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Design Thinking as Facilitator for Innovation in Swedish Healthcare

A case study at Karolinska University Hospital

Master of Science Thesis
in the Management and Economics of Innovation Programme

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Abstract

There are enormous challenges facing the healthcare sector in the near future. Worldwide there are problems with rising cost and variation in quality. Improvements must be made not only sporadically, but systematically in order to address both sides of the problem at the same time. Improvements needs to be made that tackle both the quality as well as the cost issue of healthcare delivery, which means that innovations are needed. Not only in the technical advancements, but largely in the delivery of healthcare.

The purpose of this study is to investigate problems that Swedish healthcare is facing in the near future regarding innovation- and development work, and to investigate how Design Thinking may support it in addressing these problems. The study includes a literature review and a case study at Karolinska, primarily based on interviews of senior employees involved in the innovation and development work in the organization.

The study identifies problems in innovation work on three levels of aggregation (strategic, structural and cultural) with misalignments amongst them. The most challenging aspects were perceived to be large organizational complexity, hesitation towards new methodologies and concepts, and difficulty in obtaining patient involvement. In our assessment of Design Thinking as a potential approach to address these problems, we found that it might be difficult to implement, especially its methods, primarily due to the inherent resistance towards new concepts. Still, the thesis argues that involving the more philosophical approaches of Design Thinking to patient involvement and cross-functional work could be a way to address some of the problems Swedish healthcare is facing.

Abbreviations

AR - Action Research
BM - Bra Mottagning (translated: good reception)
CFI - Center for innovation
COO - Chief Operating Officer
DT - Design Thinking
EBCD - Experience Based Co-Design
EBD - Experience Based Design
KI - Karolinska Institute
KP - Kvalitet & Patientsäkerhet (translated: Quality and Patient safety)
NPD - New Product/Process Development
PAR - Participatory Action Research
PD - Participatory Design
PFR - Patient Flow Responsible
PR - Participatory Research
SKL - Sveriges Kommuner & Landsting (translated: Swedish Association of Municipalities & Counties)
SSVP - Strategisk Sjukvårdsutveckling & Vårdproduktion (translated: Strategic Medical Development and Healthcare Production)
TQM - Total Quality Management
VBHC - Value Based HealthCare
QUL - Qvalitet, Utveckling, Ledarskap (translated: Quality, Development Leadership)

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1. Introduction

1.1 Background

In all organizations that strive for competitive advantage, innovation is crucial (Kalb, 2013). With increasing pressure on efficiency as well as quality improvements, the healthcare sector is no exception (Porter & Lee, 2013). Yet, in many large organizations, organizational development and capabilities that foster innovation are often difficult to achieve. The healthcare sector is facing enormous challenges in the near future, including rising cost and variation in quality (Porter & Lee, 2013). These problems can be explained by several factors amongst which the change in demographics, development of new expensive treatments and demand for better healthcare are large drivers (Kaplan & Porter 2011). Though "countless incremental fixes" have been tried in order to address the ever more burdened healthcare system, the problems only seem to increase (Porter & Lee, 2013).

In order to tackle healthcare's problems with increasing costs as well as increasing demands on quality, improvements must be made, and not only sporadically, but systematically (DeWolf, 2009). In order to address both sides of the problem at the same time improvements needs to be made that both improves the quality as well as reduces the cost of healthcare delivery, which means that innovations are needed. Not only in the technical advancements, but largely in the delivery of healthcare.

As the challenges facing the healthcare sector in the future requires large overall improvements in the care delivery system, innovative solutions will become central. In order to foster an adequate climate and gain benefits from the advancements made in the complex environment of the healthcare, a new mind set, methodology and techniques are needed to provide a more "transformational" and disruptive landscape than what is today (DeWolf, 2009). In the intricate system of healthcare delivery it has been argued that innovation work is more important than in other industries, due to the many forms of complexity, uncertainties and the need for out of the box solutions (DeWolf, 2009).

In recent improvement work within healthcare both in Sweden and internationally, there has been a trend towards a more patient-centered focus than previously. Barry & Edgman-Levitan (2012) describe how the focus has shifted away from only treating diseases towards care with an increased understanding of patients values, preferences, and needs in order to ensure quality and safety. Further, they describe the difficulty of putting words and ideas into practical use and to implement structures that continuously involve patients in development and decision-making. There is thus a need to investigate alternative approaches to improvement and innovation that also take these aspects into account.

Design thinking (further written as DT) is a way of thinking and working to find problems and to generate and implement new solutions to the problems with focus on the customer; and in the case of healthcare, the patient (McCreary, 2010). It is a relatively young concept that originated in US where it has gained large momentum in the industry, health care as well as academia over the last few years, and it is now starting to gain foothold in Sweden (Carlgren, 2015). DT originates from the design domain and focuses on a human-centered view, cross-functional collaboration and experimentation. It has developed from being used primarily in product design to being widespread within management and problem solving (Liedtka, 2014 With one of the cornerstones in DT being the practice of always starting from a customer perspective, the methods and thought processes within this field could provide synergies and

alignment with the aims of today's more patient-centered view in healthcare. While some examples of DT implementations can be found in hospitals primarily in US. This thesis will look into its potential application in Sweden, by studying the case of Karolinska University Hospital, investigating if DT could act as a facilitator and a tool to find and implement new ways of delivering care that is in alignment with current improvement work.

1.2 Purpose and research questions

The purpose of this study is to investigate problems that Swedish healthcare is facing in the near future in order to become better in continuous improvement and innovation, and to investigate how Design Thinking may support health care organizations in addressing these problems.

The purpose of the study is broken down in two research questions:

- What are the problems that Swedish healthcare is facing regarding current and future innovation- and development work?
- How may DT support Swedish healthcare in addressing these problems?

1.3 Case organization

Karolinska University Hospital is a hospital with its presence in the urban area of Stockholm in Sweden, primarily on two locations: Solna and Huddinge. It has coverage for an area of approximately 2 million residents. It was founded in 2004 by a consolidation between Huddinge Hospital and Karolinska Hospital, which have both been closely affiliated with the medical university Karolinska Institute. The consolidated entity has continued to be so. Karolinska is governed by the county of Stockholm, has a turnover of 16.3 billion SEK (2014), 15 300 employees, and has 1 700 hospital beds. It had 1 714 825 patient visits and 105 641 admissions during 2014 (Karolinska Årsrapport 2014, 2015).

1.4 Delimitations

This study will highlight problem areas in innovation work, and assess the suitability of DT as a framework for innovation in a health care organization such as Karolinska University Hospital. Outside of the scope is the development of guidelines for *how* DT could be implemented within the case organization.

Innovation in healthcare comes in many different forms. They are ranging from technical instruments and new treatments to innovation in services and care delivery. This makes the line between innovation work and improvement work sometimes hard to distinguish, and this report will therefore treat the entire spectra as being innovation work.

2. Literature review

This chapter includes a literature review in four parts. First, literature on innovation in general, innovation in healthcare, and the difficulties that lies in innovating. Second, literature on DT that aims to provide an understanding of the concept and what it implies. This part also includes examples of how it has been applied in healthcare and concepts within Swedish healthcare that are to some extent overlapping. Thirdly, the context of the Swedish healthcare and the frameworks it has used historically is described. And fourthly, Karolinska University Hospital's current framework for innovation- and development work, Value Based Healthcare, is described.

2.1 Innovation

Innovation as a concept has gained increasing amount attention during the recent decades in academia as well as industry. Companies strive to be innovative to create new business opportunities and stay competitive in the long term, and society recognizes innovation as one of the key factors driving economic growth.

2.1.1 Definitions and Classifications of Innovation

When describing innovation and innovative activities, many of the fundamental definitions used by scholars proceed from the views of Schumpeter (1934). The term innovation is usually understood as something new, products or ideas that have no previous occurrence in society that creates value for some stakeholder. However, a common view is to make a distinction between innovation and invention, with the latter being only something novel, i.e. new to the world, being it a product, a process, the methods used to come up with these (Schumpeter, 1934). Similarly, in innovation research widely cited publication *Managing Innovation: Integrating Technological, Market, and Organizational Change* Tidd et. al. (2005) argue the novelty criteria is not sufficient for something to become an innovation. They explain it as the aim is to gain strategic advantage through finding new ways of doing things, defining innovation as the "process of turning opportunities into new ideas and of putting these into widely used practice" (Tidd et al. 2005:66). Although these definitions seem rather straight-forward, how innovation manifest itself and what it becomes in different contexts varies a lot and is subject to extensive further discussion.

Depending on industry and the type of actors within, innovation appears in different forms – for example new products and services, new methods of production and ways of working, new business models, etc. (Schumpeter, 1934;Tidd et al, 2005; Mascitelli, 2000), sizes, and extents. Further, scholars often describe innovation in terms of different degrees of novelty. Mascitelli (2000) explains how scholars define innovations with a pair of contradicting adjectives. One referring to properties of doing things in a completely new way, while the second describes a less novel state where the practices builds on existing technology and knowledge, or new combinations of it. Examples of such pairs of common use in innovation research are radical vs incremental, disruptive vs sustaining, and revolutionary vs evolutionary. It can be argued though that this way to distinguish innovation can provide a too simplistic image of things. What is an incremental improvement in one setting may for example be very radical when applied to another one. Mascitelli (2000) reasons that these adjectives should therefore not be used to describe innovation, but rather to understand it. As he states: "Innovation can be thought of as a complex and continuous space, with each of the pairs of descriptors offering insights along a different plane".

2.1.2 Innovation in healthcare

Länsisalmi et. al. (2006) argue that in the context of healthcare, innovation can be argued to be somewhat more complex than in other sectors. They describe how healthcare is characterized by unique conditions regarding risks, regulations, and behaviors of practitioners regarding protectionism of their autonomy as well as reputation. This can often make innovation work in healthcare more difficult and challenging to manage. Fleuren et. al. (2004) also argue that innovation in healthcare can be regarded as a special case due to an often occurring issue to get practitioners to accept new methods and solutions.
Faulkner & Kent (2001) describes how methods and procedures in healthcare often are subject to extensive research with a long development and testing procedure before exposing it to the patient. Also as Pope and Mays (2000) argue, medical practitioners are mostly used to clinical, often experimentally based, research with quantifiable evidence, and not qualitative research methods that are more common in relation to innovation of care delivery.

The structure and context of healthcare organizations together with the mindset of practitioners creates an approach to innovation that could be argued to deviate somewhat from definitions of innovation in other industries. Related to Schumpeter's (1934) innovation criteria the hesitation towards change and untested novelties in the healthcare industry might make endeavors, that in many other industries would be regarded as development work, being of such novel nature that they could be regarded as innovations.

To draw a clear line between what is development work and what is innovation is difficult since the two concepts are closely related and largely includes the same components. However many authors tends to write about innovation as being more linked to out of the box solutions, complex problems, more uncertainty and methodologies connected to these (Tidd et. al. 2005; Adams, Tranfield & Denyer, 2001; Day & Shoemaker, 2011; Mascitelli, 2000). Further Lefler (2010) argues that an innovation differs from development and improvements in the aspect of giving competitive advantage that others are unwilling or unable to replicate. This definition implies that innovations are comparative in the sense that if someone else replicates it, it loses its status of being an innovation. This definition could be argued not to fit with the more cooperative situation in the Swedish healthcare sector where actors cooperate more than they compete. This perspective however further emphasizes the blurriness of the "line" between the concepts, especially in the case of the Swedish healthcare.

Using the resource and capability perspective one could find a number of definitions on what innovation capability is (Carlgren, 2013). One that is broad enough to be suitable for the healthcare sector is one provided by Lawson and Samson (2001): *"the ability to continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the firm and its stakeholders"*.

2.1.3 Difficulties of Innovating

For small firms it can be difficult to obtain the technical, financial and other resources necessary for improving incrementally in a competitive way with larger actors. For larger ones however the difficulty often lies in disruptive innovations (Assink, 2006). The difficulties in adapting to disruptive innovations primarily lies in the path dependency of the company, and that cannibalization and devaluation of the current assets can risk the operations, and even existence of the firm (Christensen, Kaufman & Shih, 2008). The lack of "greenfield" thus makes it difficult to acquire so called ambidexterity regarding the innovation process, in other words to manage a wider range of innovations; from incremental to radical, from sustaining to disruptive etc. (Assink, 2006). Assink (2006, p.1) presents some of the

most important inhibiting factors when working with disruptive innovations in large firms: *"the inability to unlearn obsolete mental models, a successful dominant design or business concept, risk-averse corporate climate, innovation process management, lack of adequate follow-through competencies and the inability to develop mandatory internal or external infrastructure."*

Argyris (1991) emphasizes the difficulties in the level of education and specialized competencies amongst the employees. He argues that generally professionals are too focused on problem solving, or "single loop learning" as he refers to it. He argues that highly skilled professionals are very efficient in performing the single loop learning, this in turns provides the learning dilemma where the aversion to fail and satisfaction of solving problems induces the risk of not going into the "double loop" learning. Where you instead of trying to solve "external" problems, question what you are doing and in what ways you can improve internally.

Christensen, Kaufman & Shih (2008) describes how only focusing on current or historical needs can provide a lock-in that disables the ability to adopt to new technologies. Capital funds are allocated to activities that satisfy the perceived current needs. This lock-in is not easily overcome, however Bower & Christensen (1995) provides a framework for how big firms should approach disruptive innovation and new technology in order not to just survive technology shifts, but to exploit them and to keep a strong market position.

1. Determine whether the technology is disruptive or sustaining
2. Define the strategic significance of the disruptive technology
3. Locate the initial market for the disruptive technology
4. Place responsibility for building a disruptive technology business in an independent organization
5. Keep the disruptive organization independent

2.2 Design Thinking

To address an increasing need for businesses to improve innovation outcome in order to cope with dynamic environments, practitioners have during the recent years increasingly emphasized and advocated Design Thinking as an alternative problem-solving methodology (Dunne & Martin, 2006; Brown, 2008, 2009; Lockwood, 2009; McDonagh & Thomas, 2010). In academia however, the concept is in an early phase with research focusing on mapping its use in relation to innovation in business contexts (Carlgren, 2013; Carlgren, Elmquist & Rauth, 2014 (2)) as well as developing an understanding of it from a research perspective (Liedtka, 2014; Carlgren, Elmquist & Rauth, 2014 (1)).

2.2.1 Tracing the history of Design Thinking

With an origin in both Design Research and Management Research, the roots of DT go back in history. Liedtka (2014) describes how the term as such actually appeared as early as 1987, but then as an approach to architectural design and not business-focused as is the case today.

In their review, Johansson-Sköldberg & Woodilla (2013) makes the distinction between "Designerly Thinking" and Design Thinking. They explain how the former has been subject to academic research for a long time, with effort put on understanding the methods, competences, approaches, thought-processes, and objectives of professional designers. On a conceptual level, they further illustrate Design Thinking as what is occurring in the intersection of "Designerly Thinking" and traditional management tools, i.e. innovation and

organizational development. In other words *managing* the design process within businesses, rather than focusing on understanding the actual design methods and practices on an individual level.

The breakthrough and popularization of Design Thinking in its current context is widely attributed to the Silicon Valley-based design and consultancy firm IDEO (Johansson-Sköldberg & Woodilla, 2013; Liedtka, 2014) and the published works by its CEO Tim Brown (Brown, 2008, 2009) and the founder's brother Tom Kelley (Kelley, 2001, 2005). Brown's high profile and visibility has played a big part in spreading the concept and making it gain foothold and raising curiosity among business managers. E.g. The Deep Dive Show on ABC Nightline in 1999, a cover article in Business Week in 2004 and TED-talks has helped in spreading the concept as well as promoting the company.

Liedtka (2014) exemplifies how IDEO initially was focused on product development and design, but in the recent decade has shifted its focus away from the outcome and more towards the process itself. Offering consultancy- and educational services the firm has been working with a range of renowned institutions: big firms such as 3M, Acer, GE, Microsoft, Toyota; governmental institutions, for example US General Services Administration (IDEO, 2015).

The wide attribution of DT as stemming from the work within IDEO can be discussed though. As an example Johansson-Sköldberg et. al. (2013) on one hand recognize the importance of IDEO in DT's breakthrough in the recent years, but on the other expose the contributions from Brown and Kelley to criticism, describing their work as anecdotal and lacking theoretical grounding. The authors further argue for two supplementary origins of DT, relating to other ways of working with the concept. First, from the works of Roger Martin at Rotman School of Business (Martin, 2009; Dunne & Martin, 2006) a more cognitive-oriented approach: "DT as a Way to Approach Indeterminate Organizational Problems, and a Necessary Skill for Practising Managers". Second, as purely theory, stemming from Bolland & Collopy (2004) "DT as Part of Management Theory".

DT has also gained a momentum and recognition in many schools, amongst which Harvard Business School, MIT and Stanford University probably are the most famous examples where courses, and even programs, are offered on the topic (HBS, 2015; MIT, 2015; d.School, 2015).

2.2.2 Exploring the Concept

DT is typically described as a process for solving problems and/or working with innovation. The different proponents all frame DT in slightly different ways, but the process typically involves similar ideas and goals in each phase (Liedtka, 2014). The concept also comes with a set of suggested tools, and some general guidelines, such as cross-functional teamwork and the idea of iteration.

However, when applied to organizational settings, DT may take different forms depending on the context of the organization and the approach to the concept. To structure how DT manifest itself in a management context, Hassi & Laakso (2011) concluded a presence of three elements: first as *a set of practices*, second as *cognitive approaches* and third as *mind-sets*. For the purpose of this report, it is not necessary to further highlight practical use of DT according to each of these practices, however it is important to point out that DT on one hand

could imply *methodologies* for innovation and problem-solving and on the other *philosophical* approaches to it.

Descriptions of Design Thinking

That research on DT in academia is young causes a discussion on a rather high abstraction level that can provide a vagueness in the conception of it. Although definitions vary, DT is generally intended to approach problems that are complex in nature and thus difficult to both articulate and solve through conventional stage-gate or other straight forward problem-solving techniques (Carlgren, 2013; Lockwood, 2009). It differs from traditional problem solving techniques by avoiding making choices for as long as possible in order to maximize learning as an uncertainty reduction strategy (Liedtka, 2014).

Liedtka (2014, p. 3) synthesizes her view on DT into a generic definition that captures the essence of the concept and the iteration and experimentation it includes:*"It is a hypothesis-driven process that is problem, as well as solution focused. It relies on abduction and experimentation involving multiple alternative solutions that actively mediate a variety of tensions between possibilities and constraints, and is best suited to decision contexts in which uncertainty and ambiguity are high. Iteration, based on learning through experimentation, is seen as a central task."*

Dunne & Martin (2009) also focuses on iteration and experimentation but puts even more emphasis on the cognitive aspects and that it is a way to approach problems using induction, deduction, and abduction simultaneously: "*Design thinking is the way designers think: the mental processes they use to design objects, services or systems, as distinct from the end result of elegant and useful products.*" (Dunne & Martin, 2009, p. 517)

Practitioners are similarly describing how DT can be applied to experiment and iterate, but tend to have a clearer user-focus in their definitions. Brown (2008, p. 2) describes it as "*A discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity*". Furthermore Lockwood (2009) points out that the user aspect is important and central in the process of DT. He puts emphasis on that DT is a human-centred innovation process which puts focus on observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping and concurrent business analysis.

The Process of Design Thinking

How DT is incorporated into organizations and how it manifest itself within depends to a large extent on the respective contexts. However, there are similarities in the general processes that are applied. Liedtka (2014) illustrates this by reviewing some of the leading institutes' approaches to DT, eg. IDEO, Continuum, Stanford Design School, Rotman Business school, Darden Business School. She explains how they all share three general process steps although the terminology differs somewhat. The first of these steps include an extensive exploratory phase where information and data is collected in order to understand the users, their needs, and the problem context. This step is followed by a phase of idea generation and brainstorming to try to find innovative ways to meet user needs. The last step implies iterative prototyping, often in cross-functional groups by early on experimenting with and testing the generated ideas in close connection with the users.

An example of how the structure used by the different schools can be similar, but takes somewhat different shapes can be seen in the two figures below, describing how DT is taught at d.school on Stanford University and The Nueva School respectively.

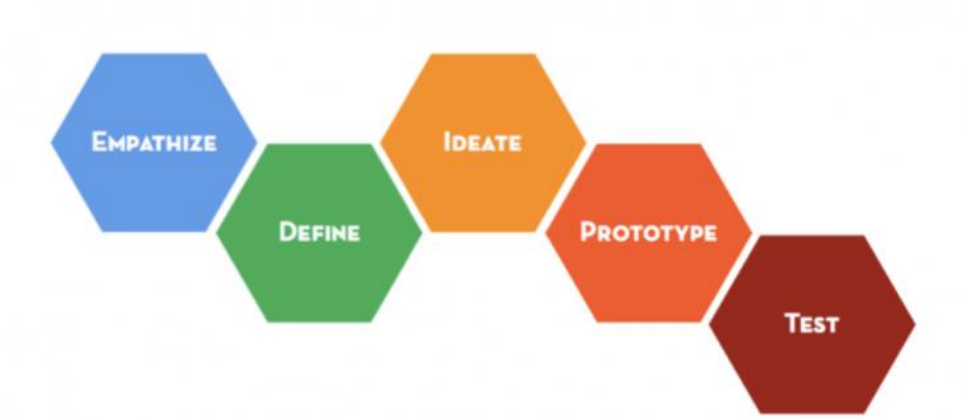

Fig. 1: The general steps taught in d.school (Hasso Plattner, 2014, *bootcamp bootleg*, d.school)

Fig. 2: The general steps taught in The Nueva School(Kim Saxe, 2008, *Design Thinking @ The Nueva School,* Innovation lab; The Nueva School).

Liedtka (2014) further explains how there is a shared view of the importance of customer involvement in all stages. Although it is carried out by different methods, and with a higher or lower degree of collaboration, the processes are all human centered and driven by users rather than experts. The prototyping and development made by the experts is not to display, persuade or test, but rather to learn and drive real world experimentation (Liedtka, 2014).

Perceived Advantages & Disadvantages of DT

In describing the benefits of why to apply DT, some criticism towards practitioners has been held forward in academia. It has been argued that much of the published material on DT is not scientifically founded (Johansson-Sköldberg et. al., 2013) and often is described through

anecdotal "sunshine stories", displayed as miracle cures (Carlgren, 2013). As an example, Brown (2008) as one of the most prominent practitioners and proponents for DT, expresses the value of DT in that it helps companies going from making existing ideas more attractive to customers, to create new ideas that better fits the desires and needs of the customers. He argues that DT thus is a way for companies to move from tactical to strategic towards their customers.

When describing areas where the methodology of DT can contribute to the operations of organizations, generic statements of value such as the one from Brown (2008) can be somewhat "fluffy", praising it as a universal solution to address all sorts of problems. Therefore, it is important to recognize both potential benefits as well as drawbacks with the concept.

Carlgren et. al. (2014) and Liedtka (2014) both explain the benefits of DT in their research. The papers argue that DT primarily can increase innovation capability and that it provides a generally desirable mindset. Carlgren (2013) exemplifies that DT often is described to be a generic problem solving approach that provides simple solutions to complex problems that is fitting in many organizations and situations, and she further argues that it is usually connected to the NPD (New Product/Process Development) phase.

One of the most salient advantages of DT lies in the exploratory and idea generation phase. As held forward by Liedtka (2014), DT can enable out of the box thinking in the development and exploration phase, rather than expensive and extensive preparatory studies and investigations. Working in iterative and exploratory ways, rather than investigating linearly, is argued to be better suited for more complex solutions and environments. This has been recognized by researchers long before the introduction of DT. As explained by McLeod & Lobel (1992) the idea of using multi-disciplinary groups could further enhance the variation in the idea generation, which is an important component for generating a wider variety of solutions.

Benett (2013) explains how benefits to some extent lies in the extensive situation analysis before starting to work with solutions. He describes how this focus is an enabler for new insights and different point of views. Further, it implies that DT can be a generator of radical breakthroughs and be comparatively more advantageous in this type of development work, than the work of more incremental nature.

Benett (2013) further claims that DT can improve innovation work through creating understanding and new ideas amongst groups from different, not evidently related, backgrounds, cultures, industries or companies. Further on this topic, Macitelli (2000) argues that work in cross functional teams, prototyping, and other "unusual" ways of communicating express tacit knowledge. Especially during the "problem understanding phase" and thus facilitating the "ambiguous and probing nature of innovation work".

Zmijewski (2014) argues that a downside with the concept is in many cases that it lacks clearness and specificity due to the fact that it is a young concept. This is not inherently a negative thing, but many organizations prefer clarity and structure of how to make use of it (Zmijewski, 2014). On one hand, this flexibility of the concept can allow organizations to customize how to adopt it. On the other, the differences in how it is applied complicates comparison between organizations, and makes it hard to draw generalizable conclusions from results obtained. Zmijewski (2014) further implies that DT and more conventional structured

methods for problem solving even can be seen as conflicting in corporate settings. He claims that companies wants the clarity and straightforward answers provided by spreadsheets, science and engineering in order to build confidence, even though it might not be what they need.

The extensive situation analysis described by Benett (2013) could be expected to be beneficial in cases where the problem situation is complex and difficult to grasp without a deep dive. In less complex situations though, where the solution is more incremental and straightforward, the extensive exploration and experimentation might become excessively time consuming. Björgvinsson, Ehn & Hillgren (2012) points out that the concept is not a new concept, but rather a version of Participatory Design. It can be argued that DT has much overlap with other concepts, which will be described (in chapter: Overlapping Concepts). This is, just as the clearness and specificity of the concept, not necessarily a bad thing, but can create confusion and hesitation towards implementation due to historical work in the organization.

2.2.3 How DT has been applied in healthcare

Originally DT was mostly used in contexts with designing of new products, but have come to include other areas such as services, strategic work and education (Liedtka, 2014). It has been used most industries and contexts amongst the most common are product development, problem identification, strategy, management work and workflow improvements (IDEO, 2015). Companies that have worked or are working with DT include Ford, Microsoft, eBay, JetBlue, Commonwealth Bank of Australia, 3M, GE, P&G, Philips Electronics, etc.

In their review of how DT is used within organizations in various industries, Carlgren, Elmquist & Rauth (2014) found that it is used both as a part of the formal product development process, but also as a supplementary method in order to find new more radical solutions. They also found that the extent to which the companies had adopted the methods varied greatly, from a whiteboard with post it notes, to dedicating an entire warehouse as "experimentation playground" for DT work. The way DT is used to foster innovation comes down to what role innovation and innovation work has for the organization.

In healthcare, DT has been carried out as a method for improvement work and innovation within different organizations in recent years, primarily in the United States. The purpose of using DT and how it has been implemented varies, but usually the work is oriented towards product development, process improvement, or redesigning patient or employee experiences. Following, a selection of organizations where DT has been implemented will be described as an illustration of the diversity in how it has been applied in different settings.

GE Healthcare

GE Healthcare has attempted to incorporate a more design centered perspective in their problem solving apparatus. They have for example a technical leadership development course that uses practices from DT. The aim is to equip the employees with tools to manage problem solving with more imagination. The organization has had much focus on Six Sigma as method of improvement but want to change focus from only operations efficiency towards “imagination at work”. The course starts with reading a comic book and continues for 2 weeks, including parts like describing their problems in haiku poems and drawing maps of the workflows and visualizing the patient experience (Wong, 2009).

The results from their increased design activity has been described as a booster of innovation and thus the bottom line (Wong, 2009). Noteworthy is also that the implementation of DT

tends to be difficult for some, much due to the discomfort included in rethinking the ways of working and regarding yourself as a designer of the organization (Wong, 2009).

Memorial Hospital of South Bend

Memorial Hospital and Health System turned to IDEO in 2002 to get help regarding developing a new heart and vascular center for the hospital (Memorial Hospital, 2014). The IDEO consultants began by observing the current hospital environment to understand how the new center could be designed. In this first phase the understanding and observation was central to understand the market, client, technologies and the perceived constraints, and this from real life situations by following and observing the patients as well as practitioners for weeks. Phase two was a so called "Deep Dive" series of three two-day gatherings where the synthesizing (understanding and structuring of the design themes from the first phase), visualizing where much brainstorming and imagining new ideas for the design was made, prototyping where sharing of ideas through building was made, refining where a narrowing of the original and prototyped ideas was made, and selecting where evaluation and prioritization of the ideas and concepts was made.

The "Deep Dive" activities acted as an eye opener for the involved from the hospital: "I look deeper and see things I've never seen before...how people really interact with each other."(Memorial Hospital, 2014, p.2). Several problem/improvement areas were isolated and addressed (Memorial Hospital, 2014). Further emphasized is the power of team work and team spirit. The sense of ownership is expressed to increase the motivation and a more open climate to work in less hierarchical groups that respects the diversified skills rather than their "seniority or political skills" and empowers the team to strive for improvement even though they do not yet have all the answers.

Mayo Clinic

Mayo Clinic is working actively with human centered design thinking. Their Center for Innovation (CFI) was created in 2008 and acts as a bridge between DT and medical practice (CFI, 2013). The CFI uses structured methodologies to increase the work of innovation and acts as an incubator for new ideas to be evolved to become ready for incorporate in the care delivery. The CFI has an in-house lab where observations, interviews and research of patients, relatives and "traditional consumers" are made. Further they work with visualization, modeling, prototyping and testing of possible health care delivery solutions (CFI, 2013). They aim to use "a problem-solving approach that goes beyond process analysis or quality improvement" (CFI, 2013).

One example of projects that has been implemented at the hospital is the Jack and Jill Rooms (CFI, 2015). The idea of this project is that only a small part of the patient meetings includes physical exams while the most rooms were equipped for this. The classical exam rooms were isolated as inadequate for collaborative communication, while the Jack and Jill Rooms were equipped to support this (CFI, 2015). The rooms were placed on both adjacent sides to the exam rooms, with monitors and space for family members, not only making the collaborative communication better, but also enabling better disposition of the exam room and allowing for more patient visits (CFI, 2015).

Chief Andrew Isaac Health Clinic in Fairbanks

In the work with developing a new outpatient and speciality clinic, Chief Andrew Isaac Health Clinic used designers to understand the patients as well as the problems and conditions. The designers went out to see how the people lived in order to understand their culture, sense of community and expectations for a healthcare provider. Further they did

extensive work on understanding the problems and conditions in the former facility. This work resulted in an entirely new model of how to deliver care to the patients in the new facility. (Kovacs Silvis, 2013)

Kaiser Permanente

Based in Oakland, California, and operations in seven additional states, Kaiser Permanente is the largest managed care organization in the United States. With 17,000 physicians, 174,000 employees, a turnover amounting to $53.1 billion, and serving roughly 8.6 million patients (Kaiser P, 2013), its operations are highly diverse and managing a coherent strategy for innovation and improvement work is a very complex task. A recent identifier and facilitator for this work has been the "Innovation consultancy team". Stemming from Kaiser's involvement with IDEO in 2003, a small team working with a DT approach was founded with the expressed purpose to develop better and more efficient processes for some of their high-value activities.

The innovation consultancy team is a group of 10 people specializing in innovation, design, and operations (Innovation Consultancy, 2015). It was founded to try incorporating the work methods Kaiser had learnt from IDEO into the organization. At first, management thought they could be spread and implemented fully in the organization, but soon they realized that it would be difficult due to both the ability and willingness for people to learn the methods. Through appropriation of a human centered design process closely related to IDEO's framework, they undertake carefully chosen projects and improvement areas aiming improving care experience for the patients and work experience for the employees. So far, this work is in an early state, trying to identify and reap benefits from quite apparent improvement areas, i.e. pick the low-hanging fruit (McCreary, 2010).

One early and famous project the innovation consultancy team undertook was one to improve how nurses exchanged patient information among each other between shifts. They thought this process was taking too long time, usually around 45 minutes, which led to a delay in arriving nurses' first patient interaction. Also, nurses wrote down patient information in their own individual and sometimes unorganized manner. (McCreary, 2010). The team made observations on four hospitals, watching shift changes practices to understand the process. This was followed by a brainstorming- and prototyping phase where a cross-functional team collaborated to come up with alternative solutions. The prototypes were tested for three weeks with an iterative approach making continuous changes and corrections (IDEO, 2005). Coming from the project, patient information exchange started occurring at the patient's bedside and not the nurse's station, the patients were encouraged to participate to ensure coverage of all information, and new software was implemented in order to compile information in a standard format.

2.2.4 Overlapping Concepts

Within healthcare, DT is a relatively young concept still under development and search for definitions and appropriate forms to apply it. It is however existing in a context where other methods and frameworks have been applied aiming at producing similar results. As in the case of Bjögvinsson, Ehn & Hillgren (2012), discussing DT in relation to Participatory Design, some might argue that DT is in fact not new at all. It is observable that healthcare actors have been and are using concepts that are similar to or overlapping with DT.

The essence of what DT aims at contributing with comes down to innovation, development, and improvement work from a user perspective. All these factors are in different ways being

considered in healthcare. When studying the components of DT along with the historical work of the case company, parallels to similar concepts that have been used in the Swedish healthcare have been identified. Some of these similar concepts are described below.

Participatory Design

According to Bjögvinsson, Ehn and Hillgren (2012) Design thinking is nothing new, but rather a conceptualization of Participatory Design (PD) which is a concept that originates in the 1970´s. They argue that the idea of PD in terms of including the user in the development process, keeping a clear customer and user focus, using designer methods in more strategic work, visualization and prototyping, makes the DT and PD the same. Naturally it is important to keep in mind that the concepts have much in common and that one can learn from looking at them both (Bjögvinsson, Ehn and Hillgren, 2012).

Action Research

Action Research (AR) can be traced back to the second world war (Argyris, 1983) but got a larger momentum during the 1980 when much research was conducted on the topic of learning by studying practice and users in, called AR or Action Science (Friedman et. al., 2014). The concept is based on a series of stages that could be followed in a cyclical way: analysis, fact-finding, conceptualization, planning, implementation of action, and evaluation (Baskerville & Wood-Harper, 1996). The level of abstraction in these steps could vary, but generally follows the cycle of the today more famous PDCA (Plan-Do-Check-Act) framework. The research gained much attention and became a large area of organizational science, separating into several sub-categories like Participatory Research, Participatory Action Research, Action Design, Single loop/Double loop learning, etc. (Koch & Kralik, 2006). The similarities with DT lies primarily in searching for solutions and finding better, more innovative solutions by focusing on understanding the user (often called the empathizing phase). The importance of AR to this report mainly lies in the fact that it has become wide spread in medical studies and isolation of best practice (Koch & Kralik, 2006).

Participatory Research

Participatory Research has its focal point in the studies of participating users and customers. It further have many similarities with AR in the sense that it originates from studying the practice, also it is usually combined with the practice of AR. However it differs slightly in focus since it aims to include the participants to a larger extent, resulting in doing the research *with* rather than *on* them (Cornwall & Jewkes, 1995).

Participatory Action Research

PAR is as the name suggests a combination of both AR and PR. In healthcare it has been studied by Koch & Kralik, who define it as a cyclical collaborative working method in which researchers and participants where concerns, claims and issues that influences peoples' lives. The idea is very similar to DT, where direct observations, storytelling, cases, group work and understanding of context is central for the progress (Koch & Kralik, 2006).

Experience Based Design

The idea of focusing on the experience of the patient as starting point for the design and development work is the starting point of EBD. Bate and Roberts (2007) provides concepts, methods and practices on the topic. The aim is to make the experience of the user clearer for the designers and to go from the focus of products and services towards delivering

experiences. Further they describe it as a stepping stone towards working together with the user in a more equal manner as co-designers and collaborators with the users or patients.

Experience Based Co-Design

As a logical extension of the concept EBD comes EBCD, which includes the user as a co developer in the process (Bate & Roberts, 2007). The concept can be described as a form of participatory action research where the focus lies on capturing and understanding processes and services (Tsianakas et. al., 2012). The subjective experience and feelings of the patient or user and the identification of "key moments" or "touching points" that shape the experience is in focus for improving the delivery of the healthcare according to EBCD. Tsianakas et. al. (2012) presents a framework for the EBCD process, including a phase with extensive interviewing, observing and collaboration with the patients in order to fully understand the problem area, this is followed by "co-designing work groups" and ended with review and celebration.

Breakthrough series

Within healthcare, Breakthrough Series has been a widely spread method of working to increase innovations and to find new ways of working. The method was invented in 1995 by IHI (The Institute for Healthcare Improvement in Boston) and includes working in teams, doing small scale experimental work in an iterative process and following the improvements closely by measuring the differences (IHI, 2003). In order to do this the main focus of the work is initially to understand what is the most important to improve and to understand the need of the patient, much like the work of DT.

Bra Mottagning - Good Reception

BM is a method of working that was developed originally by IHI but have been adopted to the Swedish conditions in the mid 00s. The methodology builds on working in multi disciplinary teams that works according to a seven step plan, including problem and goal isolation, empirical anchoring, getting rid of "old truths" and follow up on results (Ardenvik et. al. 2006). The methodology is not directly connected to DT, but the multi disciplinary teams are common as well as the connection to the "ideation" phase, which could decrease barriers to adoption in organizations which have been working according to this methodology.

2.3 Context of the current healthcare innovation work

All the frameworks presented above (overlapping concepts) have been more or less contributing in forming the foundation of how the innovation and development work is conducted today in the Swedish healthcare sector. As became evident during the study, the methods and frameworks used in the case hospital follows a close to evolutionary trend line, leading up to the current ways of working. Some of the major frameworks are presented below, of which some have elements that are similar or overlapping with the ones of DT.

Balanced Scorecard

As was found during the interviews, balanced scorecard is a concept that have come become important in the development work in the case organization. The concept is founded by Kaplan and Norton in the early 1990´s and has had a large spread in the industry as well as in the healthcare sector (Karpagam & Suganthi, 2013). It is a framework that aims to map and follow up on performance measures (Kaplan & Norton, 1992) and is important for Karolinska´s current work because of its central role in the current work towards Value Based Healthcare.

TQM

On the same basis as Balanced Scorecard is important as heritage for the current working methods, TQM or Total Quality Management has through the interviews shown to be important for the Swedish Healthcare development work in the mid 1990´s. TQM also resembles DT in the sense that it focuses on the quality delivered to the customer or user, rather than the processes used in the process (Naidu et. al., 2006).

QUL

QUL (Qvalitet, Utveckling, Ledarskap - trans. Quality, Development, Leadership) is a concept that has been widely spread in Swedish healthcare. It is a concept that originates from a more general concept which was widely spread in the Swedish industry, called USK (Utmärkt Svensk Kvalitet - trans. Excellent Swedish Quality), which has been adopted to fit the healthcare. It focuses on understanding the processes at a system level of the care delivery in order to improve it. This way of working is a predecessor of the way of working in Value Based Healthcare. The processes are mapped and analysed in order to improve the care delivered to the patient. (Streim, 1997)

Lean Healthcare

The movement towards lean production has also had its equivalent within healthcare. The focus is primarily to streamline and minimize "excess" in the care delivery. To reduce lead times, minimize errors and work with continuous improvement is central for the work towards lean healthcare. The lean healthcare movement grew in Sweden during the mid 00s and is the foundation from which Value Based Healthcare has been developed. (Rognes & Svarts, 2011)

2.4 Value Based Health Care

Value Based Health Care (VBHC) is a concept that have been made famous by Harvard Professor Michael E. Porter. Porter´s aim of focusing on value based health care delivery is to deal with the problems of high cost and variable quality of the health care delivery in the USA (Porter, 2008). Furthermore he says that the problem with the health care delivery in USA mainly is structural and managerial, which could and should be addressed with the help of a new way of regarding value delivery.

VBHC is described by Porter (2008; 2010) as a way of focusing on the value adding for the patient, this should include things from the entire value chain. He recognizes the main goal of healthcare providers as being to deliver as high health outcome per money spent as possible. He argues that the value often is misunderstood or unmeasured and that the value for the customer should be the driver that should act base for reward in any well functioning healthcare system. He argues that the problem often lies in too much focus on the input variables, such as volume of service delivered or process measures. This in extension leads to a "false" endeavor for cost savings and healthcare delivery efficiency measures.

The concept of VBHC has been spread worldwide and gained much attention. Attempts to adopt to the ideology has been made, however with different degrees of success. Sweden is one of the countries that explicitly has started to adopt to VBHC the most, despite the fact that the origin of the concept lies in USA. In Sweden there has been, and is still in progress, a widespread attempt to reform the healthcare delivery system into being based on the VBHC framework. The largest hospitals that explicitly follows in Sweden are Karolinska University Hospital, Skåne University Hospital and Sahlgrenska University Hospital.

In these two hospitals VBHC is currently one of the main project used in their development work. Although the VBHC used in the Swedish health care delivery, it can be argued that it does not follow the original idea of what Porter (2008) aimed to achieve and the methods in doing it. The version used in the Swedish healthcare is guided by a "Swedified" version of the concept, tweaked to fit the Swedish conditions better. The main guidelines that are available for the caregivers in the two largest hospitals is a book written by Nordenström (2014) which is provided to the employees by the central staff of the hospitals.

3. Methodology

3.1 Research approach

When deciding upon the general approach for research there is essentially one important consideration the researcher should make, the one between an inductive approach and a deductive approach. The inductive approach implies that the researcher makes observations and data collection, while using that data identifying patterns to further build a hypothesis/theory. The deductive approach refers to when the researcher builds a hypothesis about a certain phenomena based on previously known facts and then investigates, through data collection, if the hypothesis could be proven right (Bryman & Bell, 2011).

The approach in this study is to start with collection of data about previous use of DT in an international context, then evaluate through a study on Karolinska whether prerequisites exists that could make DT methods applicable and useful also within Swedish healthcare. The process is highly iterative, shifting between empirical and theoretical studies. Although initial problem identification and information search was needed through reviewing existing DT literature, the study as such follows an inductive approach. The observations and findings of Karolinska Hospital constitutes the basis for further theory formation and analysis on how DT could be applied in Swedish healthcare.

The study includes:

1. A literature study of: the historical development work in the healthcare sector, DT and how it has been used, and innovation theory.
2. A case study of Karolinska University Hospital investigating what problem areas and difficulties the Swedish healthcare is facing, and analyse how DT could become benevolent for the future healthcare delivery.
3. Based on the results from (2), general recommendations and some more specific examples of how to use elements of DT in order to improve healthcare delivery are provided.

3.2 Research strategy

In research it is often a need of making a distinction between a qualitative and quantitative research. The natural distinction between the two is to call a research focusing on measurement and numbers quantitative, and interpretive research qualitative. However Bryman & Bell (2011) suggests that the differences are deeper than this. They say that quantitative studies have a deductive approach to the relationship between theory and research, that the practices are of a natural scientific and positivistic nature, and that they view the social reality as an external, objective environment. They further claim that quantitative studies are better suited for more deterministic studies that aims to test theories, i.e. deductive ones.

Qualitative on the other hand, uses an inductive approach to the relationship between theory and research. It emphasizes the generation of theories rather than testing of hypotheses. Its practices puts emphasis on how people experience and interpret the world, and it views the social reality as a dynamic environment shaped by individuals' creation (Bryman & Bell, 2011).

The qualitative approach is better suiting for the type of research question and premises of the study. Since the topic is niched to a rather narrow field of Design Thinking within healthcare, quantitative data is first of all difficult to acquire due to the small number of explicitly DT-

adopting hospitals, secondly it is not very relevant due to the multifaceted utterance of DT in different organizations. Furthermore the complexity, differences in the different organization and attitude of the employees gives many degrees of freedom which makes a quantitative approach to complex to generate relevant conclusions.

Rather than approaching the problem with a deterministic toolbox, the study also tries to capture opinions, attitudes and ways of working, that enables or hinders implementation of and gaining benefits from DT. Not only is the method better for the study, but also in tune with the methods of the research topic DT itself in the sense of starting with a human centered view.

3.3 Research design

The research design chosen for this project is an exploratory case study. Typically case studies are based on data sources of various types which provides a richer and deeper empirical description of a particular phenomenon (Yin, 2004). A detailed, deep investigation of the specific case is conducted of the case in question e.g. event, business unit or organization (Wallin, 2014). Eisenhardt and Graebner (2002) maintain that case studies emphasize real-world contexts where the phenomena occurs, while laboratory experiments isolate the phenomena.

The design of this case study is chosen to be a single case on one organization. To answer the purpose of this study, i.e if DT principles and methods are applicable on Swedish healthcare, multiple cases on different hospitals and clinics would of course be preferable for greater generalizability. With a multiple case design, the limited time frame would prevent a deep and thorough analysis, which is necessary in order not to loose validity due to missing nuances and details within the complex organizations. Furthermore a study over time is not possible due to the same reason, however some mapping of historical development work within the Swedish healthcare sector will be done in order to understand the context in which DT is to be implemented.

Though the organization, Karolinska University Hospital, in the study is considered as a single case, it consists of many clinics and other units. The diversity within the organization makes Karolinska a suiting case organization in the sense of generalizability contra possibility of depth of the study. Furthermore the organization is one of the largest actors in Sweden and in many aspects a role model for other hospitals to follow.

3.4 Sampling

To chose the right sample for data collection in a case study is paramount in order to make relevant observations. This is not only important in quantitative data gathering, but also for qualitative ones. In qualitative data gathering each encounter with the data takes time and effort. Furthermore the data sources are usually limited and the researcher have to make use of the access presented.

Because of the limits in the data collection, the researcher is usually not able to conduct statistically correct probability sampling, but have to find ways to the relevant data. One way of doing this is to choose a diverse set of sources in order to get a nuanced and hopefully comprehensive view. As Bryman and Bell (2011, p. 441) puts it *"... ethnographers have to ensure that they gain access to as wide a range of individuals relevant to the research question as possible, so that many different perspectives and ranges of activity are the focus of attention."*

The sampling strategy in this study was to use purposive sampling. This is a non-probability way of sampling where the researcher chooses cases or participants strategically so that those sampled are relevant to the purpose and research questions of the study (Bryman & Bell, 2011). Because DT implies innovation in a broad context, involving technical solutions, method improvements, as well as pure redesign of processes, the population concerned of this work was defined as people who has been driving or been involved in any sort of improvement work at Karolinska.

One way for the researcher to find new input samples is through snowball sampling, where one source (often interviewee) helps to connect with new ones that are relevant for the study (Bryman & Bell, 2011). In this study this effect is important since the data collection to a large extent is based on interviews with the most knowledgeable "key persons" in each part of the organization.

3.5 Research Methods & Data Collection

The main research method used in the study for the empirical findings is interviewing, complemented with literature review on new insights and concepts that proves to be of interest for the research. The interviews aim at finding data that can provide answers to the research questions, directly or indirectly throughout the organization.

The relevant interviewees are generally identified together with the supervising contact person from Karolinska and asked for an interview. The general structure and some of the questions for the interview are given to the interviewee so that he or she can prepare and know what is expected of the interview.

The interview however is semi-structured rather than fully structured in the sense that the question sheet is seen as support for the interview and not a formal template, with this technique more open questions and follow-up questions play an important role (Bryman & Bell, 2011). This enables for the interview to give answers that in a wider sense explain the organization and the actors within. In order to find the subtleties, nuances and attitudes that are of large importance for this study, this technique can be helpful.

The interviews are structured into three parts; Firstly the charting of the current situation of the development work is on topic, where the interviewee is asked questions regarding the department´s or part of the organization´s work and view on development work. Secondly a brief explanation of the concept of DT is given by the interviewers. Last a discussion is held regarding DT and in how it could fit into their part of the organization, what would enable it and what would hinder it.

The empirical findings are based on 9 interviews, along with written documentation on the historical context of DT within Swedish healthcare (much of which is presented in the theoretical framework section; Context and Overlapping Concepts, and Value Based Healthcare). The interviews were conducted on:

- 2 representatives from SSVP
- 2 COOs (Neonatal, and Ear Nose and Throat)
- 1 senior nurse
- 3 researchers at KI (2 separate interviews)
- 1 representative from SKL (prior operations developer)
- 1 head doctor at KP

The interview approach and data gathering was done with the purpose to map the parts of the organization that directly or indirectly are involved in development- and innovation work. The clinical departments were of central interest because of their vital role and everyday contact with the care delivery. Further, SSVP, KP, Innovation Place, PFRs and Operation Developers were isolated as central, within the organization, to this type of work. Externally KI and SKL was identified as important actors in this type of work.

Due to these actors central role in the current work with development and innovation at Karolinska (and even the entire Swedish health care delivery system), they were chosen to contribute the base for the empirical study and in extension to the report.

3.6 Quality of research

To evaluate the concepts and measures involved in research is of concern in all research.There are a number of different approaches to quality of qualitative research. In this study a framework by LeCompte & Goetz (1982) is used. This framework involves internal and external validity and reliability.

External reliability refers to the replicability of research. As LeCompte & Goetz recognize, obtaining a large external reliability in qualitative studies is very difficult, mostly because of the change over time. Even though the study is conducted exactly the same way one year, or even one day, later the results could differ substantially. Not only is the human variation making the results differ, but both work methods and attitudes of the employees are dynamic and ever changing too. Things that can be taken for fact today might be completely invalid in the future making organizational studies very difficult.

Internal reliability considers the researchers´ influence on the results. Simply put it has to do with the objectivity of the researchers, and to what extent they agree on the results. In the study the two authors cooperate in all parts and phases of the work, going through, reconciling and synchronizing all parts of the work in order to increase the internal reliability. Moreover external parties are involved during the work, which further increases the reliability.

Internal validity is referring to how well the theory that emerges from observations can describe the reality of the studied entity. This does to a large extent correlate with the internal reliability because misunderstanding or other forms of biases naturally leads to wrong conclusion and in turns theory that does not explain reality. The internal validity always poses a large threat for a case study, especially in a large organization like Karolinska where results can be confusing or even contradictory. By triangulating the results and investigating the context, some insecurity can be overbridged.

External validity can be explained as the possibility for findings to be generalized also to other, similar contexts. Here, a fully satisfactory external validity is naturally very hard to obtain because all hospitals and clinics are different from each other, and they all have different attitudes and prerequisites for possible implementation of DT. To support the purpose of the study, whether or not DT could be applicable in Swedish healthcare, the size and diversity of Karolinskas operations could somewhat increase the generalizability of the study.

The study is based on a single case organization and the conclusions are not necessarily directly transferrable to other Swedish healthcare providers. Healthcare organizations are unique in their respective settings. The conclusions are case-specific and therefore revision and further studies are required before applying them in other contexts.

When interviewing personnel able to answer questions regarding the innovation work at large in the organization access was given to senior persons in the organization who was comfortable with being interviewed. Access to a larger sample and a longer time period might have enabled more insights in the full picture of the innovation work in the organization.

For this study the goal is not to find the universal, everlasting fact about how to implement DT into any future organization, but rather to use the case company as an example for where it can be useful and some aspects to take into account when evaluating implementation of new ways of working. The fact that the results are based on semi-based interviews makes the results subjective. The problem areas etc. which are described are not necessarily exhaustive, but nevertheless important.

Although the Innovation Place was isolated as an important actor in the innovation work of the case organization, the authors did not manage to access a representative from this department for an interview. This was managed through a more extensive examination of the publicly available material on their operations and projects, in order to understand the role of the department.

4. Empirical findings

The chapter about Value Based Healthcare along with the Context and Overlapping Concepts chapter explains the theoretical approach which the case hospital (along with some other large public Swedish healthcare providers) have chosen to work with. In this section, an empirically-based and more detailed description of the current development work and innovation approach in the case company is explicated, along with some of the key departments involved in the work.

4.1 Organization

The hospital can roughly be divided into two parts: the clinical departments and the central or administrative staff. The clinical departments are the ones providing the medical services, while the central staff provide the supporting and administrative functions. Karolinska University Hospital has approximately 15 300 employees. 36 % are nurses, 18 % are assistant nurses, 16 % medical doctors, 8 % biomedical analysts, 7 % administrative staff, 4 % paramedical personnel, 4 % medical secretaries and 7 % other professionals. The structure is illustrated in fig. 3 below, with the seven clinical departments at the bottom and the central staff functions to the right.

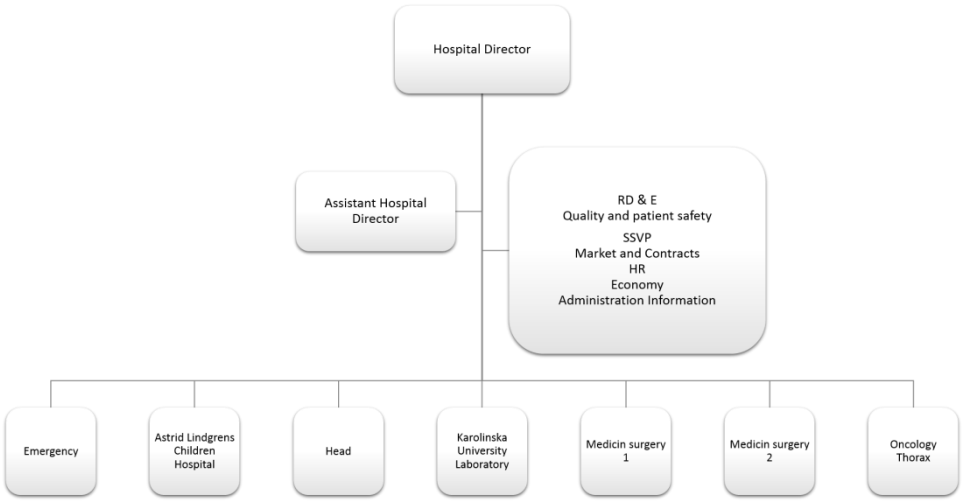

Fig. 3: Organizational chart Karolinska

4.1.1 The clinical departments

This is where the interaction with the patients takes place. There are 7 divisions at the hospital with approximately 70 clinics with approximately 400 clinical sub-departments, physical or organizational, delivering healthcare for the patients directly or indirectly. They are classified as DRG-departments or service-departments, which means that they are either getting economic compensation directly for the produced healthcare (DRG-departments) or they provide services for other clinics (service-departments). The delivered healthcare is divided into inpatient care and outpatient care, where the inpatient care usually means that the patient is hospitalized and the outpatient care conversely that it is not. The remuneration model is largely structured according to these two patient "groups".

Most of the interview results regarding the departments historical development work can be seen in the list of historical development work in the context chapter. The COOs describe that it is difficult to exactly explain the development work. In the interviews they described the

development system as being primarily top-down managed in the sense that many of the decisions are made at management level, expected to be followed in the operations. Although the top-down structure is significant, there is described to exist large freedom for each department to choose how to implement frameworks and practices in their part of the organization.

Operation developers

The operation developers are working at the clinical departments together with the COOs and the rest of the staff with the task of improving the operations. Their responsibility has with the restructuring towards VBHC also come to include cooperating with the PFR (see description below) regarding the work-flow. The role of the operations developer is primarily to be coaching and guiding at areas ranging from operational to more strategic. The affiliation of the operations developer lying at the clinical department puts the responsibility slightly different than that of the PFR. The difference was described by one interviewee as: the COO (and thus the operations developer) is aiming to deliver care to the patient in the best manner, while the PFA is responsible for delivering the right type of care.

PFR

The PFR, abbreviation for Patient Flow Responsible, is a rather new role in the hospital which has come into use with the introduction of VBHC. It has roots in the previous project of lean healthcare where there was a role called a "Flow Leader", a person who was supposed to coordinate the workflow over the boarders within the hospital. The role of the PFR is described to be a bit more comprehensive though since it implies responsibility for the entire chain, "end-to-end", with a clearer focus on providing high quality healthcare for the patients in the respective "flows". This can be compared to the "Flow Leader" that focused more on processes efficiency and especially the lead time aspects. A fundamental criterion for who should become a PFR that is expressed by the organization is that he or she should possess both enough mandate and knowledge to control the entire work flow within the hospital.

SSVP

SSVP (Strategisk Sjukvårdsutveckling & Vårdproduktion trans.
Strategic Medical Development and Healthcare Production) is one of the departments in the administrative staff. SSVP works with questions regarding strategic healthcare development and healthcare production. It is a relatively young department which have roots in a prior department called strategic operations development (SVU). SSVP is the department that "owns" the project VBHC, implying that it is responsible for driving and facilitating implementation of VBHC throughout the organization.

Within the project VBHC they act as a coaching party, which helps facilitating the work towards a more value based delivery system. To large extent their work includes identifying problem areas and visualizing potentials, identifying what can and should be improved or change and analyze the effects of this. They also have an educational mission, primarily for the key persons in the work towards VBHC.

Innovation Place

Innovationsplatsen (lit. trans. the Innovation Place) is a support function with its focus being to connect industry, academia, and healthcare in order to facilitate innovation and collaboration. The aim is to widen perspectives in order to provide innovative solutions, more efficient, effective, safe, and secure treatments, equipment, and processes.

SKL

SKL (Sveriges Kommuner & Landsting, trans. Swedish Association of Municipalities & Counties) is an employer and member organization of Sweden's 290 municipalities and 21 counties. It was founded in 2007 through a merger and reformation of he municipality-affiliate and the county-affiliate. SKL´s objective is to operate in the members´ interests and to offer them support and service. Since the hospitals constitute a large part of the counties´ responsibilities, SKL have much involvement and insights in the Swedish healthcare, especially in the nationwide cross organizational work. Each year they publish a nationwide quality comparison called (lit. trans.) Open Comparisons, which shows and lists quality metrics. This publication underpins and initiates some of the development work and helps identifying problem areas. Further they have a framework for how the different organs within health care and social services should collaborate and coordinate called SIP (samordnad individuell plan - trans. Coordinated individual plan).

KI

The Karolinska Institute is a university that is not directly a part of the hospital, but have a very close connection through extensive collaboration and staff that works on both places. Many of the research projects conducted at KI also has the hospital part as subject or aim. To secure that viable innovations are realized to benefit the healthcare sector, KI has developed what they call an "Innovation system". This includes a number of different actors providing services and competence aiming to put healthcare innovations in commercial use.

At KI there are many projects that are initiated and executed at and in collaboration with the Karolinska hospital. One example that was brought up in interviews was a project that is also adjacent to the doctrine of DT. This was carried out in collaboration between KI, Karolinska hospital and Vinnova, a governmental innovation stimulating authority. The project was by interviewees expressed as Service Design, aiming to find ways of better understanding the patients and their needs, and to evaluate new working methods and provide visualization tools. In the project there were patient representatives, rheumatologists, industrial designers and behavioural scientists. Through the project they expressed to realize many unexpected problem areas and found new ways of better serving the patients. It was expressed that the results from this work were successful and that its work methods could be of use for the organization at large although there were difficulties involved, primarily regarding cooperation.

KP (Kvalitet & Patientsäkerhet, lit. trans. Quality & Patient safety)

The mission of KP is to develop and support the operations at Karolinska in delivering "good health care", in the words of interviewees healthcare that is knowledge based, expedient, safe, patient-centered, effective, efficient, equal and delivered in reasonable time. They also have general responsibility for the oversight, control and surveillance of the compliance to laws, regulations, ethical principles and the county council's core values. The work at KP is mainly structured in projects together with the clinical departments. KP acts as support and coaching for the clinical departments, mainly in developing the operations. The interviewed representatives from KP describe the initiation of their work as being more reactive than proactive, starting with requests for support and guiding coming from different parts of the organization, both clinical departments and support functions.

4.2 The Implementation of Value Based Healthcare

The foundation for the development work at Karolinska today comes from LEAN healthcare and other older frameworks, e.g. *Good Reception*, and *QUL*. Interviewees describe it as a form of evolutionary system of development models in the sense that when a model reaches stagnation a new one is introduced to keep what was good and replace the parts where the old fell short. Many of the models come from external parties such as consultants.

The latest concept that is being implemented is VBHC which has been around for a few years, replacing Lean healthcare which had been the basis for operations- and organizational development during the better part of a decade. During interviews. the reason Lean Healthcare fell short was attributed mostly to the way it was implemented, since it came to focus primarily on lead-times and minimization of waste. Some of the stated goals with Lean Healthcare were improved availability and work environment. It was launched by the predecessor to SSVP, SVU. In the emergency care the operations were divided into 17 different flows where each flow had a flow leader. MDs, nurses and assistant nurses were organized in teams around these flows and worked together to increase the chosen improvement areas. The flow leaders were consciously chosen to be newly graduated specialist doctors, in order to avoid getting stuck in old routines while still having competence in the area.

The excessive focus on lead-times and waste handling was by interviewees described to in turn put the focus on patient and quality of the healthcare aside, which lead to mistrust and hesitation towards the concept and its methods. This lead to the need for some complementary elements to be added, where the Swedified VBHC came to provide a natural extension to the practices. The new concept has come to represent a clearer focus on quality and patient centeredness.

The Swedish version of VBHC is mainly based on the work of Jörgen Nordenström's book "Värdebaserad vård - Är vi så bra vi kan bli?", trans. "Value Based Healthcare - Are we as good as we can get?". This starts with explaining how he defines by VBHC and what is included in it. Further, he provides an 8-step process for how to work with VBHC, and then gives a practical example of how it has been implemented. Since this is the source of information on VBHC provided to the employees within Karolinska, its content becomes the basis for how to interpret and implement it in the organization.

In Nordenströms description of VBHC, he explains 12 concepts that forms the foundation of it: Value, Evidence, Process, Coordination, Indicators, Patient Centeredness, Variation, Accessibility, Cost, Patient Safety, Information Processing, and Human Capital. He uses VBHC as a type of umbrella term for improvement work in the sense that he uses many other concepts within it. E.g. using six sigma, PDCA, and lean as parts of the process.

The 8-step process working as guidelines for how VBHC should be put into use is described to be designed in a way that one should in a useful manner be able to implement it into the daily operations. The steps are as follows:

1. Identify key diagnoses
    - Choosing one or more diagnoses which should form the basis for quality improvement. The chosen diagnoses should be important because they are common, particularly resource intensive, and/or because there is a great variation in the related processes.
2. Define care episodes

- Within the treatment process of patients with a key diagnosis, that process should be divided into care episodes. These are distinguishable parts of the process, and are intended for giving different care providers a shared responsibility for the patient's health progress.

3. Define best practice
    - This step implies collecting empirical evidence in order to determine best practice. This process includes 3 steps. First, form evidence- or recommendation graded treatment guides. Second, database search for meta-analyzes and randomized controlling studies. Third, update with more recent studies.
4. Develop process- and outcome-measures for care episodes within the key diagnoses
    - This step involves developing department relevant process measures from the list of best practice. Further outcome-measures shall be defined from the existing quality registers available for the specific diagnosis.
5. Control compliance to best practice
    - In this step the current care delivery is analysed and checked to what is defined in step 3.
6. Identify possibilities for improvements in the current care delivery
    - This step involves the analysis of the difference between the best practice from step 3 and the current state. There is also discussion regarding the most important actions to be made.
7. Implement best practice
    - The aim is to improve the important identified quality parameters by using best practice methods.
8. Control compliance to new routines after 6-12 months

After the new evidence based guidelines have been implemented a new evaluation should be done to evaluate if the compliance to best practice has improved after some time.

These guidelines are not followed zealously followed in the operations, but take different shapes and forms throughout the organization and between different projects. Interviewees describe to also use general methods such as PDCA and less formal ways of structuring the work. Further the way of defining the patient groups is not solely based on diagnosis, but also on symptoms. This results in three types of patient groups: Diagnose based, Symptom based, and Multi-factorial.

The general way of defining value according to VBHC is by the simple equation:

$$\frac{Quality}{Cost} = Value$$

In innovation and improvement work there are outcomes in relation to this value definition that are permitted and outcomes that are not. This is illustrated in the table below:

	Increased Quality	**Unchanged Quality**	**Decreased Quality**
Decreased Cost	Allowed	Allowed	Not Allowed
Unchanged Cost	Allowed		Not Allowed
Increased cost	Sometimes Allowed	Not Allowed	Not Allowed

Table 1. Permitted outcomes according to VBHC

So far this way of defining value is a fictional concept since Karolinska do not have the measures to connect quality and cost directly to each patient, which makes value difficult to compare across different flows.

One of the most important aims of VBHC is to improve the overall (end-to-end flow) quality and efficiency of the healthcare delivery. The way to address how to work with end-to-end patient flow is made roughly through the process described in Nordenström's book in order to find and improve the patient flows. VBHC thus transforms the organization from a functional structure towards a matrix organization, as can be seen in the figure below, involving patient flow responsibles (PFR).

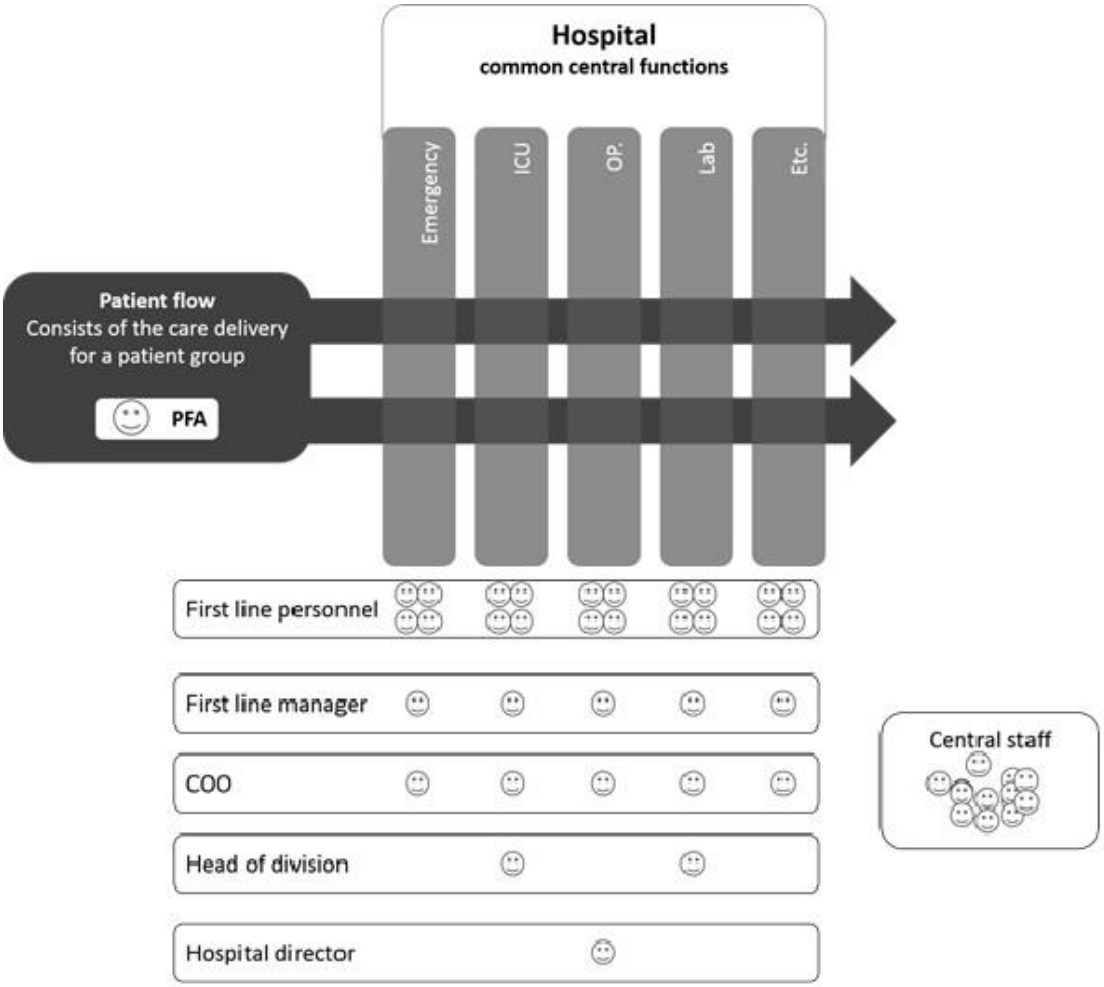

Fig. 4: Organizational chart from VBHC perspective

The PFR is the one responsible for the latitudinal work in the organization and is responsible for the patient group. The PFR works closely with, among others, the first line personnel, the COOs, controllers, operations developers, RD & E, representatives from KI, and patient representatives. The role is multi faceted and includes seven overreaching responsibilities:

- Patient Group - Responsibility for ensuring that the patient always comes first.
- Patient Flow - Responsibility for the entire flow from arrival at the hospital to the discharge.
- Coordination - Responsibility for coordination between units, external partners, including ones of innovative nature, and ensuring integration of new science and evidence.

- Work Group - Responsibility for forming and gathering the multi professional and multi disciplinary team working with the patient flow, this includes ensuring patient involvement.
- Care Programme - Ensuring that all patients are treated according to the care programme and that the care programme is assessed by relevant professions.
- Result - Responsibility for monitoring of result for outcome and resource measures defined for each patient flow.
- Improvement Work - Responsible for the work with constant improvements in close collaboration with work groups and managers in the operations.

So far there have been 10 pilot projects initiated where patient flows have been defined and PFRs have been assigned. The PFRs that have been assigned in these projects so far are also Section Managers, COOs or very senior MDs, and thus had a large insight in the operations from the start of the project. The role as PFR is planned to take 20 % of their full time employment. The seniority and mandate of the PFR is seen as paramount for the responsibility and demand for knowledge that the role include.

The PFR group have been to 5 meetings that to some extent follows the process described Nordenström. SKL and SSVP are involved in these meetings and use them as educational seminars. During each meeting the groups have worked with:

1. Understanding of the processes and methods
2. Outcome measures
    - Tier 1 - Health status achieved or retained
    - Tier 2 - Process of recovery
    - Tier 3 - Sustainability of health
3. Defining improvement areas
4. Determine target values and drivers
5. Elaborate further on the driers

In the near future there are 9 identified and defined patient flows explicitly planned to adopt to VBHC. The vision with the project is adoption by the entire hospitals clinical operations, resulting in 283 separate flows of patients with corresponding PFRs. Of the 283 patient groups 237 are diagnose based, 36 are symptom based, 2 are multifactorial and 8 are not defined as any of the three types.

4.2.1 Comparing theory and practice

It has been held forward that the healthcare delivery system being mainly functionally organized is a sub optimal solution in many aspects. This issue has been in focus ever since work flows were first introduced in the healthcare sector. However the way of reaching a more efficient delivery system is still argued. Although the goal is essentially the same in Porter & Lee's view on VBHC as in the case organization, there exist a discrepancy in their respective implementation. Porter and Lee´s VBHC (2013) argue that it is important to make the structure simpler to manage, preferably with integrated practice units. Further the simplicity should make the employees devote much time to the care giving instead of administrative work; the team or unit should have a single administrative and scheduling structure. They argue that the care delivery should be co-located in dedicated facilities, rather than spread.

At Karolinska, the approach is not to create IPUs, but rather to create virtual flows across the existing functions, creating a matrix organization. While the COOs are responsible for each of

the functions, the PFR is responsible for the lateral work. This creates a structure where work is simultaneously organized horizontally and vertically, in contrast to the Porter & Lee framework which is slimmed and simplified; a single horizontal flow with supporting functions as far as possible. The difference in essence is that the Porter and Lee focus on creating IPUs that are autonomous, working as one unit, while in Nordenström's framework the focus becomes coordinating different existing units efficiently.

The way VBHC has been implemented at Karolinska is a result from how the work has been organized historically. As some interviewees expressed, frameworks for improvement work have replaced one another throughout time in an evolutionary process. The current VBHC has strong roots in the prior work with Lean healthcare. For example, the work with patient flows was initiated in an early stage in the Lean implementation. Also, although it is a concept also within VBHC, the strong emphasis on KPIs as a managerial tool is a heritage from earlier models. Some even argue that Nordenström´s framework for VBHC should not be regarded as VBHC at all, but a more comprehensive umbrella framework for improvement work, since it covers a wide array of concepts and issues that are widely recognized as improvement management science.

In the pilot projects the methods of VBHC is still being worked out as they go along, however the environmental validity, i.e. generalizability of the results, could be questioned. Though the pilots are generally expressed to be good examples of how VBHC should be implemented, for example some of the pilot projects seem to have been chosen because of their suitability to VBHC. The neonatal example, one of the most highlighted pilots, is originally chosen because it had already, before VBHC became a known concept, revised the possibility of introducing work flow. Further it is a special case due to the fact that it possesses the entire work flow within its boundaries.

4.3 Identified general problem areas regarding innovation work

During interviews, several problem areas were expressed and commonly brought up in different contexts. The most common areas mentioned when discussing the innovation and development work were organizational complexity, hesitation towards new methodologies and concepts, and patient involvement. These aspects and their implications are presented below under each of these respective areas.

4.3.1 View on innovation

From interviews with employees within the organization, a rather narrow view on innovation appears. For them, innovation essentially is research and development of technically very advanced solutions and instruments which could be applied to improve safety and efficiency in operations. This creates the view that is skewed towards that innovation mainly is taking place within departments explicitly assigned for that purpose, e.g. the Innovation Place and KI. Related to the Schumpeterian view on inventions versus innovations, Karolinska puts a lot of emphasis on the invention aspect with KI being one of the most proficient medical universities in Europe. Resulting in overly technically advanced innovation with focus on scientific degree of novelty rather than the cost aspect. In relation to permitted improvement outcomes in the VBHC framework (See table 1, page 27) innovation activity risks ending up in the "Increased Quality with Increased Cost"-category while innovation focusing on the cost aspect with unchanged quality is not as "sexy".

The fact that the Innovation Place largely works with supporting research and technical procurements leads to the general view of innovation being solely technical advancements.

Due to this focus on technical innovations and procurements as being the definition of innovation in the organization, some within the organization even expresses a hesitation towards bringing up the concept in their context. One interviewee stated: "We have enough people working with innovation today, with the Innovation Place and all. We would rather have support with the development work."

Since the main role of most departments of the central staff primarily is of supporting nature, the responsibility of driving and implementing best practice does fall on clinical departments, and with the change towards VBHC the responsibility of doing this ultimately lies on the PFR. The responsibility of the PFR is not only to coordinate the work flow, and assemble and manage the multi professional and multi-disciplinary team working with the patient groups internally and externally, but also to drive and ensure integration of new science and evidence as well as being responsible for the work with constant improvements along the entire cross border work flow.

4.3.2 Organizational complexity

One of the major reasons for the difficulties to drive innovation and change lies in the organizational complexity. There are not sufficient structures or forms for integrating the work flow across the borders within as well as outside the organization. The difficulties are not only complex in the technical sense, of providing a platform for which to communicate, but the problem lies deeper still. There are differences in focus and specialization, there is also the issue with language, protectionism, specializing over departments, professions, and tasks.

The main issues that was mentioned as areas where problems can occur, and where the development work can be hindered are the overly *top-down managed* organization, problems with *coordination* within the organization, *knowledge transfer* within the organization and some *language barriers* within the organization. All of these issues contribute to the building of "barriers" and the mistrust in the organization, and the matter of overbridging this chasm is a challenge not easily solved.

Top down management

One issue that was commonly expressed in interviews was that when it comes to strategic questions regarding improvement work, this is done with a top-down approach. Different frameworks and guidelines for how to design improvement- and innovation work, currently VBHC, are developed to a large extent by top management together with support functions. They spend a lot of effort defining why they should work in certain ways, and how that is supposed to be done. The responsibility for implement it though, is passed on to individuals in connection to the operations. At the same time, a lot of continuous improvement work to optimize practices and processes is going on in the daily work by people involved in the operations. In other words, strategic and practical improvement work is taking place in different ends of the organization quite independently of each other.

Coordination problems

One further topic that emerged in almost all contexts was problems with coordination. What was expressed as especially problematic was the cross department collaboration, and the lack of holistic (end-to-end) control. The cross department cooperation is mainly dependent on few individuals within the organization who are motivated and knowledgeable enough to improve

the operations. Though VBHC is a project that aims to provide a more end-to-end perspective, the work is not spread throughout the organization, and is not yet a structured and organized way of working.

Though interviews clearly shows that all departments are highly motivated and skilled in improving problems appearing in their part of the care delivery, the departments are struggling in isolating problems from a more holistic perspective. It is argued that the cross-clinical cooperation is not sufficient in the current way of working in order to improve the overall quality of the care delivery for the patient.

Further there is a problem with coordination that is induced by the movement towards VBHC, in the form of a matrix organization. With the final number of patient flows being 283 and the average number of departments per flow being approximately 5, the number of contact points that occurs in the system sums up to 1415. Unless very efficient ways of communication and decision making are established, this risks becoming an extensive apparatus that consumes much time and valuable resources. Since so many decision makers need to be involved, the lead times until decision risks becoming very long. Many senior persons tend to have difficulties even booking meetings without notice weeks before, which amplifies the problem.

Knowledge transfer

Karolinska is the largest hospital in Sweden, and with its close connections to Karolinska Institute also one of the most research and knowledge intensive health institutions in the world. All activities going on within the walls of the organization is providing a huge bank of knowledge and highly skilled professional expertise. The methods for how to exploit and capture learnings are however a barrier that prevents the organization to reap the full potential in much of the improvement work taking place. A major reason for this is that the transfer of knowledge within the organization is not sufficiently structured and organized. In interviews, employees expressed a lack of awareness of how they should go about in order to both spread knowledge internally, as well as how to attract external competence and learn from it.

Language barriers

Within the hospital there is not only the cross department complexities, but there can also be between the different professions. The knowledge intense and highly specialized personnel in the care delivery is naturally a prerequisite for the health care to be expedient. This however also leads to some discrepancy in the nomenclature, which in extension leads to formation of groups and in some cases even alienation. An example on the discrepancy that was mentioned by one interviewee is that the definition of a central concept such as diagnosis may alter between the professions; what a nurse may call a diagnosis, the doctor may call a symptom etc.

4.3.3 Hesitation towards new methodologies and concepts

In the large organization of Karolinska there is a discrepancy between the guidelines, frameworks and formal ways of working, and the way it is actually carried out. This manifests itself in many ways, some central guidelines and policies are "manipulated" or formed to fit the operations, some are ignored and some are not even known throughout the organization.

Both in academic research and in practice there have been a plethora of concepts on how to approach healthcare work succeeding one another, but what shines through in the interviews is that very little changes regarding attitudes, actual working methods and responsibilities. This discrepancy exist since there is a gap between the departments. It seems that the

interviewees found that the guidelines are too many and too comprehensive to follow as recommended.

Excluding the practical implications of the organization and its structure explained in the previous section to be a factor preventing improvement work, the psychological attitude towards change is equally important. Both employees within the clinical departments and the administrative staff express a tiredness and intrinsic resistance towards new concepts and methods.

In the empirical studies, all employees expressed that both themselves and everyone else in the organization have a pathos and a natural will to always do their very best for the patients. They feel that they every day are working to improve the care delivery, which brings a natural hesitation towards changing the approach and focus with new types of development work, often brought in by consultants. Not in the sense that they feel these approaches are wrong or involves harming elements, but a questioning about what it is actually aiming to change. For example, the central element in the work with VBHC is patient centeredness, a focus that not a single employee would question. But with the core value at Karolinska having been "The patient always comes first" for a long time, a natural response some interviewees expressed was to question what the actual difference with the new concept is. It was held forward that if the anchoring is not well rooted in the operations, work procedures and practices often fall back into old routines regardless of how successful the implementation of new work methods was.

Within different departments and functions in the organization, there are also some worries regarding compensation for work in all development work. The compensation model builds on an intricate system of compensation for so called DRG-credits, cost related demarcation levels complemented with internal trading system. This intricate system in some often leads to conflicting interests regarding who reaps the benefits from the improvements made and who has to stand for the costs inflicted. This can be argued to lead to a slightly protectionist view and in some cases complicate the overall improvement.

Another obstacle to change that has been isolated as important is the fear of failure. The nature of the operations and risk structure in the hospital sphere is the source of this fear. It is evident that handling human lives and health is not something that promotes excessive risk taking and experimentation since it can lead to suffering and eventually death for other people. A common phrase that the interviewees brought up as one of the most central guidelines in how to work at Karolinska is to "doing right right away", which is a term originating from minimizing rework in operations management.

The many obstacles for improvement work makes it difficult to actuate the process and thus leads to the starting point of development and innovation work as driven by negative things. This in turns becomes a less proactive and more reactive approach to organizational development.

Furthermore there are two drivers within the area of attitudes that directly hinder the structured improvement work in the healthcare: the view of healthcare as complete lacking of "standard cases", and a culture of "heroes". Many people within the profession argue that healthcare is characterized by a lack of uniform best practices on how to conduct its operations, this hinders the improvement work on efficiency in general and patient work flow in particular. The "hero" culture is to a large extent a matter of prestige. It was exemplified

with the case of the fictional figure Dr. House, from the tv-series titillated the same. In this series the famous Dr. House acts on his own instinct in all type of unconventional manners in order to solve the toughest cases. This sort of culture becomes problematic due to a few reasons, primarily because it premieres the more difficult cases and marginalizes the easier ones. Further using unconventional methods can generate new solutions to problems, however in most cases routines and standardized procedures tend to be cheaper, safer and more efficient. Another aspect is the knowledge which instead of being transferred, is being kept a secret.

4.3.4 Patient involvement

The patient involvement at the hospital is an area that has been subject for critique from most directions. Although patient involvement and consideration of their views have been explicitly stated for many years, how it is practically carried out is questioned. Today it is expressed that the patient involvement is deficient at best. The problem is not simple since it has many roots.

Firstly, according to the interviewees, it is not a simple task to find patient representatives who are willing and able to participate, and who are suitable representatives for a larger group of patients and relatives. Experience has shown that patients are not always as eager to take part in longer studies as the care providers think. For example they do not want to be reminded of their health condition, or they are not motivated unless they are rewarded with tangible benefits, such as improved care delivery. Some groups of patients also have difficulties to physically attend. Some simply are too ill, and some may be unable to take the time off from their job.

Secondly, the health profession does not always fully appreciate the need to involve patients in improvement work. It was expressed that since they are people of highly specialized competence and expertise, working with patients on a daily basis, they often feel that they know the needs of their patients. One example of this was a project aiming to improve the diabetes care for teenagers and young adults. The profession came up with a well-developed solution including curator meetings, group meetings with other diabetic teenagers, etc. Since the teenagers did not want to know of their diabetes and aggrandize their condition they were not interested in this form of support and rejected the caregivers attempts, instead demanding on-line guidance and forums where they could easily and anonymously discuss, find information and support.

Thirdly it was held forward that there are no established routines in how to work together with the patients and relatives. There is a newly started project that aims to increase the patient and relative involvement, however the uncertainty is large and the methods are still not formed. Further the question of gathering the right type of representatives is difficult since "the perfect" patient does not exist. This in the sense that the patient wanted for this type of job should be representative for the entire spectra of patients, he or she should not request things that are difficult, sensitive or bothersome for the health profession etc.

5. Analysis of inhibitors to innovation

5.1 Problem areas in the Innovation Work

As described in the literature by both Assink (2006) and Christensen, Kaufman & Shih (2008) there often lies difficulties for large organizations in capturing the full potential of innovations, especially ones of structural and disruptive nature. The empirical findings from Karolinska shows no divergence from this notion. In interviews, a repeatedly brought up area of concern was the difficulties in both spreading solutions, especially new ways of working, throughout the organization and to convince people to change practices and methods.

The highly specialized competences enhances the difficulties of performing double loop learning as described by Argyris, and further is the territorial mind set, language barriers and differences in views inhibitors of the competence transfer across the organization. Yet another very important factor in the attitude towards innovation and change is the quantity of methods that have been implemented. The sheer number of different methods aiming to accomplish roughly the same thing implemented time, and time again with similar insufficient outcome leaves a large amount of fatigue regarding change.

The problem with the implementation of new frameworks is a multi-facetted one. Firstly the number of projects, methods etc. leaves the personnel with massive amounts of frameworks to respond and relate to. This can in cases be confusing since they come from different directions and have slightly different focus. Further it increases the administrative burden on the already heavily loaded medical personnel, in some cases even producing a duplication of efforts. Secondly the implementation seems not to be fully completed before disregarded due to bad response and replaced by new "better fitting" one. Sometimes it is argued that frameworks do not fit the organization, other times it is argued to have been misinterpretations of the concept, or it is just not implemented right. E.g. some may argue that the failed implementation of lean healthcare was due to that it is a concept for efficiency in the industry, and was not appropriate since the quality of the healthcare is more important, other argue that the lack of focus on quality was a misinterpretation of the concept of lean and some argue that the implementation took too much into account the current state of the healthcare delivery system resulting in a half-hearted failed attempt of improvement.

Thirdly the risk structure could be a reason for the failures during implementation. Since the risk structure in the healthcare delivery system premieres safe choices and gradually moving towards better solutions, it can be difficult to fully implement new methods etc. This way of working risks being too slow and the results may be difficult to see, which can result in failure. Working primarily with long term incremental improvements and holistic policies, much of the momentum and power of change can be lost in lack of motivation.

5.2 Three levels of inhibiting factors

There are many factors inhibiting innovation work as well as a possible implementation of DT. When categorizing these factors, a three level abstraction is useful for further analysis: innovation on a strategical-, structural-, and cultural level.

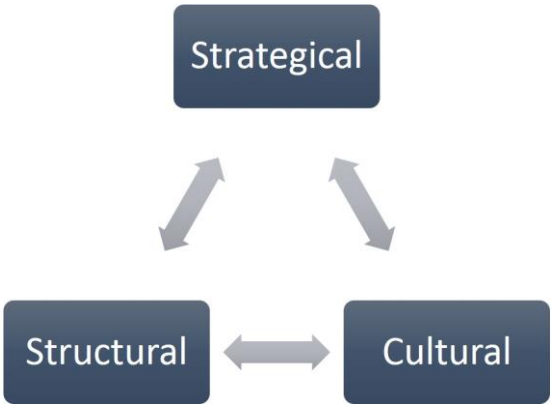

Fig. 5 - Three levels of abstraction

5.2.1 Strategical level

One of the problem areas isolated was that innovation work at large risks being overly top-down managed. To bring conformity and standardization to the organization is usually a good thing, however there needs to be support, anchoring and understanding in order to succeed. One problem with this is that the launching of new concepts and frameworks gives an inconsistency in how Karolinska handles innovation on the strategic level. Since new concepts are introduced as improvements on the older versions that were considered insufficient, few concepts seem to become fully implemented before rendered obsolete.

This eagerness to achieve change can lead to less clarity regarding what role innovation is and should have in the organization. As an example, the mantra of "doing right, right away" can be slightly misplaced when, instead of being applied in operations, it is applied to innovation work where trial and error in many ways is a necessity in the process towards success. It is obvious that in healthcare, trial and error is terrifying when it involves human lives. Most of the innovation work does however not have to include such risks. Using mantras like this in innovation work can increase the fear of failing and thus inhibits sound risk taking that is inherent in innovation work.

In extension the fear of failure can lead to an ad-hoc approach to how to introduce new frameworks. The organization appears to build on top of structures and models that are already in place. This can give faster and smoother implementation phases, but the impact of the strategic efforts and their benefits may become lower had they been more fully embraced.

5.2.2 Structural level

On a structural level Karolinska shows symptoms of not being able to spread knowledge and innovations due to the large and complex organization. Though they have much competence and knowledge in the organization, it is unable to absorb, support and spread innovation fully within the organization. The organization is intricate in many ways, not only does it include 15 000 employees, but is also wide spread over divisions, departments, professions that are constantly undergoing change. With the attempt to move towards patient flows, the organization is now aiming to introduce another dimension of in the hospital that could further complicate the process of spreading innovation.

5.2.3 Cultural level

At the cultural level it is interesting to observe how strong the will and drive is among individuals throughout the organization to improve healthcare delivery. What is inhibiting successful innovation is not the attitude towards improving, but to see the need and spread at

large in the organization. The observed insecurity in how to spread innovation due to a lack of clear directives is a factor which is important to bring up.

As a result of the difference in language, professions and possibly incentive structure, the organization becomes grouped with chasms between. What could further emphasize the barriers, both between the departments, but also for spreading of innovations, is the "hero culture" which increases the "silo" way of working. That learning and development occurs in "silos" which do not efficiently communicate and cooperate regarding innovation work, on one hand increases the maneuverability within each of them but often the holistic alignment and efficiency suffers.

5.2.4 Misalignments

For successful innovation work it could be expected to have a clear alignment in how the factors within each of the areas interact, i.e. observed artifacts within the areas of strategy, culture and structure should not oppose or differ but strengthen each other. In the present form however, there are observable symptoms that can be originating from misalignment between them.

Firstly there seems to be a discrepancy between what the organization expresses in terms of explicit procedures and what is actually carried out in the operations. The strategic guidelines and methodologies to follow could be too complex to fully comply. This illustrates a misalignment between the strategy and overall directives of the operations and the adherence to this in the culture.

There is also a misalignment between the strategy and the underlying organizational structure that needs to support it. The attempt to structure according to VBHC, in a more lateral way adds a layer on top of the organizational complexity by creating a matrix organization. The strategy is to strengthen the innovation work by constructing patient flows but the complexity of the structure might not allow for it. One of the risks with this attempt includes falling from "its own weight", consisting in complexity of the coordination. The attempt to gradually approach the more flow based system on top of the old instead of creating an entirely new flow risks becoming too complicated in terms of coordination and cooperation. Especially since the different departments have a slightly protectionist attitude.

Between the culture and structure there is also some disparities. The misalignments primarily seem to lie in the communicational issues and the attitudes that result in protectionism and a sub-optimal cooperation between the different parts of the organization, as well as between the professions. If the structure and culture would be aligned, much of these problems would probably be marginalized.

The alignment of the organization is a difficult task, especially for one of such size and diversity in specialties. Due to the misalignments the innovation work as well as an efficient care delivery system is challenged, and the work towards VBHC risks ending as its predecessor Lean Healthcare. In some ways it can be argued that the frameworks face the same challenges. Lean Healthcare could be argued to have failed due to the fact that the project ended up only focusing on lead times, a result of picking bits and pieces of Lean Healthcare and applying on the existing operations rather than aiming at its core values. VBHC faces the same risk by adding another layer of organization on top of what exist in order to bring clarity to it.

6. Design Thinking and its possible applicability at Karolinska

Today the case organization is not working with DT in any project or department. Among people working within the operations, knowledge of the concept is practically non-existent. This is to be expected since use of the concept is still young both within academia and among healthcare practitioners. There are some trends towards involving more design-oriented approaches though. The project launched from KI which uses many of the methods in DT, called Service Design, was expressed as a success. Further the interviewee expressed that some of its work methods could be of use for the organization at large. However, there are no plans on incorporating these practices in Karolinska's daily operations.

Although DT might not solve all problems it contains elements that could be used in order to align the organization further. A good start for Karolinska might be to start with the core of DT, being to aligning the entire organization towards truly understanding the patient.

6.1 Similarity between DT and current work

The review of historical improvement frameworks that have been implemented, or influenced the organization in different ways, shows tendencies on involving DT ideas and principles. As Bjögvinsson, Ehn and Hillgren (2012) reasons, the practice of putting the patient in center of development processes goes back as long as to the 70s with the introduction of Participatory Research. The recognition of the need to involve patients in both innovation processes and quality work continued within frameworks such as Action Research, Participatory Research, Participatory Action Research, Breakthrough Series, Experience Based Design, and Experience Based Co-Design. Even today, where patient involvement is not articulated to be central in VBHC work, there is still a will and desire among employees to find ways to involve patients to a larger extent.

Since customer (patient) centeredness is the fundamental cornerstone of DT, that there are tendencies towards patient involvement, and that there is a will to do it more and better is an advantage would they want to implement DT principles. However, even though there is a will to steer development work in this direction, employees express a difficulty and an inability to do it in practice. There are no standardized methods for how it should be carried out; for what purpose to involve patients, which individuals to involve, and the extent of their involvement differs between projects. It was also stated by interviewees that the organization can be unable to actually adopt patients concerns and opinions fully. The medical field and its profession is full of extensively tested methods and procedures for how to provide the best possible healthcare. The profession has, and should have, a strong belief in their competence. The result of this view that healthcare is a type of art sometimes is that they do not empower the patients fully. As one interviewee stated, everyone wants patient involvement but with "perfect" patient representatives, i.e. represent the whole patient group, have opinions but not too strong, provide ideas but not too many or too radical etc.

Karolinska's innovation work today has some similarities when compared to DT, such as the emphasis on cross-functional work. As a consequence of the professions working within healthcare, with each person being highly competent and specialized within her or his field, the innovation work is required to gather input from different parts of the organization. This since every highly specialized individual cannot be experts in all fields. The personal pride is significant though, which can create barriers that prevents collaboration and learning from one another.

Looking at the other elements included in DT, such as ideation, prototyping, and iteration in the early phase of development, as clear parallels cannot be found within the case organization. To some extent product development and process design occurs as an isolated environment with long research phases, analyzing and testing thoroughly before being exposed to patients through a top down implementation. This design can create a looser fit between patients' needs and the organization's approach to meet it, as in the case of the teenage diabetics (see under “Patient Involvement” in the empirical part on problem areas, pp. 32).This does however not imply that their innovative resources are bad, rather the opposite. It has potential to become one of the most innovative healthcare actors in Europe, with its strong connections to KI providing strong synergies and opportunities.

6.2 Design Thinking as facilitator for innovation

The sheer capacity to come up with innovations is not what is the primary element missing in Karolinska's innovation work. The difficulty lies in implementing innovations on a broader scale and utilizing the full potential of the innovation resources that exist in the organization. One bottleneck is the inability to effectively coordinate all the activity taking place. Creating separate DT units similar to popular examples from Kaiser Permanente, Mayo Clinic, etc. would offer a possibility to foster a long range of innovations and ideas, but it is questionable whether this is the most appropriate way to introduce the concept. If the structures to realize and incorporate innovation in the organization are not in place, launching methods aiming to produce an even higher number of ideas would seem starting in the wrong end. Also, this could even further complicate the present situation with dispersed innovation activities where it is hard to distinguish whose responsibility it really is.

What DT could contribute with is primarily as support to improve the current critical areas in the innovation work. In the areas where DT and the organizational have similar goals, i.e. within patient-centeredness and cross functional collaboration, the DT approach could be expected to have valuable contributions.

DT could possibly help facilitating some of the problems regarding coordination. This mainly in the cross functional work. By involving the patients and clearly putting them in focus in an "empathizing" phase, a clearer alignment of the stakeholders could possibly be made. DT approaches with absence of hierarchy in the cross functional team-work could decrease the barriers that exist in the organization today, further remedying the coordination problems.

In the endeavor of involving patients in the innovation and development work DT could prove to be fruitful since there currently is a lack of methods for it. In this specific case not only the attitude and approach, but the methods of DT can be helpful. Involving the patient as a lead user in the entire innovation process by listening and learning, as well as observing and discussing could help in understanding the needs of the patient better.

Both patient centeredness and cross functional capabilities are parts of the work with VBHC, implying that alternative approaches to these areas could be of interest to the organization on a strategic level. Further, DT could help offloading the PFR from some of his or hers far-reaching responsibilities. By sharing the responsibility for coordination and innovation the role would be less time-consuming and it could also increase the sense of inclusion and participation among employees. If the coordination and the cross border dialog is improved, decreased redundant duplication of work and increased organizational learning could be positive effects.

6.3 Potential problems with implementing Design Thinking

As Assink (2006) concludes, there are several inhibiting factors to implementing innovations. These appear to be just as relevant when considering implementation of DT in the case organization. Although there are possibilities to rely on many of the structured methodologies in DT it is important to use it in a pragmatic way, not to introduce new concepts that risks becoming a burden. Similar to as Carlgren (2013) argues for a performative perspective on DT, a clear focus on what it can provide and why may be an absolute necessity if applied to Karolinska.

One difficulty with DT is that it can be difficult to fully comprehend due to its inherent vagueness. As Liedtka (2014) states, there does not exist a generally accepted view on what DT is, and is subject to discussion even among researchers and practitioners in the field. If implementing it in large scale in an organization with 15 000 employees, the vagueness of the concept makes it unlikely that the it would be understood and adopted uniformly throughout the organization, unless a new internal very strict definition of structures and methodologies is created. Further, as was expressed by almost all sources when studying projects including DT, the approach and methods was not easily adopted by all, and expressed not even to be suitable for all.

From the interviews it could be identified that the organization suffers from change fatigue and perceived lack of time. The organization has over the years been overwhelmed by different frameworks, and is currently being exposed to a new one in the form of VBHC. With this in mind, it could be difficult to introduce DT approaches explicitly labeled as "Design Thinking". This could be expected to create a resistance to it intuitively among the employees simply by being new. Instead, it could be useful to make use of existing nomenclature, work methods, and models to achieve the benefits that DT aim to provide.

By avoiding the potential pitfall of introducing a new concept, which also includes a large risk of getting misinterpreted the likelihood of success increases drastically. The structural methodologies in DT risks becoming a load rather than an improvement. In a possible future with better structures for absorbing and spreading innovation, it might be useful to incorporate more of the methods. Now however, a more "philosophical" approach, using the mindset and the goals of DT, could be helpful in order to relieve some of the problems of the organization.

7. Discussion

This study has explored the possible applicability of DT as support for innovation work in Karolinska with two research questions. First, what problems is Swedish healthcare facing regarding current and future innovation- and development work? and second, how may DT support Swedish healthcare in addressing these problems?. The results show problems in the innovation work that on one hand could be addressed with DT, but on the other could be inhibitors for bringing in DT in the organization.

What problems is Swedish healthcare facing regarding current and future innovation- and development work?

The analysis shows that the largest problems in the innovation work is not to come up with new good ideas and ways of working. The problem is that the complexity of the organization leads to a dispersed innovation work. The organization is filled with highly motivated, intelligent and educated people, but it is difficult to improve the organization at the holistic level. The difficulty lies in aligning the organization towards capturing the potential that lies within reach.

Assink (2006) point out some potential inhibiting factors for innovation in large firms. These factors all fit very well with the problematics in the Swedish healthcare system. The established position and mental models are deeply rooted, the risk-averse mindset as well as infrastructural problems are hindering rapid change, and the lack of adequate follow-through competencies brings a change fatigue that further enhances the problems.

The technology-oriented view on innovation at Karolinska does not sufficiently cover all activities in the organization actually being of innovative nature. The processes for treatments and operations within healthcare are subject to extensive testing, discussion, and analysis before being implemented. Healthcare as such is very conservative due to the fact that it is eventually dealing with people's lives and health, and changes in processes that would be seen as small incremental improvements in other settings are seen as radical here. In relation to Tidd et. al.'s (2005) description of one type of innovation being to apply something in a new context, the nature of healthcare operations could be argued to lower the barriers before entering a context where there is a degree of novelty, insecurity, and risk taking that moves actions otherwise considered development work into the innovation territory.

In order to capture a broader spectrum of activities within the organization actually being of innovative nature, and align the employees' conception of what it is, it could be useful to introduce and apply a broader definition. One could therefore describe innovation within Karolinska as being *any activity aiming at introducing or changing into novel tools, processes, or methods to improve stakeholder value.*

Without further studies, it is uncertain to what extent the above mentioned problem areas can represent the situation in Swedish healthcare organizations in general. However, there is a resemblance between the largest hospitals in Sweden and a convergence regarding trends guiding innovation work, which could signify that some of the problem areas could be universal.

How may DT support Swedish healthcare in addressing these problems?

The findings in this study shows that it could be problematic to launch DT as a new concept in the organization. First, the historical launches of new concepts and framework has made the organization tired and resistant to change. Second, the current work with VBHC is comprehensive and difficult for the organization to adapt to. Bringing in DT as addition to that, risks becoming complicated and confusing.

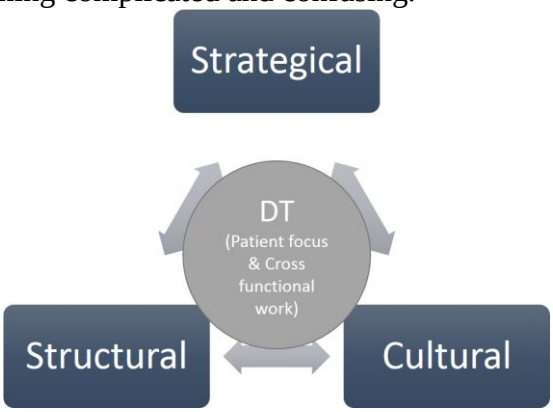

Fig. 6 - DT addressing misalignments in the innovation work

What this study argues for is to take inspiration from the "philosophical" cognitive-oriented aspects of DT, as described by Martin (2006) and Dunne & Martin (2009), rather than methodological approaches as described by Brown (20008). In conceptual terms this can be illustrated in the figure above, with DT approaches to patient involvement and cross-functional work addressing some of the problems the organization has in aligning innovation work.

It would be possible and favorable to involve patient representatives to a larger extent. What is important however is to consider the patient as a customer of the delivered care. Since the "perfect" patient for evaluation does not exist, it is important to note that the patient representative should be considered a lead user and not an expert.

When comparing to what other hospitals have done, it might not be as helpful to use the more process oriented methods of Chief Andrew Isaac Health Clinic in Fairbanks, or Kaiser Permanente, but rather the mindset approach of GE Healthcare. DT involves a mindset and an approach to cross-functional work and human centeredness that can be very useful to address the problems Karolinska is expressing in coordination and patient involvement. The main value of using elements from DT lies in the possibility to increase the alignment of the organization.

8. Conclusions

- What are the largest problems Swedish healthcare is facing regarding current and future innovation- and development work?

During the study of the case hospital Karolinska University Hospital some important factors that inhibits the innovation and development work have been found. Roughly the factors can be divided into three aggregation levels: *strategical*, *structural* and *cultural*. Within these three levels and the disparities between them, the important problems that were found in the interviews and the analysis can be described.

On the strategic level, factors such as an overly top-down focused approach in launching new concepts, and launching of new frameworks with regular time intervals, brings with it problems in anchoring new ways of working and a tiredness in change. Structural factors of complexity and communication are problematic due to the size and scope of the organization. This leads to sub optimal spreading of information and knowledge, which is essential for increasing the innovativeness of any organization. The cultural issues primarily lies in the barriers between the departments as well as professions which further complicates the communication and spreading of knowledge and innovations.

The misalignments between the different levels further amplifies the problems since there is no coherent view on the over all goals and how to reach them. Although there is a large will to improve and innovate at all levels, it is difficult to implement and capture the value.

- How may DT support Swedish healthcare in addressing these problems?

DT might be helpful in the work towards aligning the organization to use some key features of the design thinking approach and encouraging some of the elements. Since DT focuses much on understanding the customer, or patient in the case of healthcare, as well as keeping an open dialogue in cross functional groups, it might be a helpful starting point when remedying some of the problems.

One of the commonly recurring problems in the interviews was the lack of patient involvement. Using the starting point in working to fully understand the patient, preferably in cross functional teams could be a way to open up the dialogue and increase the cooperation, and meanwhile aligning the work towards an even more patient centred healthcare delivery. Since the PFRs responsibility primarily lies at the end-to-end flow of the patient, this might be a suitable starting point for the above mentioned work towards understanding the patient.

Some further possible areas where DT could act as a helping facilitator is:

- To conduct situation analysis
- To generate ideas and isolate problem areas
- To come up with quality measures
- To align key persons in the work towards a more cooperative and patient centred view

However, during the study, it has become evident that introducing new concepts risks being faced with hesitation or even resistance. It is therefore not appropriate to change methodology explicitly to using a DT approach. Due to the risks when implementing new concepts it is important not to use new terminology, new structures and new methods, but rather build on what exists. In this sense it is important to approach a more DT way of working with care to capture the essence and the philosophy and encourage patient involvement and more cross functional work rather than enforcing new structured methods to follow.

Areas for further research

Though the case organization Karolinska University Hospital is assumed to be relatively representative for the large healthcare providers in terms of problematics, structure and prerequisites for this study, an in-depth study of a wider range of hospitals would provide a better base before drawing more general conclusions about the situation. It would thus be of interest to increase the:

- Generalizability of problem areas in Swedish healthcare at large
- Generalizability of prerequisites for implementing DT in Swedish healthcare at large

Because of the findings of the study pointed at problems regarding change management, this area is an important topic, where further research could prove very fruitful in the case of Swedish healthcare. Some areas, tangent to this report could be:

- How to successfully manage change in Swedish healthcare
- Organizational change fatigue in Swedish healthcare
- Strength of examples and anecdotal "sunshine stories" in Swedish healthcare
- Lead users and lead examples in healthcare

9. References

Amabile , T. M. (1998) How to kill creativity. In: Harvard Business Review, 76, 5, pp. 76-87

Ardenvik, B., Frödeberg-Johansson, A., Lindberg, A., Larsén, G., Ainalem, I., Kjellman Kiebach, L., Svensson, P. (2006) *Detta är Bra Mottagning.* Utvecklingscentrum, Region Skåne

Argyris, C. (1983) Action Science and Intervention. In: The Journal of Applied Behavioral Science, 19, 2. pp. 115-140

Argyris, C. (1991) Teaching Smart People How to Learn. In: Harvard Business Review, 4, 2. pp. 4-15

Assink, M. (2006) Inhibitors of disruptive innovation capability: a conceptual model. In: European Journal of Innovation Management, 9, 2, pp. 215-233

Barry, M. J., Edgman-Levitan, S., (2012) Shared Decision Making - The Pinnacle of Patient-Centered Care. In: The New England Journal of Medicine, 366, 9, pp. 780-781

Baskerville R., L., Wood-Harper, A., T. (1996) A critical perspective on action research as a method for information systems research. In: Journal of Information Technology, 11. pp. 235-246

Batalden, P., B., Davidoff, F. (2007) What is ‘‘quality improvement’’ and how can it transform healthcare? In: Qual Saf Health Care, 16, pp. 2–3.

Bate, P.; Robert, G. (2007) *Bringing user experience to healthcare improvement: the concepts, methods and practices of experience-based design*. Radcliffe Publishing: Abingdon, UK.

Bate, P., Robert, G. (2006) Experience-based design: from redesigning the system around the patient to co-designing services with the patient. In: Qual Saf Health Care. 15. pp. 307–310

Bejerot, E., Hasselbladh, H. (2006) Discursive Closure, Enrolment and Materialization – a Study of TQM in a County Council. In: Nordiske Organisasjonsstudier, 8, 2, pp. 7-38

Benett, K. (2013) Design Thinking: Creating A Better Understanding Of Today To Get To A Better Tomorrow. *Forbes* http://www.forbes.com/sites/darden/2013/08/29/design-thinking-creating-a-better-understanding-of-today-to-get-to-a-better-tomorrow/. (2015-03-18)

Bergman, B., Neuhauser, D., Provost L. (2010) Five main processes in healthcare: a citizen perspective. In: BMJ Qual Saf. pp. 41-42

Berwick, D., M. (2003) Improvement, trust, and the healthcare workforce. In: Qual Saf Health Care.12, 1. pp. 2–6

Björgvinsson, E., Ehn, P., Hillgren, P-A. (2012) Design Things and Design Thinking: Contemporary Participatory Design Challenges. In: Massachusetts Institute of Technology Design, 28, 3, pp. 101-116

Boland, R., Collopy, F. (2004) *Managing as Designing.* Stanford University Press, Stanford, CA.

Brown, T. (2008) *Design Thinking.* Harvard Business Review. Harvard Business School Publishing Corporation

Brown, T. (2009) *Change by design*. HarperCollins e-books

Carlgren, L. (2013) *Design Thinking as an Enabler of Innovation: Exploring the concept and its relation to building innovation capabilities.* Chalmers University of Technology

Carlgren, L., Elmquist, M., Rauth, I. (2014) Exploring the use of Design Thinking in large organizations: Towards a research agenda. In: Swedish design research journal, 1 , pp. 55-64 (1)

Carlgren, L., Elmquist, M., Rauth, I. (2014) Design Thinking: Exploring Values and Effects from an Innovation Capability Perspective. In: The Design Journal, 17, 3, pp. 403-424 (2)

CFI. (2013) History of the Center for Innovation. *Mayo Clinic* http://www.mayo.edu/center-for-innovation/what-we-do/history-of-the-center-for-innovation (2015-03-27)

CFI. (2015) Design Thinking. *Mayo Clinic* http://www.mayo.edu/center-for-innovation/what-we-do/history-of-the-center-for-innovation (2015-03-27)

Chesbrough, H. (2011) Brining Open Innovation to Services. In: MIT Sloan Management Review, 52, 2, pp. 85-90

Christensen, C., M., Kaufman, S., P., Shih, W., C. (2008) *Innovation killers - How financial tools destroy your capability to do new things.* Harvard Business Review.

Cornwall, A., Jewkes, R. (1995) What is Participatory Research?. In: Soc. Set Med, 41, 12, pp.1667-1676. Elsevier Ltd, London

Day, G. S., Shoemaker P. J. H. (2011) Innovating in Uncertain Markets: 10 Lessons for Green Technologies. In: MITSloan Management Review. 52, 4. pp.37-45
DeWolf, L. (2009) Understanding Innovation in Healthcare. In: Journal for Healthcare Qualtiy. 31, 1. pp. 3-4

Stanford d.school. (2010) bootcamp bootleg. Stanford d.school.

Drucker, P. F. (1985) The Discipline of Innovation. In: Harvard Business Review, 63, 3, pp. 67-72

Dunne, D., Martin, R. (2006) Design Thinking and How It Will Change Management Education: An Interview and Discussion. In: Academy of Management Learning & Education, 5, 4, pp. 512-523

Fleuren, M., Wiefferink, K., Paulussen, T. (2004) Determinants of innovation within health care organizations: Literature review and Delphi study. In International Journal for Quality in Health Care, 16, 2, pp. 107-123

Friedman V. J., Rockwell Torbert, W., Nielsen, R., Bradbury, H. (2014) Chris Argyris (1923-2013): In memoriam. In: Action Research. 12, 1. pp. 110-113

Glouberman, S., Mintzberg, H. (2001) Managing the care of health and the cure of disease. In: Healthcare Management Review, 26, 1, pp. 56-69

Gregory, J., (2003) Scandinavian Approaches to Participatory Design*. In: Int. J. Engng Ed. 19, 1, pp. 62-74. TEMPUS Publications

Gustavsson, S., M., K. (2014) Improvements in neonatal care; using experience-based co-design. In: International Journal of Health Care Quality Assurance. 27, 5 pp. 427 - 438

Gyurjyan, G., Parsons, I., Thaker S. (2014) *A health check for Pharma: Overcoming change fatigue in the pharmaceutical industry.* McKinsey & Company

Hargadon, A., Sutton, R. (1997) Technology Brokering and Innovation in a Product Development Firm. In: Administrative Science Quartely. 42, 4, pp. 716-749. Sage Publications Inc.

Hassi, L., Laakso, M. (2011) Concepts of Design Thinking in the Design and Management Discourses. In: proceedings of the 4th World Conference on Design Research, IASDR

IDEO (2005) Nurse Knowledge exchange for Kaiser Permanente: Improving nurse knowledge exchange for better patient care. *IDEO.* http://www.ideo.com/work/nurse-knowledge-exchange
(2015-03-10)

IDEO (2015) Our clients. *IDEO*
http://www.ideo.com/work/clients/
(2015-03-25)

IHI (2003) *The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement.* IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement (Available on: www.IHI.org)

Innovation Consultancy. (2015) About Us. *Innovation Consultancy Kaiser Permanente.* http://kpinnovation.org/aboutus.html (2015-03-20)

Johansson-Sköldberg, U., Woodilla, J., Çetinkaya, M. (2013), Design Thinking: Past, Present and Possible Futures. In: Creativity and Innovation Management, 22, 2, pp. 121–146.

Johansson-Sköldberg, U., Woodilla, J. (2013). Arguing for design thinking interventions as artistic interventions. In: Swedish Design Research Journal, 2009, 2, pp. 40-47

Kalb, I. (2013) Innovation Isn't Just About Brainstorming New Ideas. *Business Insider.* http://www.businessinsider.com/innovate-or-die-a-mantra-for-every-business-2013-7?IR=T (2015-06-04)

Kaplan R. S., Norton D. P., (1992) The Balanced Scorecard - Measures that Drive Performance. In: Harvard Business Review. (January-February). pp. 71-79

Kaplan, R. S., Porter, M. E. (2011) How to Solve The Cost Crisis In Health Care. In: Harvard Business Review. 89, 9. pp. 46-52

Karpagam, P., L., U., Suganthi, L. (2013) Performance measurement of organization: a review of balanced scorecard technique. In: Int. J. Business Performance Management. 14, 2. pp. 129-148

Kelley, T., Littman, J. (2001) *The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm.* New York: Crown Business.

Kelley, T. with Littmann, J. (2005) The Ten Faces of Innovation: IDEO's Strategies for Defeating the Devil's Advocate and Driving Creativity Throughout Your Organization. New York: Doubleday.

Kelley, T., Littman, J. (2007) *The art of innovation: lessons in creativity from IDEO, America's leading design firm.* New York: Crown Publishing Group

Kaiser Permanente. (2013) *Annual Report.* Kaiser Permanente, Oakland, California

Kimbell, L. (2009) Beyond design thinking: Design-as-practice and designs-in-practice. Paper presented at the CRESC Conference, Manchester, September 2009.

Koch, T., Kralik, D. (2006) *Participatory Action Research in Healthcare.* Blackwell Publishing Ltd

Kovac Silvis, J. (2013) "Design Thinking" For Healthcare. *Healthcare Design Magazine* http://www.healthcaredesignmagazine.com/blogs/jennifer-kovacs-silvis/design-thinking-healthcare. (2015-03-25)

Lawson, B. and Samson, D. (2001) Developing Innovation Capability in Organisations": A Dynamic Capabilities Approach. In: International Journal of Innovation Management, 5, 03. pp. 377–400.

Lefler, P. (2010) Improvement is not Innovation. *Customer Think.* http://customerthink.com/improvement_is_not_innovation/

Lengnick-Hall, C. (1995) Improving Customer Focus - The Patient as the Pivot Point for Quality in Health Care Delivery. In: Hospital & Health Services Administration. 40, 1 pp. 25-39

Liedtka, J. (2014) Perspective: Linking Design Thinking with Innovation Outcomes through Cognitive Bias Reduction. In: Journal of Product Innovation Management,

Lockwood, T. (2009) Transition: How to Become a More Design-Minded Organization. In: The Design Management Institute, 20, 3, pp. 29-37

Länsisalmi, H., Kivimäki, M., Aalto, P., Ruoranen, R. (2006) Innovation in Healthcare: A systematic Review of Recent Research. In: Nursing Science Quarterly, 19, 1. pp. 66-72

Markides, C. (1998) Strategic Innovation in Established Companies. In: Sloan Management Review, 39, 3, pp. 31-42

Martin, R. (2009) The Design of Business: Why Design Thinking is the Next Competitive Advantage. Harvard Business School Press, Boston, MA.

Mascitelli, R. (2000) From experience: harnessing tacit knowledge to achieve breakthrough innovation. Journal of product innovation management, 17(3) 179-193.
McCreary, L. (2010): Kaiser Permanente's Innovation on the Front Lines, in: Harvard Business Review, 88, 9, pp. 92-97.

McDonagh, D., Thomas, J. (2010) Rethinking Design Thinking: Empathy Supporting Innovation. Australasian Medical Journal, 3, 8, pp. 458-464

McLeod, P. L., Lobel, S. A. (1992) The effects of ethnic diversity on idea generation in small groups; *Academy of Management Proceedings* August 1, [i]1992:1 pp. 227-231;

Memorial Hospital (2014) An Immersion in Innovation Culture: Memorial Dives Deep. Memorial Hospital
https://qualityoflife.org/tasks/sites/memorialcms/assets/File/ideo.pdf (2015-03-28)

Miron-Spektor, E., Enez, M., Naveh, E. (2012) To Drive Creativity, Add Some Conformity. In: Harvard Business Review, 90, 3, p.30

Naidu, N.,V., R., Babu, K., M., Rajendra, G. (2006) *Total Quality Management.* New Age International Publishers

Nordenström, J. (2014) *Värdebaserad vård - Är vi så bra vi kan bli?* Karolinska Institutet University Press. Stockholm

Pohjola-Ahlin, S., Janzen, S. (2012) Improving the customer encounter experience at Karolinska Institutet University Library; the 7-step program. In: Journal of the European Association for Health Information and Libraries, 8, 2, pp. 8-11

Porter, M. E. (2008) Value-Based Health Care Delivery. In: Annals of Surgery, 248 ,4, pp. 503-509

Porter, M. E. (2010) *What is value in healthcare?* Boston: Harvard Business School

Porter, M. E., Lee, T. H. (2013) The Strategy That Will Fix Health Care, In: Harvard Business Review, 91, 10, pp. 50-70

Rognes, J., Svarts, A. (2011) *Lean i Vården - En översikt över dagsläget i Sverige.* Ledningssystem och Styrning av Vård

Ruga, W. (1992) Breakthorugh thinking in healthcare design. The Healthcare Forum Journal, 35, 5, pp. 17-18

Schumpeter, Joseph A.; Opie, Redvers (1983) [1934]. *The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle*. New Brunswick, New Jersey: Transaction Books. [Translated from the 1911 original German, *Theorie der wirtschaftlichen Entwicklung*.]

Streim, J. (1997) *Sjukvårdens Huvudprocesser - Budskap och verktyg.* Sveriges Kommuner och Landsting, Stockholm

Tidd, J., Bessant, J., Pavitt, K. (2005) *Managing innovation: integrating technological, market and organizational change* (3rd Edition). John Wiley & Sons Ltd, Haddington, UK

Tripsas M. (1997) Unraveling the process of creative destruction: complementary assets and incumbent survival in the typesetter industry. Strategic Management Journal, Summer Special Issue 18: 119–142.

Tsianakas, V., Robert, G., Maben, J., Richardson, A., Dale, C., Wiseman, T. (2012) Implementing patient-centred cancer care: using experience-based co-design to improve patient experience in breast and lung cancer services. In: Support Care Cancer, 20, pp. 2639–2647

Wong, V. (2009) How Business Is Adopting Design Thinking. Bloomberg Business http://www.bloomberg.com/bw/stories/2009-11-03/how-business-is-adopting-design-thinkingbusinessweek-business-news-stock-market-and-financial-advice
Accessed: 2015 – 03 - 17

Yin, R. K. (2008) *Case Study Research: Design and Methods.* Applied Social Research Methods. 4th Edition. SAGE Publications, Inc.

Zmijewski, B. (2014) The Problem With Design Thinking Is That I Still Don't Know What Design Thinking Is. *Zurb*
http://zurb.com/article/1349/the-problem-with-design-thinking-is-that-. (2015-03-20)