Value Creation in Healthcare through Secondary Activities

A Case Study Investigating Food Processes

ANDREA GRIMMEISS
KATHERINE WANG
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Andrea Grimmeiss
Katherine Wang

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KTH Industrial Engineering and Management
Industrial Management
SE-100 44 STOCKHOLM
Värdeskapande inom Vård med hjälp av Sekundära Aktiviteter

En Fallstudie med Fokus på Matprocessen

Andrea Grimmeiss
Katherine Wang

Examensarbete TRITA-ITM-EX 2018:457
KTH Industriell Teknik och Management
Industriell Ekonomi och Organisation
SE-100 44 STOCKHOLM
Abstract

The world is facing the challenge of an increasingly growing and aging population which leads to increasing requirements on the healthcare system. This has led to higher financial pressure on operational managers to do more with less resources. Hospitals are characterised by rigid routines, strict hierarchical structures and lack of consistent definitions of value which creates challenges for improvement projects and implementation. To explore an alternative perspective of how to increase value in healthcare, the concept of secondary activities is introduced. Secondary activities are defined as activities that are indirectly related to healthcare and medical processes in hospitals. Presently, secondary activities are not prioritised in healthcare since the distinction has not been made before and therefore is the value-gain interesting to investigate. The purpose of this report is to investigate how to increase value in healthcare through improved secondary activities and the following research questions are used to fulfill the purpose:

1. What are the challenges of defining value in healthcare?
2. What process improvement strategy is suitable for improving secondary activities?
3. What implementation strategy is suitable when improving secondary activities?

The method used to conduct this study consisted of a literature study covering the fields of value creation, Lean in healthcare and change management in hospital management, followed by a case study at Norrtälje Sjukhus where the food process was investigated.

Results of the study showed that the challenges of defining value in healthcare are the different mindsets between professions operating in hospitals and the required balance between ethical and financial aspects.
At Norrtälje Sjukhus, the assistant nurses valued time spent with patients. In order to free more time for them, secondary activities have great potential of increasing value through improvement projects.

The combination of Lean and Biodesign based on comprehensive observations proved to be a suitable process improvement strategy for improving secondary activities. Moreover, secondary activities lag well behind primary activities regarding digitalisation which can increase the value of secondary activities through improved workflows. When value is defined as time spent with patients this process improvement strategy proved to be successful. Results of improving the food process in the case study showed that the total annual savings for the hospital were 3212 work hours which corresponds to 761 244 kr.

Prerequisites for a successful implementation strategy are awareness of problems, needs and to have an improvement strategy that fits the situation. Introduction of changes should made together with the personnel and be incremental to minimise disturbances to other healthcare activities. A remaining challenge is the lack of responsibility and managerial competence in the regular hospital organisation that is needed for future, continuous and sustainable improvements for secondary activities.

Keywords: Value creation, Lean, Change management, Healthcare, Process improvement, Implementation, Case study research, Operations management, Lean healthcare.
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Sammanfattning

Världen står inför en stor utmaning med en växande och åldrande befolkning vilket ställer högre krav på sjukvårdssystemet. Detta har lett till ökat finansiellt tryck på verksamhetsansvariga att prestera mer med mindre resurser. Sjukhus karakteriseras ofta av oflexibla rutiner, strikt hierarkiska strukturer och inkonsekvent definition av värde vilket innebär utmaningar för förbättringsarbeten och implementation. Konceptet sekundära aktiviteter introduceras för att utforska ett alternativt perspektiv av hur man ökar värde i sjukvården. Sekundära aktiviteter definieras som indirekt sjukvårdsrelaterade aktiviteter som stöttar medicinska processer. I nuläget prioriteras inte sekundära aktiviteter i sjukvården eftersom denna särskiljning inte tidigare gjorts och därför blir den potentiella värdeökningen intressant att undersöka. Syftet med denna rapport är att undersöka hur värdet kan öka i sjukvården genom förbättring av sekundära aktiviteter. Följande forskningsfrågor bidrar till att uppfylla syftet med rapporten:

1. Vilka är utmaningarna med att definiera värde i sjukvården?
2. Vilken processförbättringsstrategi är lämpligast för att förbättra sekundära aktiviteter?
3. Vilken implementationsstrategi är lämpligast för att förbättra sekundära aktiviteter?

Metoden som användes i denna studie bestod av en litteraturstudie som behandlade områdena värdeskapande, Lean i sjukvården och förändringsarbete inom sjukhusledningen, följt av en fallstudie på Norrtälje Sjukhus för att undersöka matprocessen.

Resultat från studien visade att utmaningarna med att definiera värde inom sjukvården är skillnader mellan professioner och en avvägning mellan etiska och finansiella faktorer. Undersköterskorna på Norrtälje Sjukhus värderar tiden med patienterna högst. Sekundära aktiviteter har stor potential att öka i värde genom förbättringsarbeten för att kunna frigöra mer tid för undersköterskorna.

Förutsättningar för en framgångsrik implementationsstrategi är medvetenhet kring problemen, behoven samt att anpassa strategin efter situationen. Introduktion av förändringarna bör ske stegvis i samarbete med personalen för att minimera störningsmoment gentemot andra vårdaktiviteter. En kvarstående utmaning är bristen på ansvar och chefskompetens i sjukhusorganisationen för framtida, kontinuerliga och hållbara förbättringar av sekundära aktiviteter.

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Norrtälje Sjukhus and all the personnel have shown us great hospitality since the first day and welcomed us into their organisation and we are very grateful for their engagement, something that should not take for granted. We would especially like to thank Inger Turn Andersson and Annette Österberg, the managers of ward 4 for their passion and drive to improve and make a difference.

Stockholm 22nd May 2018,
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1. Introduction

This chapter introduces the topic of increasing value in healthcare through secondary activities and motivates the purpose and research questions of this study. A background is provided of the problems the healthcare industry is facing in relation to secondary activities. Lastly, necessary delimitations are presented followed by the project’s contributions in terms of theoretical and practical research.

1.1 Background

The world is facing the challenge of an increasingly growing and aging population (Broadbent et al., 2009; Karolinska Institutet, 2016), mainly due to the previous significant rise in birth rate. Moreover, profound medical and technology improvements that increase life expectancy contribute to increased pressure on the healthcare system. All industrialised countries are currently experiencing rising costs in healthcare (Jacobsson, 2010; Hosseini, 2015; Buttigieg and Gauci, 2015). With limited resources the requirements of productivity and efficiency and at the same time achieving high quality healthcare are of greatest significance.

The importance of food and its impact on our health has become a popular topic in both science and social media. In addition, food plays an important role in the environmental sustainability debate, including issues of production, transportation and waste. In regards of healthcare, improved food habits can prevent diseases as well as improve the conditions for individuals who are experiencing illness or injuries (Karolinska Institutet, 2015). Therefore, high quality food in hospitals has the potential of supporting the process of patient recovery.

The hospital organisation can be divided into activities that are directly related to patient care and activities that are indirectly related to patient care by providing support to the overall healthcare operations. Areas such as finance, IT, security and food management are included in operations that support the recovery of patients, indirectly impacting the healthcare quality. Research has shown that this kind of supporting activities are currently not as prioritised as clinical ones and consequently these are not being improved to the same extent (Jha et.al, 2016; Gorman, 2016; The Council of Europe, 2002). Resource distribution and how activities are prioritised is a challenge itself, especially on the hospital organisational level (Barasa et.al, 2014). Support services are crucial for effective patient care, since efficiencies gained in human resources can free frontline unit managers and clinical staff to spend more time at the patient’s bedside (Mate and Rakover, 2016).

The link between supporting units and clinical care is dependent on a functioning hospital management (West, 2000). The combination of internal competencies within the area of healthcare and external knowledge on organisational management can contribute to improved overall healthcare quality (Stoller et.al, 2016). The potential increase in healthcare quality can therefore be found through increased value of supporting activities, such as hospital food management.

This project is a part of an eight month program performed by Clinical Innovation Fellowships (CIF). CIF started in September 2017 and brought together a multidisciplinary team of experienced professionals to
develop medical technology innovation based on a needs driven process (CIF, 2018). This year’s CIF team consisted of a business and software engineer, an industrial designer, a medical doctor and a computer and logistics engineer. The process used is called Biodesign and is developed by Stanford University (2018). The program is also associated with Karolinska Institute and EIT Health. CIF operates in Europe and has the objectives to systematically identify clinical needs and develop solutions to impact healthcare worldwide (KTH, 2018). As part of the CIF program at the Royal Institute of Technology (KTH), the current situation at a case hospital of choice was evaluated in order to identify improvement areas. A number of the problems observed were formed as a basis for Master thesis projects regarding optimisation of routines and processes at the hospital.

1.2 Secondary Activities

In existing literature, activities that are not directly related to healthcare are referred to in different ways. For example, Edwards and Nielsen (2011) refer administration and management of consumables as “non-core activities” and Okoroh et.al (2002) refer IT-system management and catering as “support services” or “non-clinical services”. This indicates that currently there is no consistent definition in theory of what activities within healthcare that can be considered as supporting ones or simply not directly related to patient care, motivating the choice of creating a new definition for this study.

For this report it was decided to redefine the category of healthcare activities that are indirectly related to patient care and support the overall healthcare management in order to bring attention to its possible value-increasing potential. In this report, the term “secondary activities” is used when referring to supporting activities that are not considered to be primarily or directly related to patient care through provision of human, technical and material resources. Examples of secondary activities are tasks related to finance, security, IT and food. This kind of activity is not to be confused with “secondary healthcare” which is usually used when referring to the second step in the healthcare chain. Instead, by distinguishing “secondary activities” as separate from other activities in hospitals, it can be investigated in more detail and its specific relevance and connection to value can be determined.

The holistic approach used by CIF allows for identification of organisational improvement measures by analysing processes within hospital wards (CIF, 2018). This way the potential value-increase of “supporting activities” are naturally recognised and possible to improve. Yet this kind of activities are not referred to in a explicit manner.

1.3 Problematisation

In hospitals, there are multiple actors and processes that need to be functioning in harmony. Patients need medical treatments at the same time as they need a secure environment to live while being hospitalised, therefore processes range from medical procedures to serving meals and sorting laundry. Primary and secondary activities are together forming the healthcare system but currently, the rising problems are piling up faster than solutions are found. The structure and strategy that has been used is outdated and no longer fitted to the situation today (P. Sturmberg, 2018). The healthcare sector is also lagging behind the digitalisation era which causes multiple problems because of the increasingly demanding population which puts pressure on the hospital organisation management (Dagens Nyheter, 2018a). By taking a different
perspective other than healthcare and medicine, an understanding of the value and potential of secondary activities in healthcare systems can provide new improvement strategies to overall healthcare quality.

Financial Pressure

The financial pressure on healthcare and hospitals is constant. While the population grows and technology advances, the demand for better, more efficient healthcare also grows meanwhile stakeholders and policymakers are pushing for reduced expenditures. Therefore, there is a need to develop support systems that can be implemented along with healthcare activities (Brailsford et al., 2012; P. Sturmberg, 2018).

It can be challenging to adapt analogies from non-healthcare-related industries into healthcare systems because of the unique setting of which it is built upon. Prices, demands and values are different than most other service industries which makes it difficult to mimic on a fair basis. The prices of healthcare services are not transparent which makes it hard for the consumer to understand its value but at the same time is the patient not supposed to know the monetary value because the only value that matters is if it will help making the patient healthy. Standardisation is done in most service industries to increase the efficiency of processes, which on the other hand might be detrimental due to the individualistic nature of every patient having different needs (Weeks and Weinstein, 2015).

Especially in Sweden where healthcare is available for everyone (Socialstyrelsen, 2018), it can be difficult to distinguish the value of processes even if it is clear that the patient’s health and treatments are in focus. A study proved how non-profitable healthcare systems such as the Swedish can be beneficial for the quality of healthcare since focus is on the patients instead of financial goals (SKL, 2014) but financial measures are still a crucial aspect and a definite limitation to the improvement potential of healthcare systems.

Ambiguity about Value in Healthcare

Healthcare systems are slow changing systems due to their unique set of incentives, constraints and regulations (Reinhardt and Oliver, 2015; Buttigieg and Gauci, 2015). The variety of work professions and a hierarchical organisation consequently leads to differences in opinions and perspectives regarding value. Furthermore, there are diverse views of what healthcare means and what it should manage (P. Sturmberg, 2018) which indicates a problem that needs to be addressed when rethinking strategies. Instead of operating through management by tradition, a transition towards management by evidence is needed. As problems become more complex it becomes more difficult for managers to comprehend the underlying connections between cause and impact leading to challenges of defining value. Research in healthcare services can be a tool to promote healthcare management (T. H Wan, 2002).

The concept of value-based healthcare is becoming more relevant. The patient is becoming the focus instead of the competence of the clinical personnel or the advancement of the treatment. The goal is to focus on the patient’s need and the outcome of his or her health after being at the hospital (E. Porter and H. Lee, 2013). An important incentive to why value-based healthcare is being promoted is because of its hopes of reducing costs, both for patients and for the hospital. However, there is a challenge here to measure and evaluate value. To measure the value, it needs to be defined which is proven to be difficult and therefore it can be considered a bad objective to strive for (Reinhardt and Oliver, 2015).
The many levels of operations within healthcare systems means that concepts such as knowledge management plays a significant role for the system (Kruse et.al, 2015). Most of the professional roles in hospitals involve highly practical and experience based skills which promotes tacit knowledge. Tacit knowledge in turn implies that the individual performs tasks or activities according to their own habits and routines that they have optimised via experience (Olofsson, 2017) which results in non-standardised execution of the same activity. This can be argued to be a reason to why codification of knowledge within healthcare can be challenging but nonetheless important to consider when developing implementation strategies in hospital environments.

1.4 Purpose and Research Questions
The purpose of this report is to investigate how to increase value in healthcare through improved secondary activities.

The following research questions are used to fulfill the purpose of the report:

1. What are the challenges of defining value in healthcare?
2. What process improvement strategy is suitable for improving secondary activities?
3. What implementation strategy is suitable when improving secondary activities?

1.5 Delimitations
A number of delimitations were made in order to focus the academic research and facilitate the practical case study. Three different research areas were chosen to focus on because of their relevance to fulfill the purpose of the report. The topic of value creation was included to provide the reader with an understanding of value creation in a healthcare context. The area of Lean in healthcare as well as change management in hospital management were included in order to create a secure foundation for discussions about practical improvements and equip the reader with sufficient knowledge to understand the case study.

The case study took place at Norrtälje Sjukhus and also included a comparable counterpart at Sahlgrenska Universitetssjukhuset. Since healthcare differs depending on the country and financial states, the case study was delimited to hospitals in Sweden in order to maintain consistency and comparability between the hospitals. Focus was on hospital wards where the patients are and consequently the study centered around the practical work of the assistant nurses. The organisational routines and management related to the work in the wards were observed and analysed.

There are many activities that can be categorised as secondary ones, however, the topic of food was chosen since every hospital ward needs to serve food and therefore it is an appropriate investigation topic to represent secondary activities. An initial practical problematisation related to food processes was also specified in the task given by CIF. All activities in the wards related to food were included in the analysis.
1.6 Project Contribution

The findings from this project will be of interest for the healthcare industry and contribute to its research field. Firstly, and the most crucial contribution is the gained awareness and attention drawn to secondary activities in healthcare systems. The importance of its existence must be noted and also its impact on the quality of healthcare. This realisation will be added knowledge to the existing research about healthcare management and will be a perspective to consider in future research in the field.

Secondly, the report will explore some of the challenges of defining value in hospital wards. This insight will provide the necessary conditions for designing process improvement projects within healthcare. The findings about existing challenges are interesting to every level in hospital management. The top can better understand what requires to be considered and then more justly make effective long-term decisions. The employees in hospitals will also on an individual level be able to more accurately improve work conditions.

Lastly, after understanding the value of secondary activities, there are considerations that need to be addressed regarding implementation and change management in hospital environments. By discussing and comparing methods of implementation based on characteristics of hospital wards, recommendations have been determined. These will help hospital management and policy makers take the right steps towards better healthcare. The report hopes to give a new perspective to management practitioners who aim to improve healthcare.

1.7 Generalisability

The findings of this report are considered to have a high degree of generalisability in Sweden since the case study is based on a Swedish hospital with the focus on a representative secondary activity. In order to increase the level of generalisability, a visit to a comparable counterpart of the case hospital was included in the case study in order to identify congruity of identified problems related to secondary activities in healthcare. Even if there were differences of how certain processes were performed, the similarities of problems and needs were strong enough to generalise the results.

Hospitals around the world exist for the same purpose - to help other people. The political environment is different in all countries, however, ethically all hospitals are the same. This cross-country mentality within healthcare allows for further generalisation outside Swedish boundaries. Moreover, the subject of value creation can to a great extent be applied and the problem described can be found in any hospital setting due to the general organisational structures in hospitals. However, the available resources in hospitals can vary which determine what actions can be made to improve the situation at hand which limits the degree of generalisability and results in a requirement of individual analysis for each hospital.
2. Literature Study

This chapter first presents the concepts of value creation from a healthcare management perspective and Lean thinking in healthcare. Following a discussion about change management in hospital management. The concepts are presented to position the study in current research and in relation to secondary activities. The purpose of the chapter is to set the foundation for the study and the analysis through understanding the state-of-art research.

2.1 Value Creation

Value creation consistently relates to the fulfillment of customer needs through products, services or tasks. The performance or actions that increase the worth of an activity create value to the organisational operations. Value is subjective and can be perceived differently depending on the customer (Fischer, 2011). What adds value is determined both by customers (Modig and Åhlström, 2014) as well as other potential shareholders in the business who want to see their stake appreciate in value. All operations within an organisation are to fulfill its purpose and to be aligned with the values of the business, which in healthcare are all related to patient care, but other priorities exist as well such as finance and safety (The University of Scranton, 2018).

In the healthcare sector, value is difficult to establish uniformly due to the different mindsets of professions operating together. Doctors tend to value fast and efficient treatment while nurses on the other hand assign value to providing care and comfort for the patient (Edwards and Nielsen, 2011). Patients at first hand require to be cured, but it is also important for them to feel genuinely cared for (Dagens Nyheter, 2018b). This makes the concept of value creation challenging when striving for cross-functional processes and developing process improvement strategies for secondary activities. In order to increase the value of secondary activities, there is a challenge to make all the different professions be able to see and understand the value that is determined for a certain activity (Edwards and Nielsen, 2011).

As already mentioned, the concept of value-based healthcare is becoming more relevant. There is a patient-centered strategy focusing less on the clinical personnel and complex treatments. A strategic drift should be made from focusing on volume and profitability of services towards the patient’s needs and the result of his or her health after the hospital visit (E. Porter and H. Lee, 2013). Value-based healthcare is being promoted mainly because of its hopes of reducing costs for both patients and hospital. However, there is still a challenge of how to measure patient value since it is considered difficult to properly define, and therefore it can be seen as a poor objective to strive for. Factors which can be measured with precision are for instance avoidance of death or infection in the hospital, however, this is a limited view of patient value. Instead, patient value is connected to higher patient outcomes at lower cost. Nevertheless, patient outcomes is still not measured in a consistent way compared to other industries. As a consequence, the lack of full understanding of patient outcomes, the industry is unable to make patient value a key objective (Reinhardt and Oliver, 2015).

The concept of value creation in healthcare is, as in any business, related to costs. The main cost drivers that are increasingly putting pressure on healthcare systems are not clearly defined which is due to the complexity of systems. However, cultural environmental changes, which influence behavioural changes of
a population, are considered as an important cost driver as well as the growing and aging population. Discussion of cost reduction alternatives quickly collides with the vague sense of patient value, but since neither can be properly measured due to their lack of clear definitions the discussion tends to a great extent rely on ethics (Reinhardt and Oliver, 2015). Additionally, due to the poorly defined concept of value, the industry lacks the ability to effectively respond to the ethical argument that healthcare should provide service at any cost.

A possible theory is to view the healthcare market as “special” (Epstein, 1992), which requires special areas of experimentation and pilot projects to find personalised market solutions adapted to the constraints on business model innovation that otherwise might increase healthcare expenditures (Reinhardt and Oliver, 2015). The unique nature of healthcare calls for government intervention into the operation of the market to control the ordinary intersection of supply and demand when it comes to resources devoted to medical care. This initiates a discussion about whether healthcare is a privilege or a right and how all people are entitled to some minimum level or equal level of healthcare, which is regulated differently depending on the country. In Sweden, healthcare is largely tax-funded and universal in order to ensure equal healthcare quality, and almost a tenth of society’s total resources go to healthcare (SALAR, 2016). The choice of moving away from the supply-demand market system towards a more regulated system, might contribute to inefficiencies and bottlenecks since the incentive of using the system changes (Epstein, 2012). This aspect of structuring the healthcare market as a centrally planned economy differentiates the healthcare market from the more common market economy based industries.

The cost problem in healthcare research can also be viewed differently. One of the perspectives proposes that costs in healthcare can be made affordable by productivity-enhancing innovations in other sectors and/or productivity-enhancing innovations can be fostered in healthcare to reduce the productivity gap between industries (Reinhardt and Oliver, 2015). Another theory builds on the idea of technology advancements that healthcare costs also rise because technologies improve outcomes and increase the number of treatable diseases. Hence, healthcare innovations fulfill the purpose to improve outcomes which makes rising costs justified. The real challenge is to identify innovations that do not improve outcomes but contribute to high healthcare costs. Still, these theories mainly concern primary activities, contributing to setting secondary activities as less of a priority for technology investments.

The process of capturing value can be optimised through efficient utilisation of already existing resources in the healthcare system. Healthcare lags for example behind the development of digitalisation compared to other sectors of the economy, which prevents daily routines from being performed in a more efficient way (Dagens Nyheter, 2018a). The actions of adopting computers, information-sharing technologies and electronic health records can greatly boost productivity and reduce paperwork burden (The New York Times, 2007). Many of the less digitalised activities in healthcare today are therefore secondary ones, making it a critical part of healthcare to focus improvements on.

However, embracing IT for process improvements is a temptation and new applications are introduced at increasing rates, but simply dropping technology into complex environments is riskful (Wickramasinghe, 2014), regardless of the kind of activity. Consequently, technology advancements should incrementally and carefully be integrated as it has the ability to facilitate daily work and raise the potential of solving complex problems.
2.2 Lean in Healthcare

As previously discussed, the concept of value creation can be used to differentiate between activities that are or are not value-adding. What adds value depends on the actors in the system, which in turn affects the choice of value-enhancing actions. However, it is possible to generalise among potential measures to make them applicable on almost any production system, for both services and products. Lean thinking is one of them. Lean is able to improve patient safety, quality of care, efficiency, patient satisfaction and performance in healthcare organisations (Rossum et.al, 2016). The rise of Lean in healthcare is reflected in the statistics of 51% of all British publications sourced focused on Lean and 35% of those represented the healthcare industry (Burgess and Radnor, 2010). Danish healthcare also reports how principles and ideas from Lean management are being widely adopted (Edwards and Nielsen, 2011). Organisations in the United States such as the Institute for Healthcare Improvement advocated the use of Lean in 2005-2007. Moreover, a growing number of literature and books about Lean indicates an increasing interest in Lean methodology (D’Andreamatteo et.al, 2015). Thus, proving strong evidence that Lean is the most frequently used process improvement method in the healthcare industry today.

Lean originates from the Toyota Production System (TPS) and is a systematic production method where the goal is to reduce or, preferably, eliminate factors that do not contribute with value to the end result (Bertelsen and Koskela, 2004). The concept of Lean production has changed considerably and has diffused from the car industry to other manufacturing industries and then to service industries (Wickramasinghe, 2014). Currently it can also be viewed as a sociotechnical system where human factors and technology play a certain role. This supports the applicability of applying Lean thinking to the service industry which includes healthcare. Any activity that does not contribute with value can be considered as waste which is everything other than the minimum amount of equipment; effort, material, space, parts and time that are essential to add value to the final product or service. The aim of Lean thinking is to provide what the customer wants in a quick and efficient way with minimum waste. This results in a smoother workflow as well as reduced waste and process variations (Wickramasinghe, 2014). Practical ways to apply the Lean thinking into practice are for instance through standardisation and decreased lead-times, simply any measure that improves the flow of activities and minimises the non-value adding steps (Edwards and Nielsen, 2011; Mate and Rakover, 2016).

Apart from Lean, there exists multiple alternatives of production methodologies that can be considered applicable on healthcare. Six Sigma methodology, which resembles Lean production techniques in the way that both methodologies aim to eliminate waste and increase efficiency (Dahlgaard and Dahlgaard, 2006), is one example that is used in healthcare (D’Andreamatteo et.al, 2015). The main difference between Lean and Six Sigma is that Lean believes that waste comes from unnecessary steps in the production process that do not add value to the end product, while Six Sigma believes that waste is the result of process variation (Bisk, 2018). Another example is the Just-in-Time (JIT) method that aims at producing only what is needed, when it is needed (Li, 2015). JIT also originates from TPS. In practice, it is about forecasting demand and to avoid overstocked inventories. At first these facts about JIT make the method questionable to apply on healthcare since it can not easily forecast and stock its services. However, material costs, labor costs and manufacturing costs are the main parts of patient care costs, which all can be integrated in the complete hospital management to connect it to the respective specialised areas. Moreover, purchasing, materials management and distribution departments should all be connected in the operations to utilise all
competences in the hospital organisation (Li, 2015). In comparison is Lean more suitable for complex organisational environments such as hospitals because of its simple elimination philosophy rather than having to investigate and alter multiple process steps according to variations in the system.

Nevertheless, Lean is not considered to be a cross-functional solution due to the existing different rationalities within healthcare since all professions, as earlier mentioned, have different mindsets of value creation (Edwards and Nielsen, 2011). Because Lean relies on a consistent perception of value to yield positive results, it is questionable if the original Lean philosophy can be applied on all processes within healthcare without adapting a more transformative approach by also taking non-standard work flows into consideration. Adopting a more transformative approach when applying Lean in healthcare is also supported by Modig and Åhlström (2014). Since Lean originates from the manufacturing industry it requires high flexibility to use Lean in service oriented environments in order to cope with the existing high degree of work variety. This supports the need of adapting the Lean concept to specific activities within healthcare since all activities, primary and secondary, as well as its main actors, doctors and nurses etc., take a different perspective of value and have different prerequisites for standardisation.

Delisle (2015) means that Lean is an effective method of improving healthcare processes although there are important factors to consider that are distinct for healthcare systems. The most important factors in healthcare are safety, quality and service delivery. As a continuation of the value creation chapter can factors such as quality be translated into financial benefits (cost reduction, productivity increase and reduction of inefficiencies) by applying Lean thinking into process improvement strategies. The processes that the author uses to exemplify the application of Lean are mostly directly related to treatment procedures such as visiting a physician or the pre surgery patient flow rather than on secondary activities in the hospitals. This makes it more interesting to investigate the perspective and potential of using Lean thinking on secondary activities.

Modig and Åhlström (2014) highlights the risk of confusing means with goals when applying the concept of Lean in hospital organisations. It is a common mistake that the definition of Lean is viewed as applying Lean-related tools such as standardisation, rather than achieving certain goals such as increased efficiency or improved workflow. Consequently it becomes a problem when application of the means characterising Lean becomes the actual goal. Focusing on goals create flexibility while focusing on the means is limiting. As a result, organisations tend to forget the initial purpose of the change project by focusing on the means instead of the goals of implementing Lean.

Regarding the application of Lean on secondary activities the research is limited, however, existing research point at the value increasing potential of applying Lean on non-core activities which resemble industrial production, as for instance administrative tasks and management of consumables. There is existing support to successfully apply Lean tools on administration in healthcare (Edwards and Nielsen, 2011). In the study by Edwards and Nielsen (2011), food related activities were perceived as more “reactive”, meaning that nurses have to respond to immediate problems and needs due to its process variances. Consequently, the application of Lean to food related activities require further research on better adapted Lean methods.
Finally, Lean in healthcare is still in its infancy and more research is needed within all application of Lean within healthcare (D’Andreamatteo et.al, 2015; Edwards and Nielsen, 2011). The Lean concept is proved to be promising assuming that Lean is adapted to the specific context within the healthcare spectrum.

2.3 Change Management in Hospital Management

Healthcare is characterised by its complex and life-critical environments, making it vital to create environments that promote consistent high quality performance. Change is a process which does not happen immediately and to successfully change an organisation means to smoothly introduce new values, processes and culture within a group and therefore is change for the great majority of times incremental in its nature (Scott et.al, 2000). Changes need to be implemented with caution and, as in any business, routines need to have a clear purpose. All changes include phases of uncertainty and adjustments, however, in healthcare these need to be minimised in order to prevent disturbances to patient care (Wickramasinghe, 2014).

The driver for change is important to regard in these situations. Hospital systems have always been pressured by rising costs and assuring medicinal quality which is making policy makers and managers seek options to reduce waste, increase efficiency of delivering healthcare and improving the usage of resources (Fraser et. Al, 2008). Another perspective on change drivers is that it can sometimes take place as incentives for ceremonial acts rather than increasing efficiency. When implementing change, the organisation can raise awareness and disrupt its negative image which can affect processes and results (Nilsson, 2010).

Regarding change projects related to secondary activities within wards, there seem to be a gap in the current literature. The role of secondary activities, such as food processes, logistics of daily products and cleaning services, that are the backbone of running a functioning ward are not addressed in a focused manner. Whether these are of significant importance is yet to be investigated. To explore its possible relevance, a larger perspective is examined which are healthcare systems and hospital organisations as a whole.

The characteristics of Swedish healthcare must be determined since healthcare differs around the world. Sweden has an overall healthy population in international standards which is a result of several factors such as lifestyle, environment and genetics. The quality of healthcare is high and the system itself can be considered both innovative and relatively flexible. This is due to its decentralisation where councils are free to customise their own operational structure which leads to variance in each clinic (Rae, 2005). With the diverse situations in the country and the diverse organisational structures, it can be hard to distinguish why change is needed and what challenges there are that prevents it.

Business management techniques were traditionally seen as unsuitable for healthcare management but this opinion has changed over the last decade (Rossum et.al, 2016). Today business management techniques such as Lean are becoming more common and has started to be viewed as a tools for delivering higher quality and more efficient care. However, even if clinicals are informed about new insights on optimal patient care, no changes necessarily take place within their daily routines (Grol et.al, 2013). This is partly a consequence of change inertia, proving the difficulty in changing routines, and that healthcare is an industry that is resistant to change (Britnell, 2015). As a result, difficulties in successfully implementing change initiatives arise, creating a strategy-to-performance gap or implementation gap (Rossum et.al, 2016). The implementation gap is also referred to by Jacobsson (2010) to be another explanation to why
improvements of hospital processes using Lean have benefits but still challenges when achieving long-term impacts. The healthcare context is considered to be ambiguous, and he stresses the need to to focus on the implementation of this kind of process improvement methodologies.

In order to actually change behaviours there exist multiple theories to consider. Some theories emphasise changing the behaviour of the individual, others recommend changing the organisation and its physical contexts and processes. Some theories assume that change is dependent on intrinsic motivation while others believe that external influence or pressure from higher authorities produce the optimal results. Similarly, some literature emphasises personal responsibility to achieve change, whereas others criticise an individual’s capability of self-regulation (Grol et.al, 2013). Still, people naturally resist change regardless of the environmental context because it makes us feel safe and in control. In the best of worlds people would be given the required time and support to adjust to changes in their own pace, which unfortunately rarely is the case since the business reality of today requires companies to rapidly adjust in order to stay successful (Moran and Brightman, 1998).

In Sweden there is a strong hierarchical culture within healthcare. Together with the managers, the doctors are on the top of the ladder (Brandt and Larsson, 2009). Historically, doctors used to have total decision power but today, that responsibility is distributed amongst other managers and personnel as well. Still, the doctors rule over nurses that decide over assistant nurses and even if these power levels are solely determined by the responsibility order of patient care, the hierarchical tone is often carried over in other situations in the hospital organisation such as decision making regarding changes. There are many strong actors; the municipality, managers, doctors and nurses that want their opinions considered (Hansell, 2005). Therefore, better delivery of process improvement projects through changes to organisational and administrative arrangements can be challenging to accomplish since various interest groups may be averse to give up influence (Rathwell and Persaud, 2002).

Rigid and strict routines create an abundance of tacit knowledge between the employees and the inheritance of knowledge becomes a prominent power measuring tool. The medically trained personnel perceive themselves as the best judges of their organisational situation. Because of this, outsiders of the medical sphere are less respected even when trying to provide knowledge unrelated to medical processes. Traditions and the hierarchical culture in hospitals is impacting continuous improvement work by affecting leadership and how knowledge in operations management is developed (Jacobsson, 2016). This has lead to hospital organisations having a bad internal and external reputation regarding change management (Nilsson, 2010). Change is hard and with 70% of all change projects fail in any type of organisation (Beer and Nohria, 2000), it is not surprising that complex organisations such as hospitals struggle.
3. Methodology

This chapter explains the method used to conduct the study. The overall research design consisted of a literature study and a case study supported by a method called Biodesign, which is based on a needs driven approach when identifying problems. Lean tools were applied to the solution generation.

Since the project is of interest for two different actors, the hospital and the academia, the research design was customised to address both. The main two parts were to develop practical solutions and at the same time contribute scientifically to the research field. A simplistic illustrated figure of the research design can be viewed in Figure 1.

![Diagram of research design](image)

Figure 1. General outline of method.

The study included a literature study that was performed in parallel with a case study to support the process of developing new theory. The case study was performed at Norrtälje Sjukhus where the food process, an example of a secondary activity in healthcare, was investigated. At the hospital, observations and interviews aligned with Biodesign were made to gather empirical material which made it possible to identify problems. Based on findings from the observations and interviews as well as the literature study, solutions aligned with the research questions were generated. Since the research questions required strategic advice on how to perform improvement and implementation projects concerning secondary healthcare activities, a pilot study was included to evaluate the solutions in practice.

This chapter also includes a critical discussion about the research quality based on reliability and validity.

3.1 Biodesign

The Biodesign process is a design thinking method adapted to medical innovation (Stanford University, 2018). The process is divided into three main phases: identify, invent and implement. The identify phase was partially conducted as a pre-study where the CIF team performed an initial observation of general processes within the case hospital in order to gain understanding of routines, processes and to find problems. Their findings were presented to the hospital’s reference group and the top three of these problems were given to Master students to investigate further (CIF, 2018). Several of the found issues were related to secondary activities rather than the treatments of patients. This further highlights the importance of efficiency of these supporting processes in hospitals and healthcare systems.

This project starts as a continuation of the identify phase followed by an invent phase inspired by Lean thinking and then lastly an implement phase. The basis of the study was set during the identify/pre-study phase. The CIF team had discovered that activities related to food in the wards were time consuming and
therefore also contributed to higher costs than expected. Since there is a constant demand of more patient contact it seemed interesting to investigate the possibility of freeing more time for assistant nurses through optimising these processes (CIF, 2018). This initial problematisation was re-evaluated based on findings from the observations.

In this report, the Biodesign process is considered to set the foundation of further Lean application. Biodesign focuses on the needs of the actors in the system and Lean focuses on value-adding activities. To counter the known change resistance present in healthcare environments, it is critical to firstly understand the culture and personnel at the workplace, then making them recognise the benefits of change. Practically, Biodesign promotes extensive observations at the start of a project in order to identify the needs, restrictions and available resources which are necessary to determine value. Biodesign allows value to be identified based on the relevant actors’ needs in healthcare environments and by applying Lean tools, fitting improvement solutions could be developed. Together the methods contribute to a streamlined process of value-adding activities.

3.2 Research Design

The research design is a model of how to make the problematisation researchable (Blomkvist and Hallin, 2015). The overall research design consisted of a literature study and a case study supported by Biodesign. The three phases of the Biodesign process correspond to the steps of data collection and analysis, solution generation and implementation. Since the first step of collecting and analysing data was based on observations, unstructured interviews and literature reviews within the field it allowed identification of needs, which then were used to create solutions based on Lean thinking. How the research process of this project corresponds to the process of Biodesign is illustrated in Figure 2.

Figure 2. Method and research design using Biodesign.

A qualitative method was chosen for the project since interviews and participating observations were considered suitable for the study due to its close contact to personnel and high dependency on social
interactions. Choosing a qualitative method was considered suitable due to a high degree of social factors that affected the case study. The qualitative method includes having an inductive approach to problem solving (Blomkvist and Hallin, 2015).

The study used an inductive approach since it is considered to be especially appropriate in new topic areas (Eisenhardt, 1989). The empirical material has the ability to change the initial theoretical framework, since it might show a different theory of interest to focus on (Blomkvist and Hallin, 2015). The inductive approach also means iteration of research questions, purpose and background, since knowledge is gathered during the whole research which requires revision of your previous work. Still, the inductive approach allows you to make use of existing theory to better understand your findings. This facilitated the process of weaving the interests of the academia and the industry together, by using the case study to support new theory. The initial research was of an exploratory kind to better identify the best research design for the case, which was done during the data collection and analysis.

The choice of research design is dependent on what type of empirical material that will help understanding the researched phenomenon. As previously mentioned, the research design of choice included a case study, which is specifically used in inductive studies (Blomkvist and Hallin, 2015). Theory developed from case study research is likely to have important strengths such as novelty, testability and empirical validity (Eisenhardt, 1989). “The case chooses the researcher” (Blomkvist and Hallin, 2015) describes the choice of research design. In other words, the case that was assigned by the CIF and Norrtälje Sjukhus became the one to study. This form of research design might turn out differently than what initially was assumed, however, by embracing the characteristics of exploratory research, new discoveries can be made.

Case studies typically combine data collections methods, which for this case were observations and interviews. Observations were performed in the beginning of the study as part of Biodesign to better understand the nature of the problem investigated, which included shadowing and asking questions to nurses and assistant nurses. Documentation was made through field notes, which meant taking notes while observing. Observation methodology is suitable when the questions you want to answer are of an exploratory nature (Blomkvist and Hallin, 2015).

The interviews held were of the unstructured kind in order to continue on the exploratory path by asking open questions to gather as much information as objectively as possible. Some of the observations were interactive which made it possible to perform unscheduled and short interviews when possible. The evidence collected from the case study was mainly qualitative based on words, but also included quantitative parts based on numbers from measurements during the observation period (Eisenhardt, 1989).

3.3 Literature Study

The literature study was used for two reasons, to gain initial knowledge about existing theory regarding relevant subjects related to the study and to use knowledge to analyse quantitative and qualitative results from the case and build new theory. The literature study was conducted in parallel with other data collection sources of the case, both for the purpose of understanding and to ground the case situation as well as possible to existing research. This is part of the inductive and iterative properties of the study. Instead of a linear process, the literature study was done through all stages of the project (Blomkvist and Hallin, 2015).
literature was gathered from databases for academically approved reports (e.g. KTH Primo) to increase credibility. Initially, the priority was to gain an overview of the characteristics of healthcare, especially in the Swedish healthcare system. Based on findings in those papers by noting recurring topics in similar studies the literature study could be evolved into a foundation for the analysis. The recurring topics, such as value creation, Lean thinking and change management were further investigated to create a solid knowledge foundation to be able to analyse and develop a process improvement and implementation strategy for the case study.

It is important to remember the explorative nature of inductive research. This implicates that inductive processes are better fit for studies in newer research fields such as this project or the beginnings of improvement projects where problems need to be identified in a complex situation (Gladwell, 2010). Later in the study, the literature is also used to discuss the results in order to solidify the validity and generalisability. By comparing existing literature, whether the content is conflicting or similar, improves the quality of the results and can also lead to interesting new findings within the research field (Eisenhardt, 1989).

3.4 Data Collection

In this chapter the main methods of data collection are presented. The data collection consists of observations and interviews from the case study, both vital to achieve Biodesign’s purpose of identifying case specific needs. The combination of the data collection and the literature study made it possible to triangulate results to control the validity of the study. The data collection was required for the process mapping of the hospital which in turn was needed to identify perceived values to deliver an improvement strategy accordingly. The theory-building process is iterative and cycles through all relevant data; case data in form of observations, existing theory and emerging theory (Eisenhardt and Graebner, 2007) in order to develop the most accurate theory hypothesis, following the inductive and explorative research design.

The data collection is mainly qualitative but has some quantitative measurements. Qualitative measurements include for example stress levels and opinions expressed by personnel. Quantitative measurements such as time spent on specific work tasks were used to compare routines. To evaluate changes and implemented improvements in a tangible way these types of measurements can accurately show the impact and significance.

Observations

As part of the Biodesign method, the first step was to identify the needs of the actors in the process. Observations made it possible to quickly and accurately form an understanding of the environment and personnel as a system, especially the present challenges. Observation is a type of qualitative data collection where the aim is to collect a variety of diverse opinions. The benefit of observations is the possibility to gain an accurate overview of the whole studied field, including the studied individual and their native environment (Jamshed, 2014). There are different kinds of observation methods. During observation, you observe and document behaviours and actions of people and groups under certain conditions (Psykologiguiden, 2018). A naturalistic or unstructured method of observation was used in this study since similar studies had not been done in the same environment before and there was a need to explore
opportunities without any restrictions or influence of previous opinions (McLeod, 2015). There are two common observer roles which are *participant as observer* or *observer as participant*. In this case study, the observer role was of the latter, which includes both observations as well as interactions with personnel by asking questions (Blomkvist and Hallin, 2015).

Since the case was performed at a hospital, which is characterised by high stress levels and little time for distractions, this observation method also made it possible to interact with the personnel without having to reserve time for longer interviews. The project started with three weeks of observations of the system at the case hospital. The aim was to get familiarised with every part of the investigated processes and gain understanding of how the system works and is perceived to function by the personnel. By doing so, the hope was to find the challenges of defining value or driving change. During the observations, the observant was as unaffected by subjective opinions as possible in order to form an independent view of the situation. Thus can the results of the observations be compared to the described view by the employees.

After mapping out the food related processes, it could be broken down and connected to specific actors which made it possible to more closely focus value increase on an isolated actor in the system. The conducted observations were focused on the assistant nurses in the wards since they work closest to the secondary activity of choice in the case. The observant was to pay attention to both how the process worked in terms of routines and time schedule and also soft factors associated to the assistant nurses’ attitude and opinions related to the activity. Apart from occasionally asking short questions in order to clarify the action of the assistant nurses, as little interference with their work was of importance to avoid distraction from their natural behaviour. In total, approximately 150 hours were spent on observing the work of the assistant nurses. All observations were systematically documented at first as field notes that later were transcribed into categorised documents and lastly analysed based on findings. Field notes are written in connection to the observed happening, mostly handwritten and used to remember important observations as well as details for later analysis. All notes were marked with date, time and location to be able to create an accurate understanding of the system (Cohen, 2006). After each observations session, the handwritten notes were transcribed digitally no more than one day after to assure that the observations were still fresh in mind. By transcribing, the observant once more went through what was observed and filled in any thoughts or details that were missed in the notes. As part of the results from analysis, values for the case wards could be identified. These could be derived by analysing the observations and finding the needs and problems for the case.

For the purpose of investigating generalisability and to explore alternative ways of executing similar tasks, a comparison was made with another hospital’s ward. The observation was done in a similar manner, although during a shorter time period (one day), where the observant would objectively watch and note how processes were executed and ask qualitative questions to employees if needed. Corresponding actors in the ward that were handling the food processes were interviewed to keep the comparison fair including a kitchen responsible, an assistant nurse and also one of the head nurses that acted as a manager for the assistant nurses. The exploration was controlled by the outcomes from the previously done observations at the case hospital in order to make a fair comparison regarding relevant aspects.
Interviews

Unstructured interviews are characterised as being more explorative and resemble guided conversations rather than a structured interview. The posed questions are flexible depending on situation and need but all questions are in general open ended (McLeod, 2014). As the observations were done at the case’s workplace, the interviews were conducted while following assistant nurses throughout the ward. This kind of mobile interviews in contrast to sedentary interviews can, if done well, be an efficient way of understanding a certain environment (Evans and Jones, 2011). Through conversation with the employees and emersion into their work space, the culture of the ward could be sensed which is an important part to understand for future change management. Other soft factors regarding attitude, roles and personalities were also of great importance when improvements were to be developed.

The assistant nurses are the personnel that work closest to the food processes in the wards and were therefore also the most valuable interview targets. Approximately 20 assistant nurses and four managers were interviewed. Interviews were held spontaneously with the employees in order to compliment the observations, to seek their interpretation of value and to identify any problems with defining them. The interviews were unstructured but of qualitative property. For example, during observations, it would happen that the assistant nurses did certain actions where the purpose was not obvious, then the observant would ask about it to understand the value of the action. The observant also frequently asked about the opinion of the assistant nurse regarding certain actions, whether they enjoyed doing it or what their perception of it was. All the employees were helpful and willing to answer all of the questions. No interview guides were used since the interviews were kept flexible to fit the situation at hand, however, there were more frequently asked questions which can be reviewed in Appendix 3.

To also gain understanding of other professions in the hospital and their view of value, two meetings were arranged together with the ward managers, doctors and the hospital’s operational manager. These meetings were brief and unstructured with the purpose of receiving feedback of proposed improvement suggestions.

The managers of the wards were additionally interviewed and communicated with in order to understand what perspective they had of value and the perceived problems. Because of the ward managers’ close connection to the assistant nurses’ work, it was important to communicate closely with them since they can directly affect the assistant nurses’ work conditions. Again, these interviews were used in purpose of complementing the observations to correctly link relationships and identify congruity in the case’s system. Furthermore, the communication with managers was continuous throughout the study to gain valuable feedback and reactions to proposed ideas of improvement. These interviews were unstructured and held spontaneously to fit the busy schedule of the managers.

3.5 Data Analysis

The data analysis is the bridge towards creating new theory. The most important aspect is its transparency which is provided through detailed description of method and argumentation (JTLA, 2010). The data analysis can be divided into two parts. The first part was the analysis of the data collection and the second part was the analysis after the results of the implementation. In order to answer the first research question, the data collection including the literature study were crucial. From the observations and interviews, challenges of defining value could be identified in the healthcare system. The next step was to identify the
causes of the surfaced problems in order to determine process waste and any resource restrictions. The distinction between problem and cause is comparable with the relation between symptom and disease. In order to treat the symptoms, the underlying diseases need to be found. Consequently, by finding the underlying problems, challenges of identifying value became distinct.

With a thorough understanding of the needs and challenges, the analysis was applied using the literature study and Lean thinking. The possibility of Lean application was confirmed as the possibilities and limitations of the case environment became clear. The main focus was to minimise activities that were not contributing to any value to any actor in the processes. More specifically, elimination of repetitive actions and steps that involved uncertainty, ultimately standardising investigated processes in the ward. Removing uncertainties also reduces the risk of faults. Improvement solutions were developed to be aligned with the needs and the principles of Lean.

The second part of the data analysis was done after the pilot tests to evaluate the collected results. Implementation of developed improvements was a method of evaluating the initial analysis and improvement strategy. New data of quantitative measurements and qualitative response made it possible to estimate the gained value of the improved secondary activities. It also allowed evaluation of the chosen method and its efficiency of mitigating the identified challenges of value definition. This result was further analysed using the theoretical concepts set in the literature study in combination with the previous observations to draw conclusions and form a new theory unique to this study.

3.6 Implementation

The final stage of the method was to test the solutions in practice since the purpose of this report included to identify an implementation strategy suitable for improving secondary healthcare routines. In order to verify a successful strategy and analyse the change process, the solutions were presented and tested at the case hospital. Workshops were used to engage the personnel in the change process and receive valuable feedback regarding the solutions. Moreover, a pilot study was performed in order to test the solutions in practice and analyse the reactions of the personnel as a consequence of the change process. Implementation trials or pilot tests are appropriate in complex systems where changes have a history of failures or problems (SAGE, 2005). This chapter presents the method of the implementation by describing the approach of the workshops and pilot study.

Workshops

The implementation phase started with arranging two workshops for the ward managers and personnel. Workshops is a type of interactive learning that promotes communications and responsiveness in the participating group (Nasmith and Steinert, 2009) which consequently increases the level of involvement. The purpose of the workshops were twofold; to engage the personnel in the change process by including their feedback in the development of the new routines and efficiently transfer knowledge through social interactions as a complement to knowledge codification. This was considered to be part of an appropriate implementation strategy for the case study.
As previously discussed, outsiders of the medical sphere are sometimes less respected even when trying to provide knowledge unrelated to healthcare (Nilsson, 2010). To prevent a similar mentality from affecting the project, focus was put on involving the personnel in the process and making them feel that they were capable of affecting the change process. Close communication with the personnel contributed to a relationship based on mutual trust which facilitated the change process. Involving the personnel more into the implementation process encourages participation (Moran and Brightman, 1998) and the perception of change management shifts from being an external force to being a collaborative effort towards improvement.

A major part of the solutions was about changing routines that had never before been addressed in this manner. Previously there was a lack of awareness of the value-adding potential of secondary activities such as the food process which made it less of a priority for improvement projects. Consequently, to improve the routines related to the investigated process, awareness of the improvement potential had to be raised. Since routines are to a great extent based on tacit knowledge (Olofsson, 2017), which is related to experience and abilities, it can be a challenge to strictly codify routines which further proves that workshops would be a suitable compliment to documenting the new routines since the workshop concept allows discussions to take place which facilitates the knowledge transfer.

Moreover, the workshops were to ensure a consistent knowledge base among the assistant nurses. By having workshops, information about developed improvement suggestions was delivered to both assistant nurses and managers at the same occasion. This way securing that an equal level of information was delivered and fair feedback could be received based on the same presentation.

As mentioned in previous chapters, it is an utmost incremental process of introducing change which takes time (Nilsson, 2010) and the two workshops were each held in a broader time span of two weeks to allow step-by-step introduction of new routines. In between the first and second workshop the pilot study was performed. This way the personnel could be properly informed about the pilot study beforehand and also allow feedback to be collected both during and after the pilot study was performed.

In order to create a favourable environment for change through increased motivation, focus was put on the potential value increase of improving the routines related to the investigated process. It was emphasised that these changes would result in more time for patient care, which was aligned with the values of the personnel (Moran and Brightman, 1998).

An example of how the workshops practically supported the implementation was the introduction of a new digital solution, which is described more in detail later in the report. The solution was thoroughly presented during workshops before a pilot study was performed to facilitate the integration in the daily work. This allowed feedback to be received from the personnel and iterative improvements of the solution to be made. Since the previous level of digitalisation was low it meant an extensive change to introduce digital tools, which required a well prepared implementation strategy. The workshops prevented unnecessary errors to occur and made the personnel feel in control of the change process.
Pilot Study

The first workshop was followed by a pilot study. The purpose of the pilot study was to test the quality of the improved solutions in practice. The initial solution prototype was incrementally improved based on the feedback from the first workshop as well as continuous feedback during the pilot study. This way, impact and results could be identified and evaluated, including measured results as well as feedback from the personnel.

To be able to credibly build new theory through the case study research, it was needed to evaluate the potentially new established theory, since good theory should be testable (Pfeffer, 1982). By including a pilot study at the end of the project a critical evaluation of the applicability of the solutions could be made, which is necessary for justification of the work’s scientific quality (Blomquist and Hallin, 2015). The pilot study enabled a final iteration of the solutions since it revealed new findings when tested in practice. The solutions could be redesigned a final time which meant that the number of unanticipated problems could be reduced and increase likelihood of success for future implementation (Van Teijlingen and Hundley, 2002).

Furthermore, the fact that digital tools only to a limited extent had been used for secondary activities at the hospital before, it was considered even more important to perform a pilot study to evaluate the response and feasibility of the digital solutions before delivering a final implementation strategy. As supported by Wickramasinghe (2014), simply dropping technology into complex environments such as hospitals should be avoided by careful and incremental integration.

3.7 Research Quality

In order to obtain satisfying results from the method of the study, the concepts of reliability and validity were used to justify the research quality. Reliability is another term for consistency or repeatability over time (Greener, 2008), which is affected by the level of transparency and relevance of sources. Validity on the other hand, describes how well your method is aligned with the purpose of your study, which is reflected in the choice and handling of data sources in relation to your study’s purpose (Blomquist and Hallin, 2015). Consequently, high validity requires high reliability, however, high reliability does not pre-requisite high validity.

The reliability of this study is affected by the unstructured interview approach used in the case study, since unstructured interviews lack the repeatability of structured interviews. As a result, the qualitative evidence in the empirical material lowers the reliability. However, in social science research based on qualitative approaches the phenomenon to be researched is often too complex to achieve high reliability, therefore it is of great importance to focus on presenting a high level of transparency of the method used (Moravcsik, 2014). In this study, the evolution of the research has been described as thoroughly as possible in order to provide the reader with sufficient information to be able to repeat the study and some quantitative evidence was gathered, for example time to complete certain tasks at the hospital, which creates a more reliable and balanced collection of evidence.

As this study aims to investigate the potential of value creation through secondary activities in healthcare, the literature study and empirical material were focused on this subject. The literature study centered around the topics of the problem as well as about Lean and value creation. The topics of value creation and change
management are considered to create a knowledge base sufficient to understand the problem at hand, while the topic of Lean in healthcare is meant to equip the reader to analyse the problem and identify solutions. The case study embodies the addressed the problems of how secondary healthcare activities are non-prioritised for improvement projects despite their value enhancing potential to overall healthcare quality. Thus are the choice of sources aligned with the purpose of the study which supports high validity.

By continuous motivation of methodological choices in relation to the purpose of the study, the validity has been considered to increase. To ensure further validity, observations and interviews gathered in the case study were followed up with the personnel at the hospital evaluating the interpretations of the information, which was done through workshops with the personnel by confirming observed challenges. Creswell (2007) suggests that validation is a distinct strength in qualitative research due to the extensive time spent in the field, creating closeness of the researcher to the participants in the study which add value to the accuracy of the results. This viewpoint supports the use of observation method included in Biodesign.

Moreover, triangulation of discovered theory from the literature study and facts from interviews were used in order to ensure both high reliability and validity. For example, answers from interviews and observations were compared to identify congruity before conclusions were drawn. Still the validity is affected by the limitation of empirical material gathered, since all empirics is based on one case study only. A limited comparison was made to another hospital to increase the level of validity, however, as the research questions aim to generalise the investigated phenomenon it would have been desirable to include more case studies in the research material.

Finally, due to a pilot study being included in the method, the results of the analysis are proved testable as well as feasible. This ensures the accuracy of the findings that according to the research questions are to include a suitable improvement and implementation strategy, which is especially needed when using a qualitative approach (Creswell, 2007). In addition, according to Epstein (1992) the healthcare market can be viewed as “special” which requires experimentation and pilot projects to identify personalised solutions. Hence, the testability of the study supports both high reliability and validity.
4. Case at Norrtälje Sjukhus

This chapter presents the case study that was performed at Norrtälje Sjukhus to exemplify how secondary activities are not prioritised for improvement projects but have great potential of increasing the overall value of healthcare. Background information about Norrtälje Sjukhus is presented followed by their current problems. Lastly, delimitations of the case study are stated.

4.1 Background

Norrtälje Sjukhus is a small hospital but offers all basic emergency care except for childbirth (Tiohundra, 2018). The hospital also has specialist clinics and four wards which consist of internal medicine, surgery, orthopedics and geriatrics, with a total of 96 beds. The hospital is situated in Norrtälje that has a population of 60 000 people distributed on an area corresponding to a third of Stockholm county (Norrtälje Kommun, 2018). The population is the oldest in the county (Sveriges Radio, 2013), and the total number of inhabitants increases during the summer which affects the hospital workload. Norrtälje’s mission is to enhance cooperation between public and private as well as between municipality and county.

Norrtälje Sjukhus is proud to be able to offer their patients fresh, hot food delivered straight from a nearby kitchen, Kök i Roslagen AB, from which the hospital also orders daily groceries. Each meal consists of two alternatives as well as customised meals required for special diets. Kök i Roslagen AB (ROS-kitchen) provides hot meals for lunch and dinner for 74 customers (wards) all year round (Gerdsling, 2018).

Norrtälje Sjukhus was considered a suitable choice of case study due to a number of reasons. Firstly, the relatively small size of the hospital increased the chances of making an impact during the limited time period of the study. Secondly, the hospital is known for its quality healthcare which is supported by great rankings and awards over the years (Dagens Medicin, 2018), however, internally there are still challenges such as need of rapid improvements regarding high stress levels, poor communication between professions, insufficient time with patients and piles of administration. This indicated a need of looking beyond the main healthcare related activities by investigating the routines related to supporting activities. At Norrtälje Sjukhus, it was specifically requested to investigate the food process, since the hospital had been made aware by the CIF about time-consuming routines related to the ordering and distribution of food.

The case study of the food process at Norrtälje Sjukhus represents the concept of secondary activities since the process of providing food to patients exists in all wards regardless of hospital to satisfy basic needs of living. Due to its indirect relation to healthcare and being a supporting function to the recovery of patients it is a distinct secondary activity. Food is provided as standard regardless of the diagnosis and therefore unrelated to medical treatments.

4.2 Current Food Related Problems

The problems in the wards that could be distinguished consisted of understanding of the food process, seeing food as part of healthcare and the workload of the assistant nurses (Swedish: undersköterska, USK). USK is the profession at Norrtälje Sjukhus that works closest to the food process and therefore they were
considered an important actor in the investigation. Combined, these were the topics that needed to be considered when developing a process improvement strategy. Since every ward in every hospital has this type of secondary activity similar problem situations are likely to be found in other cases of the healthcare industry.

Understanding Processes

One of the most fundamental problems was the lack of understanding of the food processes at Norrtälje Sjukhus as a whole. The topic had not yet been investigated in relation to other processes. The food processes are interconnected with several actors on an everyday basis and stretches from asking the patients about their meal to how the waste is handled. The value chain and information exchange of the processes were currently not mapped, which made it difficult to distinguish actionable improvements and to identify how the food was related to and affected other everyday processes in the wards. If the hospital gained better understanding and control of the food related processes, the relations to other parts of the hospital organisation and processes would become clear which could inspire further improvement projects and increase employee awareness of the topic.

Because of the previous lack of awareness of the value-adding potential of the food process, the possibility of improvement projects was excluded. Consequently, to improve the routines related to the investigated process, the employees needed to be aware of the improvement potential. Another benefit of increased awareness was the increased understanding of value of different processes and how values can be prioritised. For example, whether food waste is more important to reduce than to provide a high degree of patient customisation of meals, or if the caring time should be more effectivised rather letting the USK take their time with the patients.

Food as Part of the Healthcare

For people that are ill, getting sufficient nutrition is key to rehabilitation and becoming healthy again. As mentioned before, Norrtälje Sjukhus are proud of the food they serve and care about the food quality. The wards serve three meals a day and an extra evening snack before bedtime. They also provide lighter meals, drinks and snacks around the clock. Somehow the issue of food, despite its importance to patient’s health and being a large part of the nursing work, has gotten little attention in regards to improvement discussions around productivity. There has been few distinguishable changes related to the food processes within the wards in recent years. Hygiene is the number one priority in the hospitals and is particularly important regarding food which also makes food processes limited to change.

Assistant Nurses and their Workload

The USK have many responsibilities and work tasks. They work closest to the patients and take care of their well-being in general while they are in the ward. Examples of responsibilities are: measurement of vital parameters, washing and dressing patients, mobility assistance and more. They also take care of some householding tasks in the ward such as cleaning the washing room, doing kitchen duties and managing laundry. Accumulated are these tasks heavily time consuming, especially in wards with patients of older age that are in need of mobility assistance. The serving of food to patients alone takes six hours of USK working time each day per ward (CIF, 2018).
There is a common opinion that USK need more time to take care of patients instead of other work. To improve the care of the patients in these wards, there is a constant demand for more time spent with them and to reduce the time spent on secondary activities. The main problem with the time consuming tasks is the financial aspect and how costly it is for the hospital to have nurses work with tasks that are less related to their competence.

The challenge is to balance the healthcare related tasks with the secondary activities that are still vital tasks that keep the ward functioning. Questions such as how much time food processes should be allowed to take and whether it should be given time are of interest. Important factors to consider include what responsibilities and restrictions the USK have and how they are prioritised. This problem further highlights the lack of value awareness amongst the personnel at the case ward.

4.3 Delimitations of the Case Study

Four wards exists in Norrtälje Sjukhus, however, focus was on ward 4. A sufficient part of the observations was dedicated to ward 1, 2 and 3 to be able to conclude that an acceptable amount of similarities existed between all wards to allow generalisations to be made across ward boundaries. This way results could be generalised to concern the entire hospital.

The food process at Norrtälje Sjukhus involves many actors, however, it was decided to delimit the study to focus on the organisation within the wards including limited communication with the ROS-kitchen. Another delimitation of the project was to focus on USK work time spent on food related processes, and exclude other known food related problems such as food waste, since USK work time was considered to be the least efficiently utilised resource and the more prioritised issue in the wards.
5. Case Study Results

This chapter presents the results of the case study at Norrtälje Sjukhus. Needs and values among the USK could be identified as well as existing problems in the food process, which made it possible to create a process improvement strategy. A prerequisite of improving the situation at the hospital was to map the entire process related to food in order to understand the system and its actors, especially since this kind of holistic view of the food process did not formerly exist. Based on the observations made and previous research, causes of problems related to secondary activities such as the food process are identified and explained. Moreover, practical solutions to the problems at Norrtälje Sjukhus are presented. A major part of the solutions concerning the new routines for lunch and dinner were possible to verify through a pilot study at the hospital which resulted in valuable data of time and money saved. This made it possible to verify a suitable implementation strategy to improve the food process.

5.1 Observations

The observations in the case could be divided into two levels: actors and mapping of processes. Together they gave an understanding of existing needs and values related to the food process at Norrtälje Sjukhus. The understanding of the situation was a crucial part of finding problems and developing improvement suggestions.

By investigating the bottlenecks of the process, underlying problems and challenges of defining value could be identified. The three most interesting steps to investigate was: filling of the paper ordering list, meal ordering through Mashie and the breakfast routines. After observation, many common problems were found between the processes. Also, the results from the visit to Sahlgrenska Universitetssjukhuset is presented which could be used to generalise the results at Norrtälje Sjukhus.

Actors

The first step of mapping out the processes related to food distribution was to identify the actors that were involved. The function and value of each actor was important to understand in order to follow micro processes within the large picture. The food related processes at Norrtälje Sjukhus involved six actors in total. Figure 3 shows the general order (from left to right) of the food being prepared till it becomes waste.

![Figure 3. Actors of food related processes.](image)

In this project, focus was put on the three blue marked actors in Figure 3 since these were the ones directly connected to the work USK have related to food processes in the wards. The USK are the employees that have most contact with food processes and are responsible for the ordering and serving of food in the wards at Norrtälje Sjukhus.
All food was prepared from scratch in the ROS-kitchen which was lead by an ambitious and hardworking manager. He and his employees assured the quality of the meal regarding produce, nutrition and variety. The ROS-kitchen reflected the ambitions of Norrtälje Sjukhus for high quality food for its patients.

The kitchen communicated with the hospital and the wards through a software called Mashie. Mashie was a digital tool that facilitated the communication between the ward and kitchen. It handled all the meal and grocery orders from the wards. The two hot meals per day, lunch and dinner, were prepared by order predictions. Every lunch and dinner had two meal options that the patient could choose from and customise. However, according to the USK, the quality of food was more valuable than having multiple customisable options in terms of nutrition and patient recovery. Additionally, the wards ordered groceries to have in-house for daily use. Breakfast for example, consisted of groceries ordered from the ROS-kitchen. The wards were responsible for sending orders in through Mashie correctly and in time for meals.

Every ward appointed an USK to be responsible for the kitchen’s duties of the day, this person would in this study be referred as the KR (Kitchen Responsible). The KR’s duties included organisation and cleaning of the kitchen, ordering of groceries to the ward, sorting of clean laundry and serving of food and drinks. The reason to the KR’s existence was the extensive amount of tasks related to meals. In a 24-hour operational ward there were multiple mandatory tasks related to maintaining the patient’s comfort and basic living environment rather than being directly related to the treatment of symptoms. The food process occupied a large part of these tasks. After observation, the estimated time a KR was needed in the ward’s kitchen per day was over 5 hours. This only includes time for preparing, serving and after-cleaning of the three main meals. This made it easy to understand that food related tasks were an important part of the maintenance and daily function of the ward.

The other USK in the wards had the responsibility of serving food and drinks to the patients. They also took meal orders from patients every day. It was important to understand that the USK were highly pressured in their daily work. There was a high demand of increasing the time spent close to the patient, assisting them healthcare wise, rather than doing secondary activities related to food.

By studying the actors it became clear that high quality of the food served was highly valued since it enhances the hospital experience for the patient and aids recovery. However, actors of the system wished they had more time to actually spend with the patient rather than spending time on organisational tasks such as taking meal orders and serving. Therefore an improvement strategy of reducing time-consuming tasks related to food ordering and distribution in the wards was needed.

Mapping of Processes

In order to create a process improvement strategy, the problems in the food process needed to be identified through mapping. There were two main processes at Norrtälje Sjukhus related to food distribution, differentiated by the meal type. Lunch and dinner routines were similar and therefore observed as the same. They also involved all actors mentioned in the previous chapter. The breakfast routine on the other hand was an internal process within the ward apart from receiving groceries from the ROS-kitchen. From observations, each step of the processes was distinguished and analysed objectively as part of the mapping.
Observations showed that all processes were more preformed and experienced as a personal habit for the USK rather than a routine. Most USK performed the process their own way based on experience and preference which meant that some employees worked less efficiently than others.

The Lunch and Dinner Process

The processes consisted of 11 steps in total from the USK asking what the patient wished to eat till the food became waste. Figure 4 shows the steps connected to each actor. The majority of the steps were communication steps where information was shared from one actor to another.

![Diagram of the lunch and dinner process](image)

**Figure 4.** The lunch and dinner process in steps connected to actors.

**Description of the process by step:**
1. The USK presents the meal options to the patient.
2. The patient chooses and tells the USK.
3. The order is filled in on a paper list by the USK.
4. The paper list is handed over to the KR and is interpreted.
5. The order is translated to digital by the KR in Mashie.
6. Mashie communicates directly with the ROS-kitchen where the food is prepared.
7. The food is transported to the wards before meal times in heat isolated carts. The KR is responsible to take care of the content of the cart and to serve the food on plates.
8. During the meal service, the KR stands behind the kitchen counter while USK come and state their order for her to serve.
9. The meal is served by USK to patient although it happens that the KR helps with this task if the patient is sitting in the common area and not in their rooms.
10. The potential leftovers are cleared away by the USK and sorted as waste.
11. In case of leftover food in the canteens it is discarded directly by the KR.

As shown, the distribution of the main meals was a complicated chain of communication and logistics. Every step was dependent on the previous one. Through the observations at the wards, improvement potential for each step could be seen although limitations also became clear. The observations also showed that the patient pool present in the ward was diverse and could not be controlled. Especially in the medicine ward, the turnover rate of patients was high, with an average of 4 days per patient.
The results from the observations supported the decision of excluding the process of serving lunch and dinner. The action of taking time to enjoy a meal was valued by both USK and patients. Serving food can be considered to be time spent with patients and therefore it was not included as a process to be time reduced. Problems during the meal service such as uncertainties regarding special diet meals and portion sizes existed during serving that decreased efficiency were considered a direct consequence of earlier steps in the ordering process of the meals, and therefore focus was put on these previous steps. Nevertheless, the serving of breakfast was still considered important since it was a separate and internal process.

Still, the strongest request that was expressed by the USK was to reduce the time spent on tasks related to food processes in order to spend more time close to tending the patients. By identifying and breaking down the food process could the values of specifically USK be emphasised; spending more time caring for patients which pulled the attention to the process steps involving the USK and the KR. In Figure 4, the three steps that are highlighted in red (step 3-5) were identified having the greatest improvement potential regarding time savings. These steps mostly revolved around the ordering of meals and each step had a simple function yet proved to be time consuming.

Filling of the Order Lists

The micro-process seen in Figure 5 describes step 1-3 in greater detail. The initial step, presentation of meals, was often time consuming itself. Then the USK would need to make an assessment of portion size. In some cases, the USK would explicitly ask about portion size but mostly, it was ultimately estimated by the USK since he or she oftenly knew the patient well. If doubts occurred, the USK asked other co-workers that were more familiar with the patient. This kind of uncertainty was time consuming.

![Diagram of the ordering process](image)

**Figure 5.** Detailed process of how the ordering list was filled in.

After the main meal had been chosen, the patient would have to decide what sides they wished to accompany the meal. The alternatives were divided into carbohydrates (potato, mash, pasta or rice) and vegetables (raw or boiled). According to observations, each of these options were asked for individually to each patient and for each meal. Consequently did the number of choices directly lead to more time required for the process. Observations showed that this process took approximately 60 minutes accumulated per ward and day.

Ordering Through Mashie

The digital ordering process, step 4-5, was a considerably challenging process to analyse because of how differently it was performed depending on the observed individual. Figure 6 shows the general outline of
steps that were required to complete an order but the order of the displayed steps were not always followed although they were executed in the end.

![Diagram of process steps]

Figure 6. Detailed process of how the meal orders were translated from an analogue list to a digital order in Mashie.

Firstly, in a few cases, if the KR had not been working in the kitchen for a long time, there would be a problem of not remembering the login details for Mashie that was specific for the ward. The solution was to find a free colleague to ask which required time.

After logging in, the KR started to analyse the paper ordering list. It was observed that the ordering list itself was filled in differently between individuals, with variations of phrases and symbols which made it even more challenging to interpret information. In Mashie, every component of each meal and every special diet or allergy order was made separately. It was therefore common that the KR first summarised the number of portions for each component by hand on the paper list before translating it digitally to Mashie. On several occasions, some kind of confusion would emerge regarding information on the list and the KR would have to find the corresponding USK responsible for that patient and ask.

The KR needed to re-estimate the total number of portions based on the type of food since it was a well-known fact among experienced USK that some type of foods meant larger or smaller portions which required adjustments. The repeated need of estimating number of portions seemed to lead to inefficiency of this process. The meal ordering took approximately 15 minutes in average per session.

The Breakfast Routines

As mentioned before, the breakfast routine acted out internally within the ward using groceries previously ordered from the ROS-kitchen.
There were similarities between the breakfast and lunch and dinner processes regarding communication between KR and USK but the communication method was different in some steps which lead to higher risks for errors.

Description of the breakfast process in steps:
1. The USK asks what the patient wishes to have for breakfast and presents the options. There are many choices for sandwiches, yogurt, porridge and drinks etc.
2. The patients makes a choice.
3. The answer that is given is either written down by the USK on a scrap piece of paper or memorised by heart.
4. Telling the KR the order. The USK can be in this task interrupted and has to come back later.
5. The KR prepares a tray with the order.
6. USK picks up the tray. Oftenly the USK is standing and waiting while the KR is preparing, or they spend time themselves to prepare the order on trays.
7. The tray is handed to the patient to enjoy.
8. The potential leftovers are cleared away by the USK as waste.

Alike the lunch and dinner processes were the USK more closely involved in the process. Mornings in the wards were usually stressful and there were many healthcare tasks to complete before the medical doctors’ morning visit. Essentially could the whole process be broken down to two points of communication, the KR and the USK. The USK needed to communicate the order of the patient to the KR and the order needed to be prepared for the USK to finally serve it to the patient. Observations showed that the USK were often interrupted in the process to do something more urgent or prioritised and therefore was the breakfast process a generally disrupted chain of tasks rather than an intact flow. Being interrupted lead to USK forgetting orders and having to re-ask the patient which took time.

There was a strong desire from the ward managers to facilitate this process for the USK in order to reduce their stress levels during mornings and ultimately increase the quality of healthcare for patients. Here is an example of where the interpretation of value differentiates between roles. While the managers who are concerned about the work conditions of the USK prioritise stress levels, the USK are more interested in having more time to care for patients. The managers had explicit visions of using digital tools to solve the problems but the vision had never been able to become more than a concept due to lack of in-house competence and responsibility of the administrative employees in the hospital.
Sahlgrenska Universitetssjukhus

Sahlgrenska Universitetssjukhus was chosen as a comparable counterpart to Norrtälje Sjukhus. Both hospitals provide similar emergency care and serve fresh and hot food. This way the food process could be compared between the hospitals.

The most significant difference between the food process at Norrtälje Sjukhus and Sahlgrenska Universitetssjukhus was the existence of a so called “Economy Assistant” (EA) who was a staff member without any formal medical education. The EA’s responsibility was similar to the KR at Norrtälje Sjukhus, they amongst other things took care of householding in the kitchen, ordering of groceries and laundry. Another central difference was that the cooked food came to the wards already portioned out and served on trays which saved the EA the time of plating the food and many other tasks related to service of meals. The USK at the ward had less responsibilities and fewer food related tasks than the USK at Norrtälje Sjukhus.

The two food processes that they were accountable for were to hand out weekly meal menus to the patients in which they independently marked their meal choices and to order meals for the USK own respective bubble. Breakfast at the ward was conducted in a similar manner as in Norrtälje but the patients were freer to take their own food from the breakfast buffet. In general, it can be said that the food related secondary activities at Sahlgrenska Universitetssjukhus were more standardised and required less time from the USK.

Overall, the ward at Sahlgrenska Universitetssjukhus had similar mandatory secondary activities to keep the system working although some of them were performed differently it had comparable outcomes. The problems that the ward was experiencing were expressed by the head nurse and coordinator were familiar from earlier observations. There was a strong demand for more time spent with patients. The consequence of having to spend time away from the patients was that the USK felt stressed while working. The important role of food and nutrition was emphasised by the interviewed employees similarly to Norrtälje Sjukhus.

The observed ward at Sahlgrenska Universitetssjukhus even had an in-house nutritionist that nurses could work with to guarantee that the patients got the nutrition they needed. Lastly, a low level of digitalisation was observed, the USK and EA did not use any other digital tool to facilitate their work tasks apart from ordering groceries and meals through a computer.

Results from the visit to Sahlgrenska Universitetssjukhus showed that both hospitals valued quality food, USK felt stressed about the need of spending more time with patients and shared a low level of digitalisation. The values of the USK were therefore considered to be similar as well as the potential of increasing the level of digitalisation of their work.

5.2 Analysis

In order to create a process improvement strategy and later an implementation strategy, findings from the literature study and case study were combined and Lean thinking was applied. The main problems in healthcare are, as already discussed, the high stress levels and need of high resource utilisation. Identified problems from theory and empirics were non-prioritised development and inefficient use of secondary activities in hospitals. The causes of these problems that concern healthcare in general could partly be explained by the routines related to secondary activities that support the healthcare processes.
A consistent pattern of the observed processes at Norrtälje Sjukhus was the shortage of standardised routines related to secondary activities. By not having common routines for all secondary activities, they tended to be performed differently from person to person. This in turn created uncertainty related to tasks since there was no standard framework to rely on, which resulted in decreased efficiency. Moreover, shortage of standardised routines contributed to actions being repeated and time-consuming.

At Norrtälje Sjukhus the food process was heavily time consuming for the USK, which came as a surprise to them. There was a lack of awareness on how the food process was affecting the overall workload. Theory does not cover the performance nor importance of secondary activities in relation to overall value creation in healthcare. Consequently, there exists no consistent strategy for improving secondary activities such as the food process in hospitals. Secondary activities are not as prioritised and can be considered to be taken for granted compared to primary activities. This lack of awareness also meant that the USK had before never reflected over the value of these activities which is a prerequisite of being able to define value.

According to theory one of the main challenges of defining value in healthcare is due to the required balance between ethical and financial perspectives. By aiming for higher patient outcomes at lower costs it is considered to increase the value of healthcare, however, only looking at patient outcomes as avoidance of deaths or illnesses is considered to be insufficient since more complex aspects as ethics should be included. Still, as in any business, value can be measured based on cost drivers. Both perspectives of interpreting value were part of the approach at Norrtälje Sjukhus, where they combined the ethical values of wanting to spend more time with patients with financial values, since more time for patient care means efficient use of work hours.

Furthermore, as discussed in the literature study, the challenge of defining value can also be explained by the different professions in hospitals that have different views of value. From the meetings with the ward managers, doctors and operational manager the contrasting opinions were clear. Ward managers, whom mostly represented USK shared their opinion of needing more time with patients and wanting to reduce stress levels while the doctors perceived value as needing more cooperative time with the USK during diagnosis. However, the ward managers claimed that this was not possible since the USK were already time pressured to execute their current work tasks. The operational manager, who was not familiar with the detailed processes in the wards, kept a neutral opinion aligned with the hospital’s generic value proposals to improve the general healthcare quality.

Moreover, the process of capturing value can be according to literature optimised through efficient utilisation of already existing resources in the healthcare system. This process is currently prevented by inefficient routines related to organisational management, which could be facilitated through process improvement strategies including Lean and increased utilisation of digital tools. According to existing research Lean is the most commonly used process improvement method today and applicable in hospital environments, however as experienced in the case, Lean is needed to be adjusted to the specific situation to be suitable for healthcare.

This leads the way to a final common cause of identified problems, which is the low level of digitalisation in healthcare, mainly concerning secondary activities such as administration and other daily routines that are not necessarily directly related to healthcare. The work at Norrtälje Sjukhus could be described as
paperwork based, since almost all activities were performed and documented on paper, before possibly being transferred digitally to a computer. In the case of the food ordering system, all orders were first written down on paper before being typed into the computer program. Hence, activities that are performed from paper-to-computer instead of directly using a digital device take more time and are inefficient.

5.3 Solutions

The next step in the case study was to practically formulate a process improvement strategy and then pair it with an implementation strategy. The solutions to the problems at Norrtälje Sjukhus consisted of tangible deliverables (see Appendix 1) that addressed identified causes of problems found during the data collection. The initial focus point of the solution was to create an understanding and awareness of the current food process and its complications. The mapping of the current food processes made it possible to create incentives for change among the workforce which was presented to the personnel.

The main goal was to provide incrementally implemented solutions that avoided radical changes to the routines of the USK. The reason behind this was to facilitate the process of integrating new routines into their busy schedule at the same time avoiding mistakes along the way that could affect other healthcare activities, which was described as a risk factor in the literature. All solutions provided to the hospital were designed to standardise and codify routines in order to ensure a common way of working in the wards.

New Routines for Lunch and Dinner

Bottlenecks were detected at the steps related to ordering through Mashie. Common misunderstandings existed that concerned interpretation of the information on the meal ordering list as well as how the information was to be transferred to Mashie. Consequently, it took a lot of time to perform the order due to uncertainty of the process. Therefore, the solution consisted of a protocol for ordering meals through Mashie in a more efficient way. This included adjusting the ordering list for meals to make the design in line with the user interface in Mashie (see Appendix 2). In other words, the input parameters required for Mashie was also included in the ordering list to facilitate the information transfer. Moreover, the number of questions required to complete each order was reduced to save time for the USK, according to the principles of Lean to reduce unnecessary and non-value adding steps. This required reduction of the number of choices related to carbohydrates and vegetables for each meal, however, the patient is still able to choose between two different alternatives for each meal and allergies are still respected. All routines related to using the ordering list and ordering through Mashie were documented in the protocol with step-by-step instructions and made accessible to everyone in order to standardise the routines, following the Lean philosophy that promotes standardisation.

To further make the ordering process through Mashie more efficient, a document including recommended portion sizes of meals were created. The reason for this was due to the fact that standard portions for certain kind of meals were larger or smaller than normal, due to nutritional based needs, which otherwise would result in increased food waste or insufficient volumes of food. Among the USK, this knowledge was previously gathered through experienced, however, when the information is documented everyone is able to access the information from start which means mistakes can be prevented.
New Routines for Breakfast

A strong request from the ward managers consisted of facilitating the breakfast routines, since this time of the day was usually the most stressful. In order to introduce digital tools into the wards’ daily work, a digital ordering system for breakfast was developed (see Appendix 4). This was to be used internally through tablets by allowing USK to communicate orders to the KR. By using a tablet to perform breakfast orders the USK are now allowed to perform other urgent morning tasks while waiting for the breakfast to be prepared by the KR. When the breakfast tray is ready to be picked up, the KR is able to notify the USK through the tablet. For the first time, there was a reason to distribute tablets to the wards and in collaboration with the IT-department a number of tablets could be provided for testing. This digital breakfast solution was an initiative to introduce digital tools to the daily work related to secondary activities, and also to decrease non-value adding waiting times during the time-consuming and inconsistent breakfast routines. Unfortunately, the new breakfast routines could not be thoroughly evaluated during the time period of the study, therefore the results presented below were based on estimations and oral feedback from USK.

The idea behind the new breakfast routines and digital solution was to allow the USK to be interrupted during the breakfast process without it affecting its efficiency and to minimise the time the USK is needed in the kitchen. This promoted a smoother workflow following the Lean thinking. The new process flow can be seen in Figure 8.

![Figure 8. Details of new breakfast routines.](image)

With the new routines the USK will only need to go to the kitchen once the order is ready to be served. There is a natural task gap between the USK sending the order till it is ready to be served which can be used to caring for patients. This contributes to a more efficient use of USK work time by reducing waiting times and non-value adding steps in the breakfast process.

Implementation

The pilot study allowed the solutions to be verified in practice, including introducing the new changes to the employees and implementing the new routines. Workshops were held at the wards to properly assure a consistent knowledge base for the entire workforce and the ward managers. Both managers and USK were
present which made it possible to receive valuable feedback for the solutions and at the same time make them involved and engaged in the change process. However, it was clear that not all of the USK had been able to integrate the new routines into their work during the test period. A major part of the workforce had not read the provided documents explaining the new routines which meant that they were still in an adaption phase of the change and perceived it as more inconvenient than their old routines. The negative impact of this type of change resistance during the pilot study was countered by reassuring the employees that it is an inevitable part of a change process and it will become better if they keep embracing the new routines. Most of them seemed optimistic about eventually getting used to the new routines without disturbances of other activities in the ward. The ward managers supported and welcomed the changes and asked everyone to thoroughly start following the new routines.

It was clear that change requires time and effort before results can be reached, which the ward managers also pointed out. Having support from the ward managers was important to gain trust from the USK and for the consistency of the change process since they could answer questions when needed during the pilot study. Altogether, it was possible to conclude that workshops and incremental introduction of new routines in combination with support from managers proved to be a successful strategy when implementing changes related to secondary activities.

The implementation resulted in quantitative numbers for time saved. In order to calculate the time saved for each activity, average times observed before the pilot study were compared to the times after the test period. Consequently, the time saved could be calculated, which in turn could be multiplied with the salary of an USK in order to find out the money saved.

**Value Increase**

The time and money saved for the new lunch and dinner routines were possible to measure during the pilot study or based on justified conclusions. However, because the new breakfast routines were not thoroughly included in the pilot study at the time, since the breakfast program was still in development and tablets were being acquired, estimations of the time saved had to be made. The estimations were based on previous observations of actions that are no longer necessary when using the new breakfast solution, for example standing in line while waiting for the breakfast tray to be prepared by the KR.

All results of time and money saved are gathered in Table 1. The stated activities for lunch and dinner describe the ordering process, which represents the time of ordering through Mashie as well as the time of taking orders from patients, and the serving process represents the time of distributing the meals to the patients in the wards. Moreover, the activity for breakfast is based on the time of taking orders from patients and serving.
Table 1. Results of time and money saved after implementation.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time saved [min/day/ward]</th>
<th>Money saved [SEK/day/ward]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunch order</td>
<td>25</td>
<td>99</td>
</tr>
<tr>
<td>Lunch serving</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Dinner order</td>
<td>25</td>
<td>99</td>
</tr>
<tr>
<td>Dinner serving</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Breakfast order and serving</td>
<td>72</td>
<td>284</td>
</tr>
<tr>
<td>Total daily savings per ward:</td>
<td>132 min/day/ward</td>
<td>522 SEK/day/ward</td>
</tr>
<tr>
<td>Total annual savings hospital:</td>
<td>192 720 min/year/hospital</td>
<td>761 244 SEK/year/hospital</td>
</tr>
</tbody>
</table>

As a result of the redesign of the meal ordering list, the number of questions needed to be asked during meal orders were reduced by half which corresponds to half the original time spent on the ordering process. Before, the procedure of completing the meal ordering list for lunch and dinner took 30 minutes, respectively. Now, when the number of questions were reduced by half, the time was assumed to also be reduced by half as well resulting in 15 minutes of time saved. Additionally, the time of ordering through Mashie went from 15 minutes to 5 minutes, which resulted in 10 minutes of time saved. In total, the time saved for the lunch and dinner order activity was 25 minutes which corresponds to 99 SEK/day/ward, respectively. The time for serving lunch and dinner (USK perspective) was measured to 10 minutes respectively before the pilot test, however, when the new meal ordering lists had been redesigned to better fit their needs, fewer misunderstandings occurred which reduced the time to 5 minutes.

The routines for taking breakfast orders and serving the patients were measured during the observation period, which resulted in 120 minutes of work time for the USK. By excluding the time for standing in line waiting for the breakfast tray to be prepared by the KR and also the approximate time for the USK to repeatedly walk back and forth between the patients and the kitchen during breakfast, an estimation of the time saved by implementing the breakfast program could be made. This resulted in 72 minutes which corresponds to 528 SEK/day/ward.

Since the solutions could be generalised to be applicable on all four wards in the hospital, the value of total annual savings for the entire hospital could be calculated which resulted in 761 244 SEK, corresponding to 192 720 min (3212 h).
6. Discussion

In the discussion our results will be compared with previously studied literature investigating their relevance and discussing interesting findings from the case study. The discussion will also provide a critical reflection of the chosen methodology for the study. Moreover, the contributions of the study to the healthcare industry and field of research will be discussed.

6.1 Value in Healthcare

The concept of value creation in healthcare is challenging to define. It depends on the different mindsets of professions operating in hospital environments and the existing fundamental values of the healthcare industry as a whole (Edwards and Nielsen, 2011). Value creation can be considered as hard data by counting the number of saved lives or cured diseases, but also as providing care and comfort for the patient. Additionally, as in any business, value is related to costs which sometimes collides with the vague sense of patient value that cannot be properly defined and measured since it partly relies on ethics (Reinhardt and Oliver, 2015).

Therefore, it was of greatest importance for us to truly get to know the personnel and what they value at Norrtälje Sjukhus. The Biodesign method which promoted the extensive observation period, approximately 150 hours, allowed us to talk and get to know them, which in turn provided an understanding of their mentality and culture. After the observation period it was clear that the USK valued time spent with patients, since they believed it was the essence of their work and their main purpose of working within healthcare - to help other people. By being able to attend patients more closely by spending more time at their assistance, the risk of falls or other errors due to nurses not being present is decreased according to the assistant nurses. And thus the quality of healthcare can be argued to increase simultaneously. This project showed clearly that there is potential for improvements that can free up the necessary time. Furthermore can the saved time, which is a highly valuable resource, be used to increase other values such as relieving stress levels or expanding educational possibilities for their employees which could passively increase efficiency and competency levels overall. This also shows how improvement projects of secondary activities can lead to more general improvement possibilities despite the complexity characterising hospitals where many actors work together and are affected by each other.

The case at Norrtälje Sjukhus confirmed the theory described by Edwards and Nielsen (2011) saying that doctors and nurses have different ideas about value. During the case it became clear that doctors did not understand all the work that the USK had to do because the opinion about what truly adds value differed between the professions. This challenge prevents cross-functional definitions of value to exist. The benefit of investigating secondary activities is that they are often more isolated from primary activities and therefore are changes to them less likely to affect the organisations processes cross-functionally. The investigated food process in the case study was handled solely by USK without any significant interference from other professions in the hospital, which made it possible to identify a common definition of value which in turn allowed value to be increased. As a result, value at Norrtälje Sjukhus was defined according to the USK perception of value, which was time spent with patients, and our mission was to increase the time.
According to Epstein (1992), the healthcare market can be viewed as unique due to its high variety of operations and ambiguous view of value, in turn requiring personalised solutions adapted to the specific situation at the hospital (Reinhardt and Oliver, 2015). After the visit to Sahlgrenska Universitetssjukhus it became clear that every hospital and ward have different values and organisational prerequisites which requires customised solutions. At Sahlgrenska Universitetssjukhus they used a more standardised system of pre-prepared trays when distributing meals, which was a more effective way of serving meals although it had a more industrial feeling. Sahlgrenska Universitetssjukhus valued high quality food like Norrtälje Sjukhus but time efficiency was considered as higher priority. This can be explained by the fact that Sahlgrenska Universitetssjukhus is a larger hospital than Norrtälje Sjukhus, creating greater incentives to increase efficiency. To increase value it is necessary to understand the actors and situation, which based on the food process includes the patients and their dietary needs, financial basis of the hospital, work culture and current routines.

Healthcare is a unique industry due to the challenge of balancing ethical and practical aspects when defining value. As previously discussed, it is difficult to justify certain decisions or change suggestions since it depends on both financial and moral arguments that also are closely linked to the different professions operating in hospitals. To exemplify the challenge of defining value in healthcare, the improvements we accomplished at Norrtälje Sjukhus were expressed as an increase of value in multiple ways. Financial values were important to the top-management since they were responsible of the hospital’s business operations, therefore the value-increase was expressed in numbers of profit to create incentives for future change. Additionally, the assistant nurses valued time spent with patients, and therefore the value-increase was also expressed in time saved. By expressing the improvements in both financial and ethical ways it was possible to motivate a broad value-increase. Explicitly, our results show the available resource potential generated through this improvement project which allows managers to transform this resource as needed.

Introduction of digital tools to facilitate daily time-consuming routines was both a request from the top-management and an observed highly demanded need in the wards. Theory claiming that the healthcare sector lags well behind digitalisation, mainly secondary activities (Dagens Nyheter, 2018a; The New York Times, 2007) could be confirmed. By reducing work time spent on administrative tasks, in the case of the food process it was activities related to ordering, it was possible to increase the time spent with patients. At Norrtälje Sjukhus the breakfast routines were the most time-consuming ones and therefore considered to have the greatest impact of digital improvements. This proved that there is great potential of digitalising similar activities in the future.

Previously there was a lack of awareness of the value-adding potential of secondary activities such as the food process which made it less of a priority for improvement projects. There did not exist a clear distinction between hospital activities that are directly and indirectly related to healthcare, which prevented improvement projects focusing on secondary activities. By highlighting the potential and need of improving secondary activities it is possible to include them in future change projects. With a solid improvement and implementation strategy, secondary activities are proven to be a suitable approach to improve the value in healthcare with both financial and ethical measures considered.
6.2 Process Improvement Strategy

To develop a process improvement strategy for secondary activities, we chose to use the principles of Lean methodology as a tool to solve the specific problems at Norrtälje Sjukhus, rather than deliberately applying the complete concept of Lean on the entire hospital system. Lean advocates smooth work flows through elimination of non-value adding activities, which can be done through standardisation of tasks and decreased lead-times. However, as supported by literature, the service-oriented healthcare industry has a high degree of variety in its work since each patient is different, sometimes making it difficult to standardise (Modig and Åhlström, 2014; Edwards and Nielsen, 2011; Weeks and Weinstein, 2015).

The category of secondary activities share a common feature of being easier to standardise compared to primary activities, since they are more similar to industrial production, as indicated by Edwards and Nielsen (2011). Therefore the food process in the case study was considered to be representative of the category secondary activities regarding Lean application. A similar case study with focus on a different secondary activity would be possible using the same methodology described in this report.

The Lean concept was used in combination with the needs-driven process of Biodesign. Biodesign is considered complementary to Lean in healthcare environments to counter the common change resistance. Biodesign allows value to be identified based on the actors’ needs in healthcare environments, and by applying Lean tools practical improvement solutions to improve work flow could be developed that were aligned with the identified needs. By focusing on the needs of the personnel when developing solutions no unnecessary changes were made and only value-adding activities could exist. Moreover, we gained trust from the personnel since they noticed that we truly cared about them and prioritised their needs. This combination of methodologies proved to be a successful improvement strategy when increasing the value of the food process.

Our main focus at Norrtälje Sjukhus was to reduce repetitive tasks and elements of uncertainty to free more time for USK to spend on patient care. A clear example was the improvement of the ordering process of meals in the wards. After the observation period the current ordering process could be mapped and time-consuming or uncertain tasks could be detected and improved or eliminated. This was also an action of standardisation, since the new ordering process was introduced as a new common and easier way of ordering meals. Another example of Lean application was the introduction of a digital breakfast solution that reduced waiting times and improved the work flow during serving. This application of Lean on daily standard routines showed great results in savings of time and money.

This result is well aligned with literature, saying that production alike routines are well suited for Lean application because of the standard nature of the work (Edwards and Nielsen, 2011). However, the food process was not always expressed as a standard activity due to changing treatments and dietary needs of patients etc., meaning that Lean application is not necessarily useful. This is not aligned with our results that clearly show how the ordering process and distribution process can be improved using the value enhancing tools of Lean. Despite the fact that the food process involves many changing factors due to unique patient conditions, the routines for managing the process can still be standardised. Still, it needs to be kept in mind that situations occur when it is not possible to follow standardised routines, however, these kinds of situations are exceptional and inevitable, especially in healthcare. Therefore our result can be
viewed as expanded research on better adapted Lean methods on healthcare food processes, as requested from previous researchers in the field (D’Andreamatteo et.al, 2015; Edwards and Nielsen, 2011). Moreover, successful Lean implementation requires a common interpretation of value in the organisation which, as previously discussed, varies between different professions at the hospital. This supports our choice of limiting the application of Lean to specific activities rather than applying Lean cross-functionally.

Yet we agree with previous research recommending to use Lean in healthcare with caution. There exists a high degree of soft values that interferes with the traditional production mentality of Lean, which consequently requires a more flexible approach. We managed to adapt the Lean concept by involving the employees in our work and take their thoughts into consideration when designing a solution. This way Lean was positioned in a sociotechnical context where social factors and technology worked together, as mentioned by Wickramasinghe (2014).

6.3 Implementation Strategy

As literature showed, the operational structure between hospitals and wards differs from place to place in Sweden (Rae, 2005). The comparison between Norrtälje Sjukhus and Sahlgrensa Universitetssjukhus was a clear example of how processes can differ even if they serve the same purpose. The interesting discussion point is to why a certain routine is chosen for a process over another. The results from the case study and the observations from the comparable hospital ward showed that the approach towards secondary activities is highly pragmatic rather than thoroughly considered as part of the healthcare. The lack of acknowledgement of these activities, despite being a large part of the USK work responsibility, then leads to inefficient ways of executing them.

The results support existing literature regarding how change and implementation is a process that takes time (Scott et.al, 2000; Moran and Brightman, 1998), especially in environments such as hospital wards where there are strong hierarchies and rigid habits around daily tasks (Britnell, 2015; Rathwell and Persaud, 2002; Hansell, 2005). It was time consuming to develop an implementation strategy that was intricate enough to fit the workplace and it was difficult to involve everyone at the ward to coordinate changes smoothly. Additionally did the short time frame of the project limit the length of the pilot study and follow up evaluations. We encountered problems such as doubt amongst the employees in the start of the implementation phase due to the instability and uncertainty created when new habits are being adopted. Because of a short pilot study the natural period of need for adjustments among the employees dominated a large part of the pilot study, contributing to difficulties in accurately evaluating the improvements and implementation. To counter this phenomenon, we tried to be as transparent as possible regarding the process for the nurses and USK. The changes themselves were designed to disturb other processes as little as possible which required good planning and consideration of the workplace as a whole and its specific needs. We believe that a longer pilot study would mitigate potential uncertainty of the improvement and implementation results.

From this case experience it was clear that change is time consuming but it also showed how important time is, as also was discussed by Scott et.al (2000) and Moran and Brightman (1998). It is hard to rush individuals to embrace a new habit and in our opinion, time should be given as long as there is progress. Optimally, the pilot study should have been given more time under surveillance. After the initial two weeks,
we made an evaluation of the results and impacts of the change but in reality, the change was still on-going and the ward was going to continue with the implementation process.

As explained by Rae (2005), Swedish healthcare is decentralised which allows variety in each clinic, promoting personalised solutions to be created and well adapted to the specific situations at each hospital. Each hospital and ward therefore has the freedom and potential of customising their improvement strategy to fit their unique needs. The potential for improvement of secondary activities can then be argued to be greater than primary since they are less connected to medical processes with stricter regulations and therefore simpler to change. As seen in the case study, there were few restrictions of how the food processes were supposed to be performed and therefore it allowed for highly customised solutions for that particular ward. Consequently, improving secondary activities are then proved to be both value adding and easier to modify.

The strategy-to-performance gap mentioned by Rossum et.al (2016) and Jacobsson (2010) was solved through careful and well-planned introduction of the new routines. The implementation strategy greatly depends on how the changes are introduced, which was experienced during the pilot study and its including workshops. Communication was the key to solving the majority of the encountered difficulties during the implementation phase. To prevent extensive internal resistance to change because of the hierarchical power structure described by Brandt and Larsson (2009) we approached the employees in a friendly manner from the very beginning during the observations to gain trust and respect for the future collaboration in the project. By changing the USK and managers’ perception from seeing the project as a hostile external change force to being an opportunity to realise long-wished improvements, facilitated the change process immensely. The workshops were built upon this bond of trust and respect. With as many as possible feeling comfortable speaking their opinions to us, the better the results since more perspectives of the problem and solution could be reviewed. We in return, felt free to regularly communicate with the USK in order to discover any problems during the implementation phase. This made it possible to continuously iterate the improvement solutions. Another prerequisite that greatly facilitated the implementation phase was the strong engagement and drive from the managers. Because of the time frame of the project, it will become the manager’s responsibility to make the introduced changes to last. Their involvement made it possible to drive our work forward and with continuity since they are present at all times and can supervise the employees.

As discussed by Nilsson (2010), change can sometimes be more of a ceremonial act. An example from the case study was how the corporate group was proud of their hospital’s food quality and consideration for food waste, which positively promoted a solid external image which in turn made personnel as well as habitants in the area to have a more positive perception of their hospital. Whether the improvement projects actually yielded any results was less significant due to the sheer psychological impact of individual’s attitude. Similar effects can be considered to be expected for the implementation of digital tools in hospitals, since it promotes a modern picture of the hospital and indicates a leading position in the market.

In regards to the implementation of digital tools, it was easy to identify needs and simple digital solutions for a specific need. But, the challenge was the design and development of the software and practical implementation. With only two management engineers and one software engineer from the CIF to develop...
a new fitting activity, the process was slow. This was also due to the heavy background research (approximately 150 hours of observations) that needed to be done prior to the software development.

If the hospital or ward had relevant in-house competence about improvement projects and change management, the process would be faster and possibly more accurate. This type of competence does not currently exist in Norrtälje Sjukhus, managers are mostly administratively educated with some leadership knowledge which is not sufficient for smaller scaled practical improvement projects as secondary activity improvements are. This makes the accomplished changes in this project less sustainable since the absence of engineers will lead to a halt in development of improvements. Some of the more drastic changes previously attempted at Norrtälje Sjukhus are implemented because of time critical circumstances and a change is forced to happen, rather than planning ahead and deliberately driving change. This type of change is not always well thought through and grounded.

No one is assigned responsibility nor given time to continuously work for the purpose of this study, to improve daily routines and processes, mostly secondary activities, for the sake of their employees’ work quality and the value of healthcare quality. With the increasing demand of increased efficiency and digital tools, the need of engineering competence and organisational managers at hospitals will increase and maybe in the future, they will have a significant role in healthcare. Hospitals cannot afford to continuously hire external support and therefore, providing sustainable improvement support is essential.

One could argue for it not being worth disrupting secondary activity routines to risk affecting the quality of healthcare and primary activities. The focus should rather be put on improving the primary healthcare activities since they are more directly connected to the patient’s health and one of the most important values for a hospital. However, what we are arguing for is that secondary activities need to be viewed separately from primary activities and that the value of improving them has a direct positive impact on the values of the particular hospital and ward. This is built on the presumption that the improvements to secondary activities are based on correctly identified values and successful implementation. To increase the chances of success, the timing of implementation is important as well as the strategy design itself. As mentioned before, it is highly beneficial to implement in iterative steps where simple functions can be tested without disturbances of other activities in the ward.
7. Conclusions

This chapter summarises the main findings in this project in relation to the research questions. The purpose has been fulfilled through investigation of existing literature and an extensive and thorough case study that exemplifies how value can be increased by improving secondary activities. By distinguishing secondary activities separately from other healthcare activities we concluded that they are currently not prioritised and that there is potential for improvement and value increase of overall healthcare quality. This insight contributes to an alternative perspective for developing more successful improvement strategies within healthcare.

7.1 RQ 1: What are the challenges of defining value in healthcare?

The challenges of defining value in healthcare are the different mindsets between professions operating in hospitals and the required balance between ethical and financial aspects. To exemplify and approach the challenges of defining value in healthcare, the improvements at Norrtälje Sjukhus was expressed as a value-increase in multiple ways, both in numbers of financial profit and time-saved for the USK. Expressing the value-increase in terms of financial value motivates the top-management to drive change projects since it includes the perspective of the hospital as a business through necessary resource allocation. Additionally, expressing the increase of value in ethical terms through increased time for personnel to care for patients, respects the fundamental values of the clinical personnel operating in hospitals.

7.2 RQ 2: What process improvement strategy is suitable for improving secondary activities?

The combination of Lean and Biodesign proved to be a suitable process improvement strategy for improving secondary activities. It is of great importance to identify the unique needs and values of the specific hospital. Biodesign promotes extensive observations of a specific case environment, especially within hospitals, which creates a realm where Lean can be applied. Biodesign identifies the needs, restrictions and available resources for Lean-based solution generation. By isolating secondary activities and breaking them down to its fundamental steps and purposes, it becomes easier to distinguish both the closest related actors and what they perceive as value. This also makes development of solutions towards improvements more practically approachable by applying Lean as a tool rather than a cross-functional concept. Biodesign focuses on the needs of the actors in the process while Lean aims to eliminate non-value adding steps and improve the workflow which makes them complementary to each other in healthcare contexts. Combined, the methods allow only value-adding steps of the process to exist and adapts the process according to the unique situation at hand which is crucial in healthcare environments.

Secondary activities lag well behind primary activities regarding digitalisation, and digital tools can increase the value of secondary activities by making them more efficient and improve workflows, which was proved in the case study through introduction of a digital breakfast solution.

When value is defined as time spent with patients this process improvement strategy proved to be successful. When improving the food process in the case study the results showed that the total annual time
savings for the entire hospital was 3212 work hours which can be used to spend more time with patients, as strongly requested by the personnel. By giving the USK more time with patients the value has increased which can be viewed as an efficiency increase in a value perspective regarding healthcare systems in general. The positive results from this case study in a smaller hospital showed is certainly promising for the potential in other hospital sizes. The results of time saved can also be translated into an increase of monetary resources of 761 244 kr.

7.3 RQ 3: What implementation strategy is suitable when improving secondary activities?

The implementation strategy is crucial to minimise the strategy-to-performance gap during improvement projects. Prerequisites for implementation are awareness of the problems, the needs and to have an improvement strategy that fits the situation. When planning the implementation strategy the focus should be put on making the change practically incremental and iterative to minimise disturbances to other healthcare activities. It is also important to involve the personnel as much as possible in the process which can be done using workshops and pilot studies. Furthermore, it is essential to give change enough time to diffuse into the work environment and become a standardised routine. Support from managers is important to facilitate the change process. A remaining challenge is the lack of responsibility and managerial competence in the regular hospital organisation that is needed for sustainable future improvement and implementation strategies for secondary activities.
8. Limitations and Further Research

Being a case study of a relatively new research field, exploring the value of secondary activities within healthcare, there were limitations that could have possibly further elevated the study. As the literature proved, there is a distinct lack of studies done in this field and therefore it would require more similar case studies to further generalise the developed theory. Other case studies should preferably be done in hospitals with other characteristics than Norrtälje Sjukhus to investigate the width of generalisation of the theory. For example, larger or smaller hospitals with different problems and needs.

Our case only focused on the food process which got to represent the category of secondary activities as a whole. This simplification was justified due to the common characteristics of secondary activities shared by the food process and extensive work hours that was spent on investigation, providing great potential of positive improvement effects of the complete category of secondary activities. However, investigation of more secondary activities is recommended for future research to further strengthen the results.

As the project proceeded, time became an increasingly important factor in terms of implementation quality for the case ward. Many steps were time consuming and consequently further impacts in the healthcare system as a result of improving secondary activities could not be investigated. For example if it led to any shifts in how primary activities were executed or if this successful change project would act as a catalyst for future improvement projects.

Since different professions tend to have different perceptions of healthcare values, it would be interesting to perform similar case studies but with a stronger focus on another professions than USK. To find secondary activities closely related to doctor’s or nurse’s daily work to improve and compare those results to this study, for example activities that function and are executed across workgroups.

In terms of theory usage, this study has been limited to a perspective that we believe is viable applying value creation, Lean thinking and change management to motivate and argue for the proposed changes. Although these are sufficient to form theory, other perspectives using another set of literature and theory might give further insight of the role of secondary activities within healthcare.

Lastly, optimally the integration of primary and secondary activities would be investigated in order for them to function in harmony in complex healthcare systems by allowing secondary activities to support and enhance the overall healthcare quality.
References


Gerdsling, Niclas; Unit Manager Måltidsenheten. 2018. Interview. 7 February.


Appendix 1. Collection of New Food Routines for USK

Matbladet
Informationsblad för matrutiner
Förtydliganden från köket

● Du ska **alltid** ringa köket vid frågor och förbättringsförslag!
● Portionsstorlekarna går **ej** att ändra eftersom de är förbestämda enligt livsmedelsverket och baserade på näringsbehov.
● Nötter förekommer **aldrig** i maten! Undantag för mandel men detta står i så fall utskrivet. Du behöver alltså inte beställa specialkost vid nötallergi.
● Vid **livshotande allergier** ska du **alltid** beställa specialkost trots att allergenen i fråga ej står specificerad i måltidens innehållsförteckning!

Rutiner vid måltidsbeställningar

● Lunch- och middagsbeställningar ska genomföras under eftermiddagen dagen innan.
● Om en ny patient tillkommer efter att lunch- och middagsbeställningarna har genomförts ska dessa uppdateras.
● Lunchbeställning ska ske innan kl 9:00 via Mashie.
● Middagsbeställning ska ske innan kl 13:15 via Mashie.
● Frukost serveras kl 7:45–9:00.
● Dagsbeställningar ska genomföras i samband med lunchbeställningen innan kl 9:00 via Mashie enligt inventeringslistan.
● Veckobeställningar ska genomföras på tisdagar i samband med lunch- eller middagsbeställningen via Mashie enligt inventeringslistan.
● Innan jul och innan sommar ska inventeringslistorna uppdateras.
PM för måltidsbeställning via Mashie

1. Logga in med användarnamn och lösenord.
2. Summa antalet måltider för lunch och middag på matlistan:
   a. Avrunda antalet portioner först efter att du summerat portionerna för alla bubblor.
3. Beställning av specialkosterna för lunch:
   a. Beställ först allergikost och övriga matpreferenser (tex. fläsk, laktos, vegetariskt).
   b. Beställ sedan portioner med annan konsistens (H, T, FL).
4. Beställ sedan normalkosterna i "kombinerad portionsbeställning" genom att fylla i varje komponent för lunch.
5. Beställning av grönsaker:
   a. Avgör om grönsaker passar till matalternativen.
   b. Beställ hälften råkost och hälften kokta grönsaker av grönsaksportionerna.
6. Beställ efterrätt till alla patienter:
   a. Spara i kylen om det blir över till fika.
7. Upprepa processen för middag.
Rekommenderade portionsstorlekar

Komponenter där du kan avrunda uppåt:
- Fläsk
- Soppa
- Kycklingfilé
- Sill
- Hel laxfilé
- 
- 
- 
- 
- 

Komponenter där du kan avrunda nedåt:
- Pyttipanna
- Pannkakor
- Potatis
- Lasagne
- Makaronipudding
- Isterband
- Äggakaka
- Palt
- 
- 
- 
**Rutiner vid ifyllning av matlistan**

1. Fyll i datum och matalternativen.
2. Fyll i allergier och övriga matpreferenser (t.ex. fläsk, laktos, vegetariskt).
   a. Fyll **ej** i konsistens av måltid (H, T, FL) i kolumnen för allergi.
3. Fråga patienten vad den önskar att äta till lunch respektive middag.
   a. Fyll i portionsstorlek för önskat matalternativ (1, ½, SP).
   b. Fyll i konsistens vid behov (H, T, FL).
4. Fråga om patienten vill ha grönsaker.
5. Kryssa eventuellt i rutan för KVM.

**OBS!**
- Uppdatera matlistan när patienter kommer och går!
- Summera **inte** antalet portioner, det är köksans ansvar!
- När patienter serveras ska **endast** lunch- eller middagsrutan strykas!
Appendix 2. New Meal Ordering Lists

<table>
<thead>
<tr>
<th>Datum</th>
<th>Lunch:</th>
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<td>2.</td>
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| Eftersätt: |
| Middag: |
| 1. |
| 2. |

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Summering normalmat:  

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<th>T = Timbal</th>
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<td>FL = Flyt</td>
<td>M = Mos</td>
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Telefon kök: 27 414
Appendix 3. Frequent Interview Questions

Would you say that this is an average day of activities?
How often do you perform this task?
What is the purpose of this task?
What do you like about performing this task?
Is there anything that you would like to change with this routine?
Have this routine changed recently?
Are there any existing improvement plans?
What problems do you encounter in your daily work?
Is this task difficult in any way?
What do you value in your work?
How do you feel right now (while performing this task)?
How long have you worked here?
Appendix 4. Layout of the Digital Breakfast Solution
Ågg  Kaviar  Salt  Juice  Näringsdryck  Saft  Kaffe  Mjölk  Socker  Honung  Suketter  Te  Mjölk  Socker  Honung  Suketter

Skriv din kommentar här.

BESTÄLLNINGEN SKICKAD  SÄNG 13

RENSA  SÄNG 13