufacturing and many other service sectors (Government Communications Department Ministry of Finance Ministry of Social Affairs and Health Ministry of the Interior, 2017).

On January 1st 2019, the Finnish social and health care services are going to become the responsibility of the regions, and it has been estimated that eventually the achieved savings could be as much as 3 billion euros annually (Hallituksen esitys sote- ja maakuntauudistuksesta 2.3.2017, s. 1-2.). As the annual overall price of primary health care was 3.8 billion in 2014, and the industry is well known to contain inefficiency, it is a promising target for creating savings (National Institute for health and welfare, 2014).

Objective

The objective of the report is to provide understanding regards to innovation process models, which can be benchmarked by private and public primary care providers in Finland to enhance and develop internal innovation and R&D process models. The report aims to answer the following three research questions:

1) What is the current situation of innovation processes in Finnish primary health care?
2) What drives innovation in health care?
3) How can innovation processes be applied in Finnish primary health care after the reform?

Research method

The research behind this report is based on prior literature and interviews conducted with different professionals with key insight to the subject. Part of our literary sources were acquired by asking the interviewees for recommendations, and the rest by utilising Google Scholar and Scopus. In our search for appropriate sources, we used the following searches for Google Scholar: "Primary health care open innovation", "Primary health care innovation" and "Healthcare innovation". The searches used for Scopus was "Primary health care" with additional clarifications of both "Research and development" and "innovation". Additional information was gathered from government statements, project documentations and articles.

Interviews

During the duration of the course, our team interviewed 7 people. Out the seven persons we interview 3 were senior physicians responsible of innovation and R&D from private Finnish healthcare organizations and 1 senior physician from a public Finnish health care organization. All of the mentioned senior physicians had experience in various non-profit foundations such as Tekes. The other three consisted of a senior medical officer at National institute for health and welfare who has worked within practical development education and development activities in public healthcare, a senior expert from Nordic Healthcare Group, and a master's thesis worker at Aalto who used Megaklinikka as a case study in her master's thesis.

During the interviews the primary objective was to understand on what is the current situation of innovation processes in Finnish primary health care. After the process was explained, we digged further on what are the underlying problems and what needs to be developed. Even though the amount of interviews was low, the answers did not contain any contraventions with each other. The interviews also complemented out literature review, however, we noticed that many of the points that were brought up in literature, did not necessarily apply to the Finnish healthcare ecosystem.

Terminology

According to the report of the International Conference on Primary Health Care (1978), ” **Primary Health Care** is essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system of which it is the nucleus and of the overall social and economic development of the community.”

The definition of **innovation** is that it is something novel, replicable and repeatable, and it produces value to the innovator and the user. More specifically, **management innovation** (distinct from technological innovation) which we focus on in this report looks at innovation from the perspective of ”how people come together, organize themselves, and cooperate to create value with the tools and technologies available to them.” (Sing & Lillrank 2015)

Service innovations are any new **services** that are a result of **innovation** processes which are valuable for customers. **Innovation process** is the sequence of actions by organisations to introduce new products or processes (innovations). **Innovation system** is a concept that contains the interactions between key attributes needed to create a process, product, or service, and stresses the importance of technology and information transfer between individuals and organisations. **Diffusion**, in this report, refers to the transfer of innovations and information and knowledge associated to them between organizations and individuals

What is the current situation of innovation processes in Finnish primary health care?

To gain better understanding of healthcare innovation processes in Finland, we interviewed professionals from healthcare and supporting industries. We also studied some of the most renown current Finnish innovation support cases and studied academic literature from this perspective as well. First though, we present an example that illustrates the problems that the Finnish healthcare innovation system still has related to the diffusion of innovations.

Case: Megaklinikka

Megaklinikka is a dentist company founded in 2010 (Megaklinikan toimintamalli). Their operations are done quite differently than in other dentists' offices. Instead of having their dentists occupy their own rooms where patients come and go, their dentists move between rooms with patients and nurses doing what only a verified dentist can do such as giving diagnostics and conducting surgeries. All this is administrated by their enterprise resource planning (ERP) system (Megaklinikan toimintamalli).

We gained our knowledge of Megaklinikka from a master's student using this ERP-system innovation as a case study for her master's thesis. Our interviewee told us that the ERP-system at Megaklinikka originates from an ERP-model used in an eye hospital in India. So the model is an example of reverse innovation. The system requires a certain number of doctors and a certain number of rooms for patients and nurses to work in a profitable way. With adequate masses the ERP-system used by Megaklinikka can bring significant savings (HEMA-institution, 2016).

According to HEMA-institution (2016) when using Megaklinikka's ERP-system, patients are given a one hour slot within which they are invited to the practice from reception. Then according to the overall situation at the hospital the system optimizes when doctors are needed where and when to invite another patient to practice. The idea is that doctors also tend

several patient issues at the same visit. Typically patients are assigned to further visits to the hospital to tend for different issues, however, with Megaklinikka's ERP-system all these issues can be tended for within the same visit.

This system brings savings because it reduces overhead from having to invite patients to the hospital over and over again. This way you don't need to make all the preparatory procedures again and again. On the other hand, the system optimizes the use of doctors at the practice. It's widely known that doctors are the single most expensive resource at most hospitals, thus optimizing the use of doctors and taking away tasks that can be done by someone else from doctors makes sense.

Even though Megaklinikka can be estimated to succeed because of their ERP-system innovation, they are not keen on keeping it completely for themselves, and the system has been integrated by two public hospital organizations in Finland (HEMA-institution, 2016). Furthermore, according to our interviewee Megaklinikka continues to sell its ERP system to others. At Jyväskylä public dentist's office, they could tend over twice as many patients within one person-year and almost twice as many procedures per one person-year. Meanwhile their patient satisfaction remained the same (4.5/5.0). This example proves that this system could be adopted by many healthcare actors in Finland.

Even though you could think that this kind of implementation ready innovation would spread through domestic healthcare fast, it hasn't. The ERP-system is still used only by two public actors in Finnish public healthcare (HEMA-institute, 2016). We can't help but wonder: why?

Challenges and barriers of innovation in Finnish health care organizations

This subchapter discusses the challenges and barriers of innovation that current Finnish healthcare system faces. The intensity of challenges varies between organizations, but more or less, all of the challenges and barriers mentioned in this chapter can be related to most health care service providers. The challenges can be divided into three sub-categories;

knowledge, organization, and overall health-care sector based. The issues mentioned in this chapter will be reflected from insights gathered from our interviews and literature search.

Knowledge barriers

Knowledge regarding innovation is scarce, due to the fact that a lot of innovation studies in health care is focused on single technologies, specific policies or actors just as patients, physicians and entrepreneurs. Wider socio-economics contexts of innovation processes and conditions for implementing, and developing innovations in health care, need to be understood better. Innovation processes are nonlinear, complex and require subtle and broader system transformations. (Larisch, Amer-Wåhlin & Hidefjäll, 2016.) There is not enough knowledge about the successful implementations of healthcare organisations´ innovation or determinants of the innovation in larger health care organisations, because the research has been focused on individual doctors so far. It has been assumed that the innovation in larger health care organisations differ from the innovation within individual health care professionals. (Fleuren et al., 2004.)

Staff shortcomings

Health care organizations are mainly constituted upon medical doctors, with medical degrees in their respective area of knowledge. This poses a seed-stage problem, where the range of innovations is constricted within a bubble and the possibility of creating cross-boundary innovations is reduced. This problem does not exclusively occur in the seed-stage of the innovation process, but according to our interviews, is a regular problem when evaluating and cultivating both in-house and outside innovations.

One interviewee mentioned that the organization has produced numerous innovations in-house of, which many had the potential to be productised. However, the ventures have constantly failed, as the organization lacks capable personnel that would have the motivation and knowledge, as to how make the product/service attractive and ready for the market. This has led the organization to primarily utilize innovation in-house and also exclusively develop innovations that could be seamlessly integrated into the organization's own business.

Collaboration between stakeholders

Certain issue that emerged both in literature and interviews was the lack of collaboration between stakeholders. Occasions for knowledge development and diffusion across health care sectors and between healthcare professionals, patients and relatives are limited, due to the organizational boundaries. Therefore, guiding efforts and resources within healthcare companies to critical needs and problems are extremely limited. As well as, sharing and developing knowledge.(Larisch et al., 2016.)

The lack of collaboration resulted in that innovations coming from outside organizations failed to understand the needs of the mother organization. One of the interviewees mentioned that starts-ups that came up with innovations usually focused on, how their product/ service may ease the lives of the patients. These start-ups failed to include in their presentation, as to how much effort would the integration of the innovation require from the mother organization. Therefore, the interviewee mentioned that most of their successful innovations are seeded in-house. In-house seeded innovators are more aware of the changes required by the mother organization, in the case the innovation is indeed integrated. In regards to primary health-care, the utilization rate of outside innovations is significantly lower than in secondary health-care. The primary reason for this is that primary health care service operation processes are more stabilized than secondary healthcare. Even small changes would need to be integrated into the doctor's day-to-day activities, require a significant amount of both tangible and intangible resources.

Organisations

Innovations and R&D processes are tightly linked with the organization doing it. The organization has to have the capabilities in multiple dimensions to facilitate and encourage innovation. This includes creating support and acceptance for innovation activities in the system by obviously expressed expectations and visions for innovation in health care sector. In other words, leadership and management influence the diffusion and development of innovations through the institutional framework. Moreover, the infrastructure as well as

human and financial resources have to be available for the creation and diffusion of innovation. Functionality of the system to identify and direct activities to critical problems and needs depends on the capacity of the system. (Larisch, Amer-Wåhlin & Hidefjäll, 2016.) Small organisations can not compete financially with the bigger ones and that causes problems for them to participate in innovation competition. Sometimes a startup company might meet a customer too late and furthermore the innovations that changes the market too radically, won´t go through the process, because of the public sector. (HEMA instituutti, 2016.)

Unequal premises

One of the main reasons for the lack of innovation in public healthcare sector might be due to its bureaucratic organisation structure. A bureaucratic organization's mission is not to be innovative, instead to sustain order and stability. Moreover, as the government is the primary stakeholder for bureaucratic organizations, flexibility to modify its operations and workings according to other stakeholders' needs is low. For example public sector organizations are required to invite tenders each time they want to acquire an innovation. Inviting tenders does allow the organization to see the entire field and choose the most prominent product/service, however, this process requires additional resources and decreases the organization's procurement flexibility.

Furthermore, bureaucratic organisation have the freedom of managing their activities outside the market, as it receives its money from the allocated budget assigned by the government. The inequality of public organisation's position in relation to private organisations, allows public organisations to produce business strategies regardless of the prevailing market economy. One of the primary drivers for innovation and R&D in private health care organizations, is the necessity to maintain competitive advantage and sustain a position in the market. This driver is non-existent in public organizations, which leads to a lack of motivation to invest in innovation and R&D by management. Several private healthcare providers contemplated on whether public healthcare providers will be able to innovate more efficiently after the social- and health care reform is implemented in Finland. Innovation and

R&D requires full organizational support, as both are by nature challenging and differ significantly from traditional projects.

Motivation to change

The root of motivation is either intrinsic or extrinsic. People commonly have a tendency to resist change. People´s attitude towards change restricts innovation to cultivate. The idea of moving out of one's personal comfort zone is intimidating and requires tangible and intangible resources. Therefore, the cultivation of innovation encouraging organizational culture is challenging and a tough process. Not even the best ones are able to cultivate by themselves. (HEMA instituutti, 2016.)

The lack of motivation to innovate or invest in innovation is not however, imminently recognizable from the interviews conducted. There is intrinsic motivation both on the public and private Finnish healthcare sector to innovate. However, the extrinsic motivational factors are what restricts Finnish healthcare providers to innovate. The facilitation of the required innovative environment i.e. financing, managerial support, innovation/ R&D process, does not match the eagerness to innovate.

Financing innovations

All of the interviews with both private and public health care service providers mentioned that the primary limitation for innovation is the lack of resources. The monetary value available to allocate into innovation is trivial in comparison to international levels. Currently Finnish public health care service providers do not have large dedicated innovation foundations that other international public health care providers have. For example in the U.S, Cleveland Clinics distributes 30 milion dollars exclusively to health care focused innovation projects. In Finland, currently Tekes is the only organization worth mentioning that focuses on providing financial instruments to new project.

The capital limitation in the overall health care sector in Finland makes M&A types of solutions rare. Therefore, the capital is usually available for funding for-profit ventures that are based on horizontal consolidation. Vertically integrated organisations may encounter greater difficulties in securing investments, as there typically is not reimbursement for

integrated treatment of a disease – instead, payment is stepwise. Capital limitation in organizations also leads to high level of prioritization concerning innovation projects i.e. continuous evaluation on whether the innovation project is rational to continue or not. As evaluation of early stage seed projects are challenging to evaluate, many potentially good innovation projects are left undone/ not funded.

Information technology

Technology plays a significant role in the healthcare sector. Nowadays, organizations are dependent on robust IT infrastructure in order to provide the services promised to the customers (Herzlinger, 2006.). As information technology is becoming ever more evident in the healthcare sector, several interviewees mentioned how many of the innovations projected are one or another way linked with the utilization of IT. The lack of professionals with IT skills in healthcare sector makes it challenging to develop IT-based innovations in-house.

Lack of innovation strategy in organizations

The characteristics of the organisation and the socio-political context must be taken into account even though the user of the innovation plays a crucial role in the innovation process. This is essential, because the intended user does not work in isolation and is a part of an organisation, which in turn is part of a larger environment. (Fleuren et al., 2004.) A central theme was that there is no clear leadership and strategy for innovation in health care. There is a lack of understanding among health care management and policy makers. (Larisch, Amer-Wåhlin & Hidefjäll, 2016) Health care organisations are restricted in resources in the form of time, competence or infrastructure available, because they are lacking the mission for innovation. If organisations are even partly financed and commissioned to support innovation in health care, they often lack strategic alignment and overarching leadership. Thereby it is hard for them to use efficiently the given resources. Decision makers expect innovation to result in a linear fashion from scientific discovery followed by clinical trials as the only legitimate way of creating evidence-based innovations, instead of actively involving and opening up health care settings for innovation projects. This results a dead end, because the linear fashion demands large investments into research while only limited resources are available for innovations. (Larisch, Amer-Wåhlin & Hidefjäll, 2016)

As clear strategical and operational processes are not established in the organizations, the diffusion of the innovation because challenging and requires reserving large amounts of resources. New innovations require in educating and training doctors, modifying operations according to the innovation and polishing the business strategy so that it incorporates the innovation. As most Finnish public and private healthcare organizations are unit-based, where each unit has a high independency, the distribution of innovation within the organization becomes complicated.

Health care sector

Market formation in health care is more restricted by regulations compared to other markets. This might be a barrier, because markets speed up learning processes by allowing for comparisons between alternatives and fast diffusion of superior innovations. Innovations are made widely available on markets where supply and demand meet. Furthermore, entry on new actors and open innovation platforms support network synergies. (Larisch, Amer-Wåhlin & Hidefjäll, 2016)

Long Return on Investment

It is hard to find funding for innovation in health care sector. Making a long-term investment causes problems, because hospitals are given a yearly budget with incremental adaptations. (Larisch, Amer-Wåhlin & Hidefjäll, 2016) As the Return on Investment (ROI) is commonly high in healthcare investments, it is challenging to find investors for the continuation of the innovation project. Funding the innovation´s development and figuring out who will pay and how much for the service or product it yields, are the two main financial challenges in innovation in health care. (Herzlinger, 2006.)

As mentioned in the Finance subchapter, financial resource in the Finnish healthcare sector is a great limitation. This limitation additionally directs organizations as to what types of projects they will invest upon. Interviews with private health care service providers mentioned that limitation of financial resources has led them to invest into innovations that will fulfill one of the following requirements:

1. The project has developed by its own to a certain point that additional investment by the mother organization will innovation to produce profit in short-term.
2. The ROI of the project is relatively short and the risk of losing money is reduced, either by sharing the risk with a third party or by historical proof that the innovation will succeed.
3. The mother organization sees the innovation in being critical for sustaining competitive advantage against its competitors in the future.

All of these requirements are explained by the broad picture of the Finnish healthcare sector. All of the interviewees mentioned that the primary task of their respective organization is to provide health care and not act as venture capitalist. Venture capitalist are able to produce an optimal investment portfolio with the presumption that most of the investments will not succeed, but the few that will succeed will result in an overall profit of the portfolio. Due to lack of both tangible and intangible resources in healthcare organizations, a venture capitalist approach to investments is not realistic.

Accountability

Accountability is an issue that is more heavily enforced in the healthcare industry than in other industries by governmental regulation. These regulations increasingly require companies to show that new products do safely what is claimed and are also cost-effective relative to competing products. On the funding front, the innovator has to collaborate with insurers beforehand of a launch to see to it that the product will be eligible for reimbursement. While looking for this approval, typically the innovator will seek for support from industry players (hospitals, physicians, powerful intermediaries and so on). One problem is that often insurers do not see the link between, for instance, reduction of hospital´s labour costs and the new technology responsible for it, because they tend to analyse their costs in silos. Furthermore, innovators might have a tendency to be infatuated with their own ideas and blind to competing ideas. (Herzlinger, 2006.)

Accountability is also tightly linked with patient information and utilization of that data. Especially in the primary health care sector innovation through the usage of data is in fashion. The European Data Privacy Act that will be enforced in EU countries in 2018, will establish barriers as to how much and what sort of data can be utilized. This leads to mainly two difficulties that Finnish healthcare organization need to take into account;

1. The data needs to be flexible. Meaning that data can be seamlessly taken in and out without reserving too much resources by the mother organization. In 2018 patients can request their data to be deleted or transferred from the mother organization to another organization. They also need to have the ability to check on what information does the mother organization have on him or her.
2. Innovation regarding the usage of patient data is limited. The mother organization needs to make sure that innovations are in line with European Data Privacy Act.

Innovation blocking mechanisms in Stockholm and in Finland

When we compared the Stockholm region healthcare sector and the Finnish one, we found many similarities between them. Hence, we list here the blocking mechanisms that hinder the innovation system in Stockholm:

Table 1: Blocking mechanisms of innovation in Stockholm region according to Larisch, Amer-Wåhlin & Hidefjäll (2016)

Blocking mechanism in Sweden (Larisch, Amer-Wåhlin & Hidefjäll, 2016**)**	**Comments from Finnish perspective**
Linear thinking of research and development activities: only clinical trials can result in innovations that can straight be implemented to practice	According to Aslani, Zolfagharzadeh and Naaranoja (2015) this is not that great problem in Finland, at least in primary health care.

No systematical evaluation of unmet clinical needs (from patients and healthcare professionals)	According to our interviewee from National institute for health and welfare, public sector primary healthcare actors include patients and healthcare professionals rather than the private sector for example, when they collaborate with external actors.
Lack of a unified innovation strategy across healthcare, industry and academia: actors don't understand that they should innovate with external parties, nor do they understand the uncertainties involved with innovation	Many of our interviewees described that innovative new healthcare companies rarely suggest innovations that are implementable or assess the right problems.
Many uncoordinated innovation-supporting organizations	There seems to be innovation supporting systems in Finland that don't really see eye to eye according to our interviewee from National institute for health and welfare.
Demonization of profits in healthcare	This affects the Finnish healthcare system a lot. Many politicians and the public think that opening up the healthcare markets to the private sector will hinder the quality of healthcare and mean that tax money in Finland will only enrich service providers. According to our interviewee from the National institute for health and welfare the attitude of the public sector is very suspicious of the private sector and the will to collaborate with them is minimal.
Restricted formation of new markets i.e. no	There is a "gap" between when start-ups

implementation pathways for new technical innovations	need funding for their innovation and when health care organizations are willing to fund.
Evidence for the innovations is considered insufficient for healthcare actors to implement them. There are not enough pathways or expertise in small and medium sized enterprises to gain such evidence.	According to our health care provider interviews this is also true for Finland. Additionally, our interviewee from National institute for health and welfare stated that the evidence behind hyped new innovations are often lacking and that public healthcare actors are reluctant to implement them or collaborate with innovation providers to make them suitable for their operations.
IT does not support innovation and collaboration between different actors	There is for example the Innokylä platform in Finland to support collaboration but from what we heard from the expert from the National institute for health and welfare Innokylä platform still has many problems.

Cases of healthcare innovation programs in Finland

Here we present cases of innovation programs that aim to support innovation creation and diffusion in the Finnish healthcare.

Case: Innokylä

Innokylä is an open-for-all innovation community in the web that concentrates on welfare and health care fields. It supplies both web- and face-to-face-based development utilities and methods, knowledge and partners for every phase of development. Innokylä combines the

development results from the field into one place and offers a channel for operations models distribution. The aim is to support the sustainable renewment of the welfare and health care field. Openness and development together are Innokylä's basic ideas, thus it's free to use (Innokylä information). Because Innokylä is open for everyone, it has many different user groups like developers and healthcare professionals, purchase planners, investors, deciders and leaders. (Innokylä - "open-for-all"-policy).

The Ministry of Social Affairs and Health made the motion in 2008 for an open innovation community that would offer support in practical ideation, development, estimation and distribution. It led to Case Innokylä (2010-2013) and based on the case, Innokylä was born. Several entities took part in the implementation: Finnish Federation for Social Affairs and Health (SOSTE), Association of Finnish Local and Regional Authorities (KL) and National Institute for Health and Welfare (THL) (Innokylä information). Investors of the projects were Ministry of Social Affairs and Health, Finnish Funding Agency for Innovation (Tekes) and Finland's Slot Machine Association (RAY) (Valovirta, Ville & Hyvönen, Jukka. 2011).

Case: Tekes - Innovations in Social and Health Care Services

The vision of the programme was to renew health and social services and increase business opportunities through innovative activities. This was achieved by funding public organizations (e.g. municipalities, hospitals), private parties and NGOs, that had appropriate development programs aiming at the following goals (TEKES, 2015):

- Effective, customer-oriented health and social services
- More extensive preventive actions
- Diversified partnership and cooperation

In addition to funding, the program offered other services such as

- Visits to health care conferences
- Seminars and networking events
- Newsletters and other publications
- Program web site that contains all the essential information
- Sparring services in the design and implementation phases

During 2012-2015, many programs received funding, like the above mentioned Innokylä. One of them was the "Kasvuseula" -project, an effort to create a national growth database intended to collect and analyse children's growth information to better alert for anomalies. Another was a project called "PALMU", which focused on improving joy of life and customer-orientation in elderly care. It introduced many innovative ways to increase the autonomy of old people who had memory disorders, while improving the quality of their everyday lives. (TEKES, 2015)

Lastly, the Idealinko service was a project where the inhabitants and employees from different parts of Helsinki came together to come up with solutions to improve their services. The model for creating new public service innovations has since been adopted elsewhere too. For example, the model is being developed within the Education Department to suit the needs of schools. Other projects that received support examined long-term insurance providing better security for the elderly, smartphones in combating young people's eating disorders, combining mental health and substance abuse services under the same roof, finding new ways to help the long-term homeless, reducing child placements, and support for personal assistance employers. (TEKES, 2015)

What drives innovation in health care?

In this chapter we introduce how innovation creation and diffusion of innovation is encouraged worldwide. Larisch, Amer-Wåhlin and Hidefjäll (2016) use an innovation system framework that describes the innovation system in healthcare and the dynamics and functions that contribute to success in that. The Larisch, Amer-Wåhlin and Hidefjäll (2016) study is based on the healthcare innovation system in the Stockholm region because the Stockholm model is the most developed healthcare innovation system in the OECD region (OECD, 2006 cited in Larisch, Amer-Wåhlin & Hidefjäll, 2016). To our advantage, the Stockholm region healthcare system has also many similarities to the Finnish healthcare system. Because of these reasons, we build our study on the Larisch, Amer-Wåhlin and Hidefjäll (2016) model of a successful innovation system and use their illustration of the actors in a healthcare sector as our interpretation of the healthcare sector.

To understand the scope of functions in healthcare that contribute to better an innovation system we must first understand the healthcare sector and its actors better. To demonstrate the healthcare sector and map the agents in the innovation system Larisch, Amer-Wåhlin and Hidefjäll (2016) present the Figure 1.

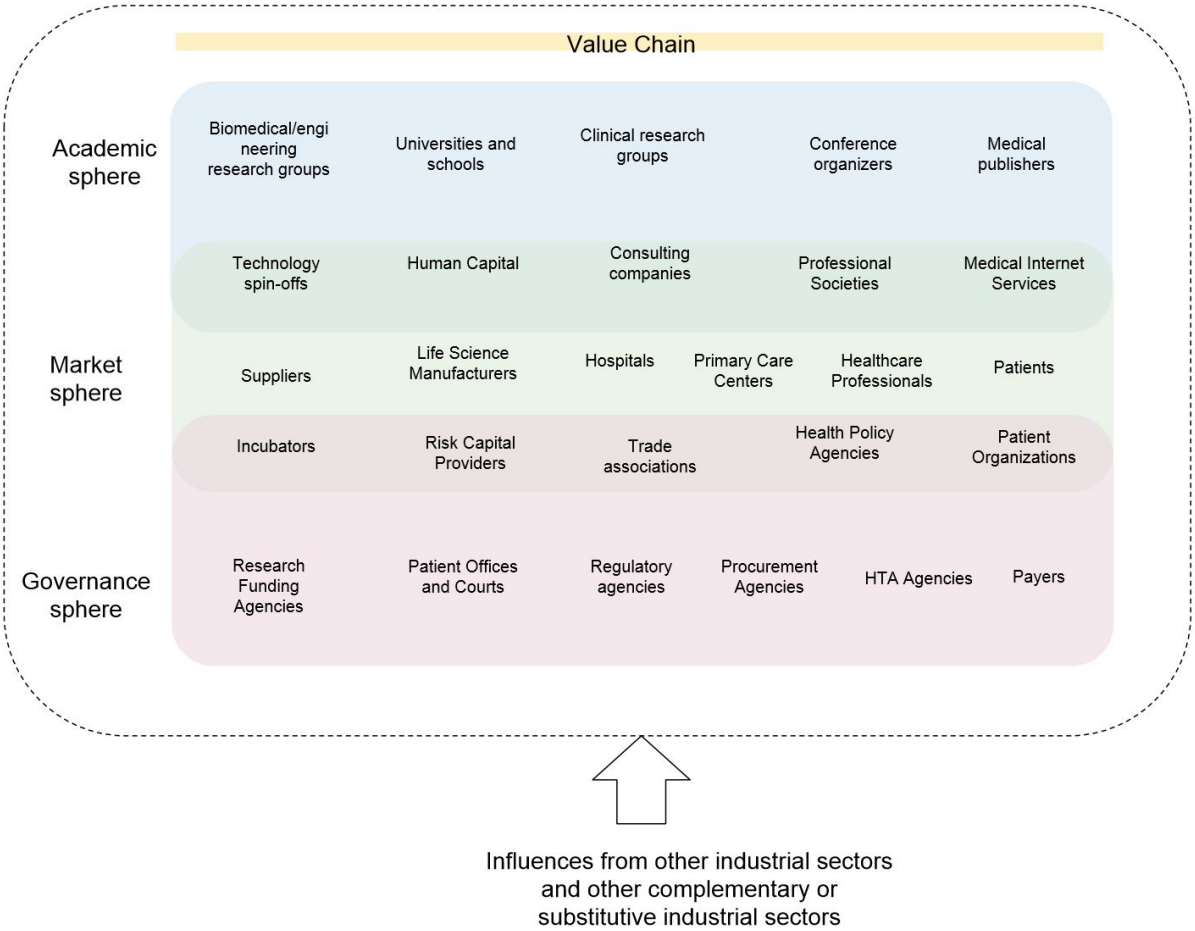

Figure 1 (Modified after Larisch, Amer-Wåhlin and Hidefjäll, 2016)

Figure 1 presents different actors within the healthcare industry and maps them by their position in the healthcare value chain and their domains. The domains vary from academic to market and government. The academic sphere means the basic research and its value chain from research groups to publishers. Meanwhile the market sphere presents where the tending of patients happen in the industry from the suppliers of hospitals to their customers, i.e. patients. Between the market sphere and the academic sphere falls information and knowledge providers such as professional societies and consulting companies. The final sphere is the governance sphere, which consists of actors that regulate or enable what other actors in the industry do. Patient offices and courts and research funding agencies are examples of actors in this sphere. Then actors combining aspects from the market sphere and the governance agencies are such as risk capital providers and patient organizations.

The actors in Figure 1 engage in functions shown in the Table 2. According to Larisch, Amer-Wåhlin and Hidefjäll (2016) when these functions are fulfilled and work well in the innovation system, innovations emerge.

Table 2 (After Larisch, Amer-Wåhlin & Hidefjäll, 2016)

Function	Explanation
Knowledge development and diffusion	Complementary knowledge from various fields has to be developed and diffused. Includes knowledge specific to innovations and about the regulatory framework, entrepreneurship and business knowledge. Interdisciplinary networking and collaborations increase the level of knowledge development and diffusion
Legitimation	Leadership and management influence the development and diffusion of innovations through the institutional framework. Important to create acceptance and support for innovation activities in the system by clearly expressed visions and expectations for innovation in the healthcare sector
Resource mobilization	Financial and human resources as well as infrastructure for the creation and diffusion of innovation need to be available
Guidance of search	Functionality of the system depends on the capacity of the system to identify and direct activities to critical needs and problems
Entrepreneurial experimentation	Through experimenting and testing, knowledge is transformed into innovations, generate new knowledge by learning from trial and error and reduce uncertainties inherent to innovations
Market formation	Innovations are made widely available on markets where supply and demand meet. Markets speed up learning processes

	by allowing for comparisons between alternatives and fast diffusion of superior innovations. Market formation in healthcare is more restricted by regulations compared to other markets
Creating system-wide synergies	If functions are fulfilled, a mutually reinforcing and synergistic system can function and spread positive effects primarily within the HCIS, but also to other sectors, and also in geographic terms to other regions or countries. Standards enable reuse and interoperability of innovations. Open innovation platforms and entry on new actors support network synergies

Knowledge development and diffusion

In traditional healthcare especially in Finland, health care has been very much its own field with its own experts and attitude of complacency. Our interviews with the public sector actors revealed that there is still a widespread, suspicious attitude towards enterprises and collaborating with them in healthcare. As one of our interviewees stated: “we feel that all the innovative companies asking for funds must have a some sort of dubious agenda behind their proposal”.

However, according to Larisch, Amer-Wåhlin and Hidefjäll (2016) and Bullinger et al (2012), interdisciplinary networking and collaboration is crucial to a successful innovation system. Knowledge development and diffusion is a function that deals with using knowledge from various fields and from various actors in order for the innovation system to work well. This means that customs from multidisciplinary sources should be applied to healthcare in addition to customs from the traditional healthcare. To validate this idea, there have been many cases where lean operations management, that originally comes from the manufacturing industry, have been successfully adapted to health care operations (Modig & Åhlström, 2012.). But how to address this? As an example of how different disciplines and

experiences can contribute to the body of knowledge in healthcare we present the case GemeinsamSelten.

"The third group of product innovation responded to the introduction of highly-educated professionals from different backgrounds who, along with academic and technical interns, were providing access to new services. In the case of interns in physiotherapy and nutrition, both groups were reinforced by links to educational institutions in the county that aimed to promote their teaching practices. With the interns, different initiatives regarding continued engagement and treatment in the spread of services with the community were observed, as was already observed in established practices. In the same way, the introduction of health professionals with different backgrounds – such as training in speech pathology, psychology, and social work – also facilitated access to services at the UBS which were, to various degrees, previously available as specialized consultations. " (Nodari et al 2015)

Case: GemeinsamSelten

GemeinsamSelten is a publicly funded German open health platform - an online community platform for innovation in healthcare (Bullinger et al., 2012). The idea behind the platform is to unite and activate diverse representatives of the public to develop new services for rare diseases (Bullinger et al., 2012). The platform not only gather rare diseases´ locally dispersed and limited knowledge from patients and their close ones, but also from various disciplines as well (Bullinger et al., 2012).

The GemeinsamSelten platform consists of three connected areas: the community area, the problem area and the solution area. On the community area, users can share their information and ideas and thought about various attributes of healthcare such as about doctors and insurances (Bullinger et al., 2012). On the problem area, patients share their experiences of their rare diseases. Lastly, the solution area is for people to provide helpful ideas and improved solution concepts for health care services and products. The platform uses rich media and on the problem and the solution areas participants may include video, picture and audio files in addition to traditional text files. The platform also provides a communication forum for users to send direct messages to one-another. The communication forum is a great channel for users to discuss, comment and evaluate other's submissions (Bullinger et al.,

2012).

The GemeinsamSelten was launched in the end of March 2011. During the first three months it attracted 803 users, who submitted 197 submission, 1454 direct messages and more than 366 comments. Taking into account that the platform is targeted to rare diseases, this kind of activity states that it is suitable to explore how the public can be integrated in health care research by the open innovation practice, GemeinsamSelten. (Bullinger et al., 2012.)

In addition to open gathering of experiences and ideas, the platform submissions were analyzed and evaluated by an interdisciplinary jury consisting of experts from medicine, health care management, strategic and general management and patient organizations (Bullinger et al., 2012). GemeinsamSelten has obviously spurred great amounts of new ideas and valuable discussion among healthcare.

The patients and their close ones get valuable information about different possibilities, experiences and how to cope with their diseases. However, we haven't identified any concrete examples of new innovations or development projects among healthcare actors. Nonetheless, this doesn't mean that the platform isn't working well or that it explicitly haven't resulted in new innovations among rare disease healthcare as healthcare actors can be discreet about their development practices. The open innovation platform also makes it easier for entrepreneurs and other emergent actors to take initiative and try to solve problems within the field of rare disease healthcare. Thus, it can be argued that this kind of open innovation can also encourage entrepreneurial experimentation.

Legitimation

Legitimation in healthcare is fundamentally different compared to other industries. It's also more restricted and protected than other industries and the public sector is far more keen to protect its position with regulations as well. While some special protection is reasonable, the idea behind the legitimation function according to Larisch, Amer-Wåhlin and Hidefjäll (2016) is to bring the valuation of innovations and spreading of innovations to the legal level. Only by removing legal boundaries of innovation and by creating legal messages of support for innovation can they truly happen throughout the healthcare sector. According to

Herzlinger (2006) currently it's important for innovators in health care to understand the extensive network of regulations that may affect a particular innovation and by whom and how those rules are enacted, modified and applied, because laws and regulations create barriers to innovations in healthcare.

As an example of changing national legal system to support and lead innovation, we present what has been done in Denmark because according to the Euro Health Consumer Index (Health Consumer Powerhouse), Denmark has the second best healthcare system in the EU. Denmark has made legal framework for innovation, the Inventor-law (since 2000) obligates all employees at private companies, public Danish research institutions, hospitals and universities to report inventions to their institution. The law reflects the employer's interest in ensuring the inventions that are done by the employees as part of their jobs. A major problem for inventors is the main rule of a three year period of limitation, which mean that the inventor must demand a reimbursement before the actual value of the patented invention is known. As invention might take up to 10 years to reach the markets, the three year period gives advantage to employers. (Innovation in European healthcare, p. 210)

Resource mobilization

Innovation development takes up resources. Better resource efficiency in addition to all the other new inventions and ways to do things in future always take up resources in the present. Our interviewee from the National institute for health and welfare mentioned that the basic day-to-day work in primary health care organizations is so demanding and busy that the practitioners there are not capable to do much development work. Moreover our interviewee conveyed that the daily work is so intense that it affects the creativity of healthcare professionals. This is problematic from the development and innovation perspective as creativity plays a vital role in coming up with new ideas.

As an example of resource mobilization, the Danish government decided to allocate in a new structure of hospitals known as "the Super Hospitals" in 2007. 7 new hospitals will be built and 9 hospitals renovated or expanded over the next 15 years. The government also

established a renewal fund connected to innovative healthcare solutions on the new super hospitals. The fund is meant to support public-private cooperation and innovation projects (Innovation in European healthcare, p. 215-216). The fund has already supported several innovation projects in Denmark that are anticipated to have great effects in healthcare and actually pay the investments back as well (Innovation in European healthcare, p. 217).

Guidance of search

The mere number of new innovations doesn't convey if there have been improvements in healthcare. The innovations also need to contribute to problems and otherwise significant parts in healthcare. For example, our interviewee from the National institute for health and welfare told us that multidisciplinary collaboration with start-ups are not interesting from the public primary health care perspective because the innovations that companies present don't typically answer to important questions or needs from the primary health care perspective.
Thus, the healthcare industry should provide better guidance for innovators (Larisch, Amer-Wåhlin and Hidefjäll, 2016). The healthcare industry needs actors that identify crucial needs and problems that require new solutions and innovations (Larisch, Amer-Wåhlin and Hidefjäll, 2016). This could happen for example via healthcare organizers that themselves don't handle healthcare activities.

After the Danish equivalent for the Finnish healthcare and social services refor, the Danish system is now structured in three levels: state, regions and municipalities. The state task involves the overall planning of public health care. The regions have the main tasks of handling public health care with responsibility and also regional development. In order to manage their tasks the regions have taken several initiatives in developing programs for innovation with the purpose of helping the healthcare sector provide better healthcare, and also, help small and medium enterprises within healthcare to experience growth. The municipalities tasks involve the outpatient segment (Innovation in European healthcare, p. 208). The reform has essentially differentiated the guidance of search from the health care providers as has also been suggested for the Finnish system (HEMA-institution, 2016).

To successfully direct innovation activities, it's important to understand the attributes of innovation processes well and execute innovation processes accordingly. The following framework from Fleuren et al (2004) , Figure 2, represents the innovation process and the determinants that affect it.

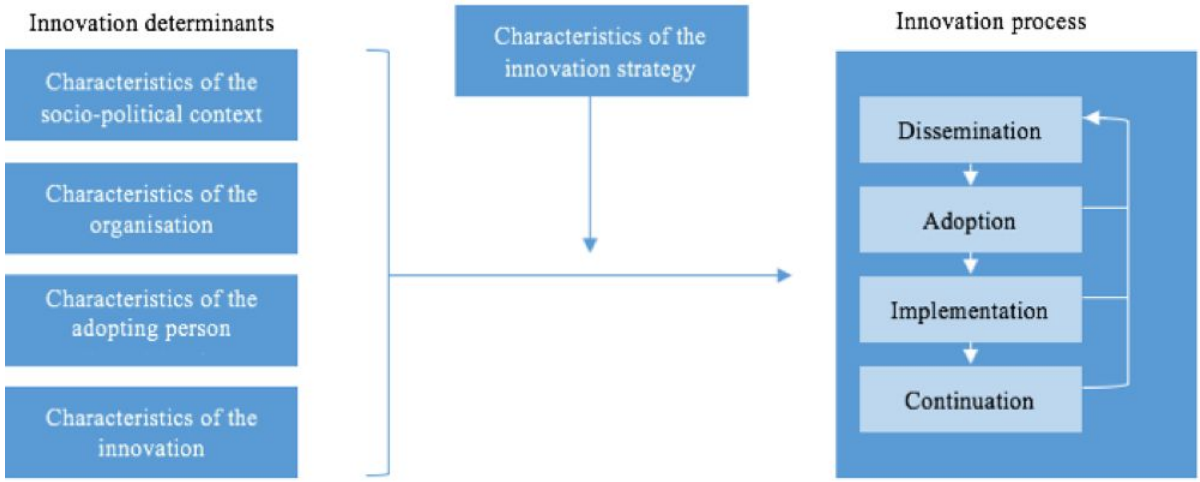

Figure 2. Innovation process and related categories of determinants (Fleuren et al., 2004).

According to Fleuren et al (2004) the four stages of innovation process (dissemination, adoption, implementation, continuation) can be seen as points at which the desired change may potentially not occur. Innovation determinants on the other hand affect the transition from one stage to another. Thus, the determinants play an important role in the innovation process. The socio-political context includes for instance patient characteristics, legislation and rules. Characteristics of the organisation signifies the decision-making process and the staff turnover in the organisation, for example. Adopting person´s characteristics means for example the perceived support from colleagues and person's knowledge and skills. Complexity or relative advantage means the characteristics of the innovation. In addition to aforementioned determinants, also the characteristics of the innovation strategy and the user of the innovation play a crucial role in the innovation process.

Thus, paying attention to the innovation determinants and the characteristics of the innovation strategy can be fruitful in the innovation process. When you want new things to happen in the organizations, you have to think about their special characteristics and assess the possible pitfalls and risks in the innovation creation and spreading processes.

Entrepreneurial experimentation

Traditional research in healthcare is slow, as it has its roots in academia and because many aspects in healthcare require lengthy validation research. However, not all research and development in health care need to go through such vigorous research and validation testing. Hence, to gain a more nimble and fast innovation and development process healthcare sector should take better advantage from entrepreneurial experimentation (Larisch, Amer-Wåhlin and Hidefjäll, 2016). Private healthcare actors are typically more innovative than their public counterparts (HEMA-institute, 2016), and big companies in most industries collaborate and acquire start-ups to gain new knowledge and flexibility, these positive effects on innovation are not a coincidence but a clear sign that entrepreneurial experimentation can support innovation processes also in healthcare. Thus, the public healthcare sector in Finland could benefit from collaborating more with the private side and engaging in more fast paced trial and error kind of approach in validating innovations (Larisch, Amer-Wåhlin and Hidefjäll, 2016).

Market formation

According to Larisch, Amer-Wåhlin and Hidefjäll (2016) market formation describes some crucial aspects in healthcare that speed up the right kind of innovation and innovation spreading. Innovations should be truly available on markets that are based on real supply and demand. When unbiased demand and supply occur, the innovations are available for everyone and the innovations that answer to important problems and needs can spread. On the other hand, the created demand will also support competition and further innovations to make the original innovation even better. To gain this kind of market formation current restrictive regulations have to be taken down at least on some level (Larisch, Amer-Wåhlin and Hidefjäll, 2016).

Market formation can be supported by new innovations that make choosing service providers

easier than before. In Finland it's often hard to change healthcare providers because the previous health data cannot be transferred to other service providers or at least it's hard. Personal Health Record (PHR) technologies allow service providers and customers to share and store standardized health records. This creates an opportunity for the customer or the patient to be more aware and in charge of his or her information, and for health-care providers an opportunity to achieve better results with fewer resources. For example in 2006, Germany introduced smart health cards, which enables consumers to carry their health records electronically and share it easily with whomever service provider they choose to use. (Lillrank & Singh, 2015, pp.21-22)

Case: Insurance based market models

According to Herzlinger (2006) it's believed that there would be more innovation, if the health care consumers control their health insurance spending. This could be seen in the case of the increasingly popular high-deductible and low-cost health insurance policies offered by multiple employers. To create this consumer-driven insurance system, the tax laws need to be replaced with ones, which favour employer-based insurance with individual tax credits for health insurance spending. Thereby, prompting the transfer of funds to the employees themselves, that they are currently spending on health insurance. A system creates a barrier to innovative attempts to integrate health care activities, if insurers set the prices that providers charge consumers. For instance, the more patients a company could successfully treat without expensive or lengthy hospital admissions, the less money it would make in insurance reimbursement. (Herzlinger, 2006.)

In the USA there is the Securities and Exchange Commission (SEC). Its role is to ensure that "consumers have sufficient information by requiring companies to publish financial results that are verified by an independent auditor". The outcome data of individual providers of care is rarely available in health care. Moreover, when the data is available it may be questionable, because these providers are not audited by independent and certified professionals. The best way to make sure that the transparency exists is the SEC. (Herzlinger, 2006.)

Creating system-wide synergies

According to Larisch, Amer-Wåhlin and Hidefjäll (2016), when all functions above are fulfilled, the positive effects of a working innovation system will spread positive effects within the healthcare innovation system, to other industries and support the geographical spreading of successful innovation. System-wide synergies also cover open innovation platforms that support network synergies and make it easier for new entrants to enter the market. Also deployment of industry wide standards in healthcare would create new more open possibilities to reuse innovations and gain synergies from being able to use multiple innovations in a compatible way (Larisch, Amer-Wåhlin and Hidefjäll, 2016). Also, in order to truly benefit from data gathering and analysis, different health care systems, both public and private, should have a ”common digital language” for communication. This is crucial for communication with each other, just as it is in all the industrial and advanced service sectors (Lillrank & Singh, 2015, p.19).

Dynamics between functions

We have now learned that, collaboration between different actors and different functions is crucial in promoting innovations in healthcare. All seven functions contribute to innovations in healthcare in different ways (Larisch, Amer-Wåhlin & Hidefjäll, 2016). And like the Figure 3 shows, some functions are more interdependent of one another than the others, creating functional clusters that have barriers between them.

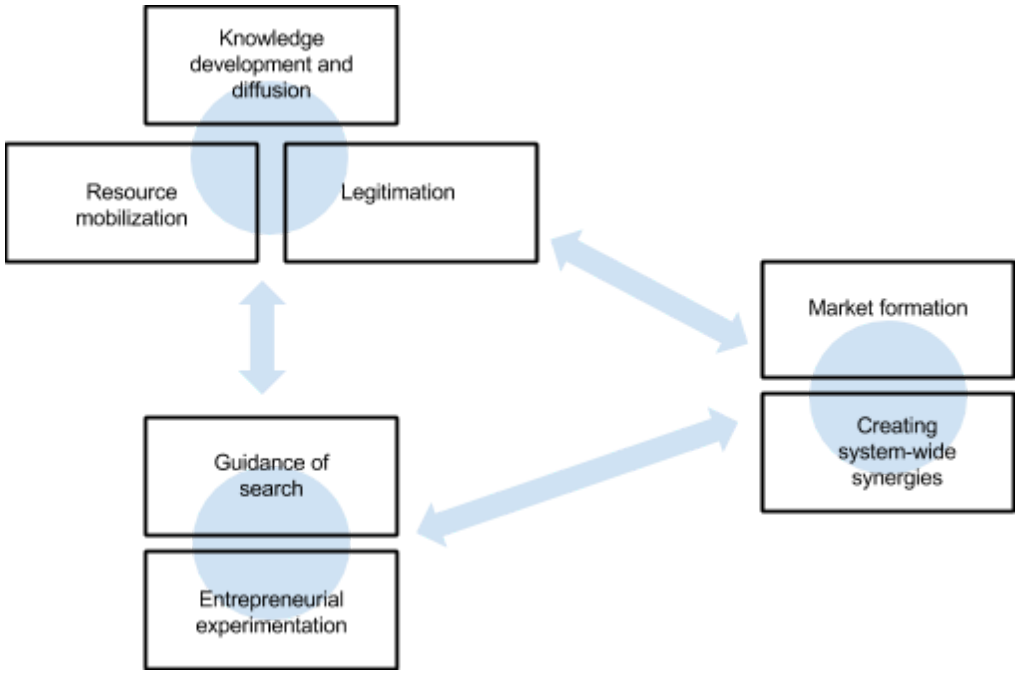

Figure 3 (After Larisch, Amer-Wåhlin & Hidefjäll, 2016)

Explanation to the connectedness of knowledge development and diffusion, resource mobilization and legitimation is that you only get resources to innovation systems after innovation practices have been legitimised (Larisch, Amer-Wåhlin & Hidefjäll, 2016). On the other hand, knowledge development and diffusion can happen only when there are enough resources to do so (Larisch, Amer-Wåhlin & Hidefjäll, 2016). Our interviews also supported this fact. For example, our interviewee from National institute for health and welfare told us about various cases where restricted amount of resources meant taking resources from innovation and development. She also told us that especially in the public healthcare sector mundane health care practices take up all the energy and resources so that individuals are not capable or willing to engage in development or innovation practices.

Guidance of search and entrepreneurial experimentation are also interrelated. The market doesn't need just any innovations, but new technologies, processes and service innovations that could solve problems that are important for the sector (Larisch, Amer-Wåhlin & Hidefjäll, 2016). Entrepreneurial experimentation without guidance of search lead to situations described by our interviewee from National institute for health and welfare: "Companies often propose innovations and solutions that don't address the real issues that

public healthcare has, such as tending those with multiple health issues. Instead, they often propose more work with population groups that are healthy." On the other hand, guidance of search without nimble entrepreneurial experimentation means that new innovations come only from traditional research activities that promote the linearity of development activities and non-multidisciplinarity, both of which have proven to be problematic (Larisch, Amer-Wåhlin & Hidefjäll, 2016).

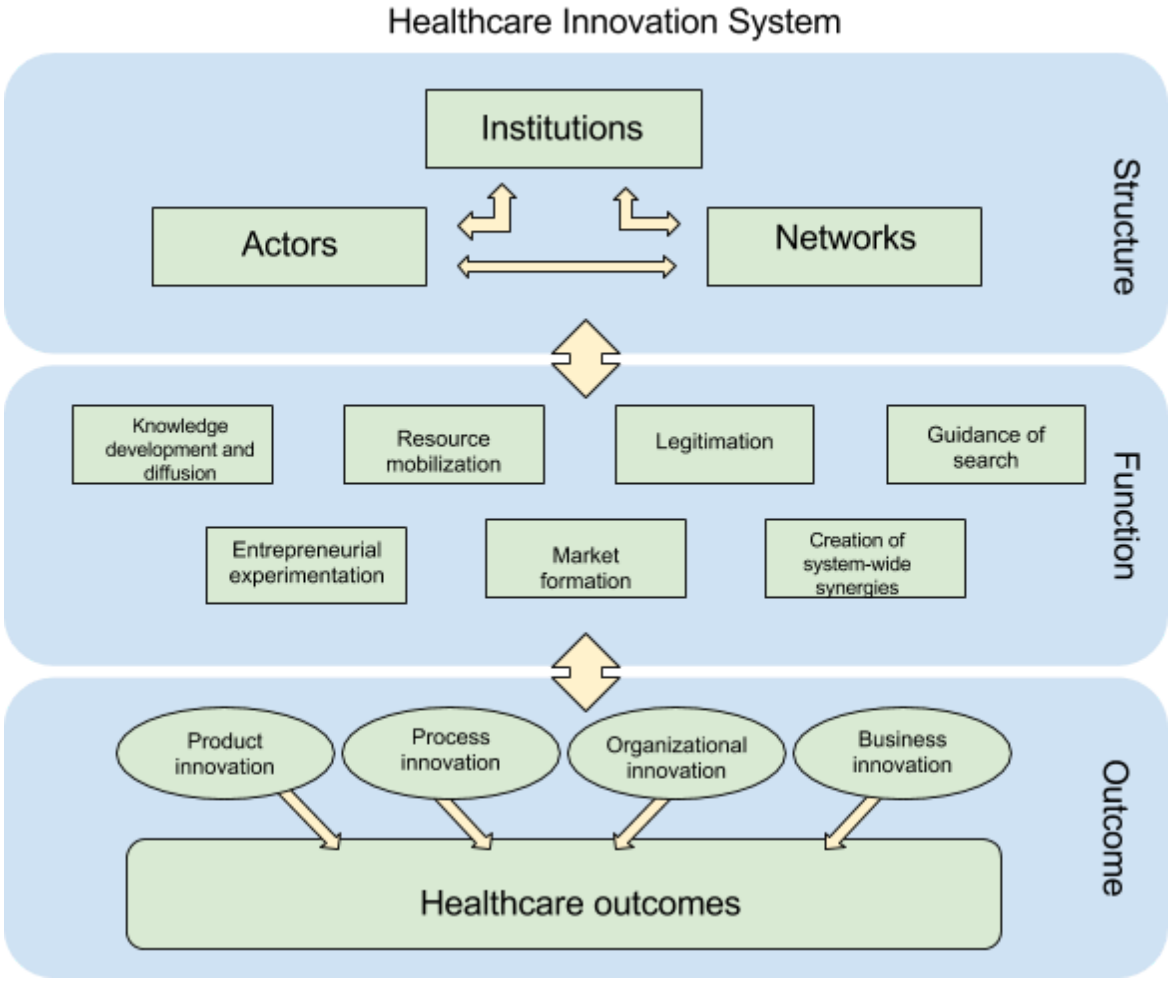

Figure 4 (Modified after Larisch, Amer-Wåhlin and Hidefjäll, 2016)

Market formation and creating system-wide synergies are also interrelated. When there are fewer regulations and healthcare providers engage in real markets, they have more incentives to develop their activities and implement new innovations and help the diffusion of best innovations (Larisch, Amer-Wåhlin & Hidefjäll, 2016; HEMA-institution, 2016). Moreover, when the structure of healthcare sector is well coordinated (Figure 4), the functions can be

reinforced by system-wide synergies (Larisch, Amer-Wåhlin & Hidefjäll, 2016). Thus, it's not enough that hospitals engage in innovation processes by themselves, but they should participate in innovation and innovation possibilities with other actors in the healthcare sector as well.

In conclusion, Larisch, Amer-Wåhlin and Hidefjäll (2016) provide us with an innovation system model brought to healthcare sector that describe which components a well working healthcare innovation system should have. By improving the functions and dynamics between the functions it's possible to enhance innovation system in Finland as well.

Life after reform: how can innovation be facilitated in Finnish primary healthcare?

In this chapter we will present concepts to enhance innovation creation and innovation spreading in Finnish primary health care. Some of these concepts are derived straight from literature, while others are based on our own analyzes based on both literature and information from our interviews.

JYVÄ initiative - Market steering

HEMA-institution with Oulu university, Oulu university of Applied Sciences and private and public organizations in health and social services sector conducted JYVÄ initiative to study how public and private health and social services organizations could work together better to ensure good service and care for all inhabitants of municipalities in Finland (HEMA-institution, 2016). The study concludes with 6 theses to better innovation creation and spreading in Health, Social Services and Regional government reform. In this section we present these theses and build on them to concern all actors in the field.

1. **There should be no structures that prevent the creation and spreading of innovations in the reform**

2. **Organizer and producer should be differentiated**

All regions should have an organizer for health and social services. However, the organizer shouldn't participate in the production of aforementioned services because it would create a possibility for monopolies.

3. **The most important task of the organizer is to maintain dynamics in service production**

The effectivity and productivity of different providers must be followed. New providers and methods should have free access to the market and be able to become new providers.

The marketspace should be divided into sensible unities that each have a fitting incentive models

4. **All service providers that are financed by the public should provide their key ratios publicly**

Public reports of efficiency makes it possible to compare different providers and also different regions in healthcare.

5. **Patients' freedom of choice should be supported**

The patients should have adequate knowledge to make wise choices in healthcare.

6. **For the choice to have influence, money must follow the patient**

The basic idea behind the 6 theses is that patients could truly select their healthcare providers and their choice should have real world implication on how much money each healthcare producer should get. Then the organizer i.e. regional government of healthcare should help keep up the local dynamics in healthcare. This means that the organizer follows the productivity and effectivity of all regional healthcare actors and ensure a real, unbiased competition situation for all actors.

The organizer should also set up a working incentive model for the system. Money should follow the patient and there should be different models of income within the system. For example, if an elderly person chooses their continuous primary health care provider, the provider should get an annual compensation from the organizer. In the end, this encourages the producer to provide the patient the best care they can as cost efficiently as they can. In other words, this system will work in favour for innovation activities, innovation spreading and coming up with new ways to work in order to be more efficient.

In conclusion, the underlying concept behind these theses is that real competition based on rates directly connected to the effectivity and quality of healthcare will lead to a fertile base for innovation creation and innovation spreading. In other words, the idea is that free markets will steer activities in the healthcare sector and encourage innovation creation and spreading of innovations.

Spreading of innovations

Innovation creation is a one thing that can lead to better processes and technologies in primary health care. However, as demonstrated in our report, there are already vast numbers of health care innovations that could bring significant savings in the field. Thus, diffusion of innovations obviously has barriers in health care and they should be overcome. To do this, the barriers to spreading innovations, the new competition based regional health and social services model is crucial. However, diffusion of innovations can be encouraged in other ways as well.

Diffusion of innovations happen in most industries almost automatically (HEMA-institution, 2016). For example, cars are nowadays very similar in shape and other characteristics despite the fact that there are dozens of different manufacturers. This is due to the fact that all manufacturers make cars so that they are first rate both aerodynamically and from the gas consumption point of view (HEMA-institution, 2016). So basically all manufacturers use the best innovations. However, the same effect does not take place in health care. There is of course the lack of encouragement due to the current affairs in health and social service production. This will change with the health and social service regional reform, but it won't solve the problem fully.

According to the theory of innovation diffusion (Robinson, 2009) there are some requirements for innovations to spread, and then there needs to be a feasible channel for innovations to spread through. The requirements for innovations are relative advantage, compatibility with existing values and practices, simplicity and ease to use, trialability and observable results (Robinson, 2009). The innovations are also more likely to be adopted when they are discussed through peer-networks and there have been many positive peer-to-peer conversations about them (Robinson, 2009).

Table 3: Spreading innovations are (Robinson, 2009)

Requirement	**Explanation**
Relative advantage	Innovation adaptation may happen if there is better outcomes when you use the new innovation. The better outcome has to come from something that the users value. For example, less costs from providing healthcare for patients with several different issues.
Compatibility with existing values	"An idea that is incompatible with their values,

and practices	norms or practices will not be adopted as rapidly as an innovation that is compatible" (Robinson, 2009) For example, when doctors and nurses need to change the way they work radically, they are not that likely to support the change.
Simplicity and ease to use	The new innovations should be simple and easy to use. The need to learn new things is daunting, and it's argued to be the key reason for healthcare professionals to resist changes in their work (HEMA-institute, 2016).
Trialability	You should be able to experiment new innovations, because this lessens uncertainty (Robinson, 2009). In healthcare there should be better chances to try out new innovations and validate them.
Observable results	Visible results motivate people to start using the new innovation (Robinson, 2009). Thus, when new innovations are adopted in healthcare, the good results should be made visible for others to see for themselves.

When new systems and ways to work are introduced, it always means more work for some and it's not feasible from everyone's viewpoint (HEMA-institution, 2016). Thus there will be resistance to change, and when it comes from influential parties it's not always easy to make

changes. Thus, when changes are planned you should also plan for how to overcome the resistance.

Another hindrance for diffusion of innovations is the initial investment. From our interviews with healthcare providers we found out that sometimes it's unclear if an innovation will bring great enough savings in the future so that it's worth to invest in.

Attributes of Successful Information Technology Adoption In Healthcare

A common trait of successful IT adaptation strategies has been the involvement of health care professionals in the planning and execution phases. This way, the people who will be the judges of whether a new system will be adopted or not will probably think that the new technology is easy to use, compatible with existing values and practices and bring advantage. Furthermore, implementation of new systems should be performed in sequence to understand benefits and issues associated with them.

A sequential step-by-step process enables early error monitoring and correction, in addition to helping avoid a catastrophic failure resulting from too large implementations at once. This also enables the developers to engage with stakeholders, providing invaluable information for further improvements. After introducing new technologies, it is important, that old processes are re-evaluated and designed to function in accordance to the new technology available. (Sing & Lillrank 2015, p.23)

One important facilitator of technology implementation is incentives. Naturally employees must be financially compensated for engaging in the adaption of health information technology systems, because of their critical importance for the successful usage of these new technologies. (Sing & Lillrank 2015, p.23)

Increased collaboration between stakeholders

This subchapter will discuss on how increased collaboration between stakeholders could

increase the quantity of quality seed-stage innovations from third-party organizations and produce more productive innovation and R&D project portfolios in the primary health care sector. Simply, the stakeholders of the healthcare sector are the patients, providers, payers, and employers. An innovation project on the other hand constitutes commonly of the following stakeholders; project organization/ group, customer, sponsor, user and gainer.

Increased amount of quality third-part seed-stage innovations

One of the primary problems currently in the Finnish healthcare sector is that collaboration between stakeholders is not cohesive and open. When third-party organizations such as start-ups (project organization) pitch their idea to the mother-organization (customer and/or sponsor), they are able to produce solutions that will help the doctors' and/or the patients' lives (users). What these start-ups fail to grasp is the importance of the "customer" in this stakeholder equation.

Insufficient amount and quality of time between project organizations and customers is the primary reason, why start-ups fail to understand the needs and prerequisites of the health-care sector. In focus to the primary health care sector, the collaboration between third-party project organizations and primary health care sector is essential to develop quality seed stage innovations. As primary health care is more patient-centric than hospital care, understanding the definite processes related the entire value chain is vital. This is executed through openness and communication with third-party organizations for them to identify nodes that can be solved or developed.

Currently, the existing health focused accelerator/incubator programs in Finland such as Vertical Accelerator and Finland Health Growth Program implements this to a certain extent. The startups that participate in those programs get to communicate with medical consultants regarding their innovation. However, we suggest that this ideology should be taken one step further. Instead of start-ups asking for information from medical experts, healthcare organizations should proactively give out information. Open workshops hosted by private and public health care organizations, where third-party organizations could freely come in and see

the processes related to primary health care from both the patients' and organizations' view would accelerate start-ups identifying the nodes in primary health care. In long-term this could lead in more quality seed-stage innovations from third-party organizations that public and private healthcare sector could benefit from.

More successful evaluation process of innovation and R&D project portfolios

Interviews revealed that financial restraints led to high level of prioritization of projects, leading to many prominent innovations to be left out without funding. This issue rooted from health care sector's inability to provide the necessary resources for the productization of innovations. Commonly, both in private and public health care sector, the executives evaluating innovation projects are medical doctors by degree. However, currently there is a trend in increasing amount of medical executives having additionally an MBA degree though postgraduate degree. Despite this, very few have experience in the field of venture capital.

Through our research we saw that due to health care service providers not identifying themselves as venture capitalists, they only invest in innovation projects with low risk. Innovation by nature is inherently risky, and getting the most from a portfolio of innovation initiatives is more about managing risks than eliminating it. Since valuable innovation can emerge from anywhere, and searching everywhere is impractical, executives must create some boundary conditions for the opportunity space they want to explore. We suggest an approach where evaluation of innovation initiatives would be executed through the cooperation between people with experience in venture capital and medical executives. Medical executives would have the responsibility in creating the boundaries and evaluating the feasibility of the project, whereas venture capitalists would have the responsibility in creating a robust innovation project portfolio. This sort of approach would solve the problem related to the cultivation of innovations to actual products/ services that can be sold to third-party organizations, as the venture capitalists would have the necessary knowledge for this.

Reducing the "gap" between seed-stage innovation and implementation of the innovation

Analyzing both literature and interviews allowed us to identify the problem related to perception of wanted innovation state. As an idea for an innovation is created, the innovation team goes forth and starts executing the project. However, at a certain state financial restraints come into question, at which point the project team seeks for additional investment. From the health sector's point-of-view, they want to invest into innovations that have matured to a certain point. Figure 5 visualizes the problem and gap of perception that is created.

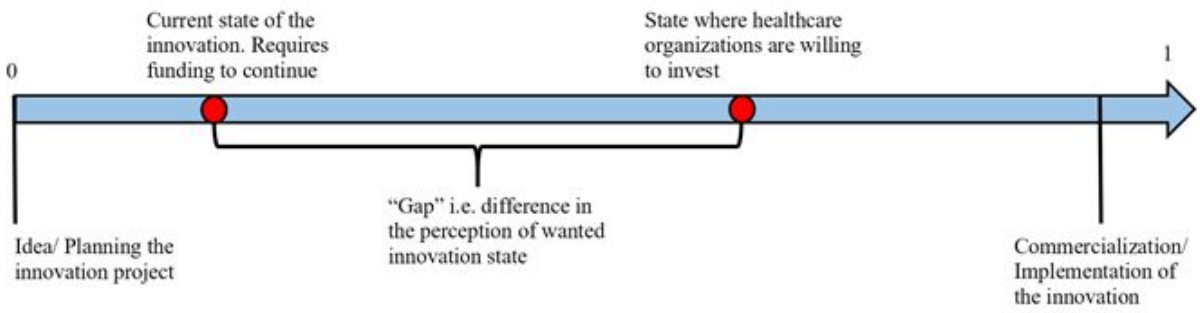

Figure 5: Gap of perception between the project team and the customer

This problem of perception may be resolved in one of the following three ways:

1. Due to financial restriction, the project team cannot continue the project on using primarily their personal finance. Therefore, a third-party organization (venture capital firm) may invest in the team and help them in their way to the state, where the healthcare organization may invest in them. This however, means that the venture capital firm will have a large portion of the innovation and the innovation may be misdirected in the path. Additionally, the "customer-project team"- dilemma arises, as team will not be in close communication with the healthcare organization, during the development of the innovation.

2. A modular solution, where the healthcare organization reserves a smaller portion of their innovation/ R&D fund for seed-stage ideas. This fund would meet the project team at the

point the team needs funding. As the funding will not be enough for the team to develop their product/service to the later point, a third-party organization (venture capital firm) comes along the way. This method will allow innovation to be developed in the right direction, however, the methodology cuts the larger fund which was initially reserved for mature innovations.

3. As the healthcare sector is limited by resources, they as well cannot move backwards the timeline to fund seed-stage innovations. As resources are limited, by creating co-op innovation and R&D funds between multiple healthcare service providers the fund would increase in size, which would allow the "gap" to become smaller. The smaller "gap" would allow the project team to meet the customer at an earlier point of time, leading to the development of the innovation towards the right direction. However, this solution is complicated, as it requires multiple healthcare organizations to co-operate with each other, leading the innovation not to result in a competitive advantage of a single organization. Rather the innovation would be more fruitful for the healthcare organizations if it was productised with a good strategy and sold out to other domestic and foreign health care providers.

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