Aalto University
School of Business

EXPLORING THE SYNERGY BETWEEN LEAN MANAGEMENT AND THE NORDIC WELFARE STATE ETHOS

Case Study of HUS

Master's Thesis

Emma Pettersson & Rasmus Paavola
Aalto University School of Business
Global Management

Spring 2024

Aalto University
School of Business

Authors Emma Pettersson & Rasmus Paavola

Title of thesis Exploring the Synergy Between Lean Management and the Nordic Welfare State Ethos: Case Study of HUS

Programme Master of Science in Economics and Business Administration

Major Global Management

Thesis supervisor Sami Itani

Date 27.05.2024 **Number of pages** 105 **Language** English

Abstract

This thesis examines the integration of Lean management in the context of the Nordic welfare state ethos, with a focus on the Finnish public healthcare system. The study examines the compatibility and possible benefits of Lean management in improving operational efficiency and performance of public healthcare.

The research employs an explorative qualitative methodology, focusing on HUS (Hospital District of Helsinki and Uusimaa) as the primary case example. Data was collected through semi-structured interviews with various levels of management at HUS and external Lean consultants. The goal was to collect empirical views on the applicability, efficiency and adaptability of Lean in Finland's evolving public healthcare.

The findings show that Lean management aligns well with the ethos of the Nordic welfare states by promoting equality and improving service delivery while maintaining high-quality care. Key practices such as continuous improvement, waste reduction and employee empowerment led to significant operational improvements when integrated carefully and correctly. The importance of strong leadership, customized training and continuous evaluation was emphasized in supporting sustainable change. The results of this thesis contribute to a broader academic discussion on Lean Healthcare, offering concrete examples and guidelines for the application of Lean in public healthcare with an emphasis on the alignment with the broader Nordic welfare state ethos.

Keywords Lean Management, Continuous improvement, Nordic Welfare State, HUS, Healthcare Management

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School of Business

Tekijät Emma Pettersson & Rasmus Paavola

Työn nimi Tutkimus Lean-johtamisen ja Pohjoismaisen hyvinvointivaltion synergiasta: HUS-tapaustutkimus

Koulutusohjelma Kauppatieteiden maisteri

Pääaine Global Management

Vastuuopettaja/valvoja Sami Itani

Päivämäärä 27.05.2024 **Sivumäärä** 105 **Kieli** Englanti

Tiivistelmä

Tämä opinnäytetyö tarkastelee Lean-johtamisen integrointia pohjoismaisen hyvinvointivaltion kontekstissa, keskittyen Suomen julkiseen terveydenhuoltojärjestelmään. Tutkimuksessa tarkastellaan Lean-menetelmien yhteensopivuutta ja mahdollisia hyötyjä julkisen terveydenhuollon operatiivisen tehokkuuden ja suorituskyvyn parantamisessa.

Tutkimus toteutetaan eksploratiivisella laadullisella menetelmällä, keskittyen HUSiin (Helsingin ja Uudenmaan sairaanhoitopiiri) pääasiallisena tapausesimerkkinä. Aineisto kerättiin puolistrukturoiduilla haastatteluilla HUSin eri johtotasojen sekä ulkopuolisten Lean-konsulttien kanssa. Tavoitteena oli kerätä empiirisiä näkemyksiä Lean-menetelmien sovellettavuudesta, tehokkuudesta ja mukautuvuudesta Suomen kehittyvässä julkisessa terveydenhuollossa.

Tulokset osoittavat, että Lean-johtaminen sopii hyvin yhteen pohjoismaisen hyvinvointivaltion eetoksen kanssa edistämällä yhdenvertaisuutta ja parantamalla palvelujen toimitusta säilyttäen samalla korkean hoidon laadun. Keskeiset käytännöt, kuten jatkuva parantaminen, hukan vähentäminen ja henkilöstön voimaannuttaminen johtivat merkittäviin operatiivisiin parannuksiin, kun ne integroitiin huolellisesti ja oikein. Vahvan johtajuuden, räätälöidyn koulutuksen ja jatkuvan arvioinnin merkitys korostuivat kestävän muutoksen tukemisessa. Tämän opinnäytetyön tulokset edistävät laajempaa akateemista keskustelua Leanista terveydenhuollossa, tarjoten konkreettisia esimerkkejä ja ohjeita Leanin soveltamisesta julkisessa terveydenhuollossa, korostaen yhteensopivuutta laajemman pohjoismaisen hyvinvointimallin eetoksen kanssa.

Avainsanat Lean-johtaminen, Jatkuva parantaminen, Pohjoismainen hyvinvointivaltio, HUS, Terveydenhuollon johtaminen

Acknowledgments

We would like the express our gratitude to all those who have supported us throughout the journey of writing this thesis. First and foremost, we would like to thank our thesis supervisor, Sami Itani, for his invaluable guidance, encouragement, and support. His expertise and ideas have been instrumental in shaping this work.

We are also grateful to all the interviewees who contributed their time and knowledge, particularly the staff at HUS and the Lean consultants from Kaizen Institute, for sharing their insights and experiences.

We also wish to thank our families, grandparents, and friends for their support throughout the thesis process. Your encouragement and understanding have been invaluable.

Lastly, the authors of this thesis would like to extend their appreciation to each other. Our teamwork and dedication have been key to completing this thesis.

Thank you all for your support and contributions.

Emma Pettersson & Rasmus Paavola

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

Healthcare organizations around the world are facing pressure to improve their operations amidst rising healthcare demands and evolving societal needs (Poksinska, 2010). In response, healthcare organizations are implementing a variety of improvement methodologies and frameworks adapted from the private business sector, one of these being Lean management (Radnor, Holweg & Waring, 2012). Noted for its universal coverage and public nature (Vuorenkoski et al., 2008), the Finnish public healthcare sector is currently facing major challenges with staffing shortages, increasing demand, and budget constraints (Tynkkynen, L et al., 2023; Lehto & Malkamäki, 2023). In 2023 under Sanna Marin's government, the Finnish healthcare system underwent a systematic reform, aimed at improving equal nationwide healthcare and establishing a sustainable cost structure, setting a contemporary backdrop for exploring if and how Lean methodologies can be adapted and applied in a public healthcare setting within a Nordic welfare state.

The study begins with an in-depth literature review, providing a comprehensive understanding of the theoretical underpinnings of the Nordic welfare state and Lean management through the history of management paradigms, followed by the application of Lean in the healthcare care sector. The literature review will also explore the potential of Lean principles supporting the foundations of the public healthcare sector, aiming for improved efficiency, quality, service delivery, and financial savings. Additionally, a review of currently available research on the topic is provided, to set the context for the research of this thesis. The review will identify the key characteristics of each theme and provide a basis for the theoretical framework.

Through a qualitative case study methodology, the empirical research section of this thesis focuses on HUS (Hospital District of Helsinki and Uusimaa) as a case example of Lean implementation within a public healthcare organization in Finland. Semi-structured interviews with varying levels of HUS management and external Lean consultants are performed to gather empirical data on the perceived applicability, effectiveness, and adaptability of the Lean methodology in the context of Finland's evolving public healthcare industry. The findings aim to present practicalities and alignment of Lean methodologies with the objectives of the Nordic welfare state ethos.

1.2 Research Problems

Current studies have shown both positive and negative results of the implementation of Lean across various sectors, including the healthcare industry (Tlapa et al., 2022). Despite the shared methodology across hospitals around the world, studies on the effectiveness of Lean in the public healthcare sector are debated (Radnor, Holweg & Waring, 2012). Furthermore, the Nordic welfare state, through its defining characteristics, provides a unique context to explore the synergy of Lean management and the Nordic welfare state ethos.

This study therefore examines the emergence and use of Lean management methodologies in a Nordic welfare state setting, more specifically in the Finnish public healthcare system. The study aims to develop an understanding of if and how Lean methodologies could be used to enhance the operational efficiency and performance of public organizations within a Nordic welfare state setting.

To generate a more comprehensive view of the Finnish healthcare context, a variety of healthcare professionals with leadership experience will be interviewed along with Lean consultants. This variety will provide a more diverse image of the implementation of Lean practices in different healthcare settings in Finland.

1.3 Research Questions

The study aims to explore the following research questions:

1. How does Lean management align with the Nordic welfare state ethos?
2. Can Lean management principles be effectively applied to enhance operational efficiency and performance in the public Finnish healthcare sector?
3. What are the factors promoting and inhibiting the use of Lean in the public healthcare sector?

1.4 Research Objectives

The objectives of this study are the following:

1. To assess the compatibility of Lean management in relation to the welfare state ethos.
2. Explore the emergence of Lean management in the public sector healthcare in Finland post-healthcare reform.
3. To contribute to academic research on Lean Healthcare in a research setting that has been underexplored to date.

2 LITERATURE REVIEW

2.1 Introduction

This literature review aims to critically analyze the existing literature on the Nordic welfare state, Lean management, and public healthcare. Primarily, the goal is to uncover the alignments and conflicts of the welfare state and Lean management ethos in the context of healthcare. The purpose of the literature review is to develop a theoretical framework that underpins empirical research.

As a starting point, the paper will expand on the emergence of the Nordic welfare state through historical and socio-political lenses. The review highlights the characteristics of the social-democratic welfare state with a focus on the Nordic system used in Finland. Furthermore, the paper outlines the context and underlying causes of the current welfare state crisis. Subsequently, the importance of healthcare function in a welfare state will be discussed.

The second part of the literature review will introduce the Lean management methodology. Starting with the philosophy and history of Lean management, the paper will explore the different Management paradigms leading to the emergence of Lean. Lastly, a literature review will be performed on current research available on the topic of Lean in Nordic Welfare State Healthcare. This will provide a basis for the current state of research on the topic, further uncovering the research gap at hand.

To conclude, this literature review is structured to narrow the focus from the boarder notion of the welfare state and Lean methodologies to the use of Lean in the Nordic welfare states. The traditional literature review framework will be used, as the focus is on identifying key trends from the available research and analyzing the findings and limitations of these publications.

2.2 Introduction to the Nordic Welfare State Model

This section of the literature review will give an overview of the welfare state in general, leading to the Nordic welfare state. First, the historical and political underpinnings will be discussed, followed by Esping-Andersen's typology of the welfare states. The characteristics of the Nordic welfare state will be further analyzed to enhance the understanding of the Finnish welfare model. Secondly, this section will uncover the causes of the welfare state crisis to set the context for the empirical research. Lastly, the vitality of healthcare as a welfare state function will be discussed and analyzed in further detail.

Wilensky (1974) states that “the essence of the welfare state is government-protected minimum standards of income, nutrition, health, housing, and education, assured to every citizen as a political right, not as charity”. Sinn’s (1995) allocative point of view describes the welfare state's main function to be the reduction of private risk and increase of insurance through redistributing resources gained from progressive taxation. In practice, the system distributes resources from the fortunate to the less fortunate. Progressive taxation guarantees the availability of funds to finance public services. The safety provided by the welfare state encourages risk-taking which otherwise would not be possible without the safety net of the provided social welfare programs. Sinn (1995) brings up two perspectives for consideration. Initially, it is argued that the most important function of the welfare state is to decrease the risk factor to encourage citizens to take part in profitable activities they would otherwise not engage in. On the contrary, policymakers are concerned, that safeguarded by the welfare system, individuals undertake excessive risk (ibid).

After World War II, Western capitalist countries increased their expenditure on public welfare (Quadagno, 1987). The reasoning for the emergence of welfare states post-war is debated (ibid). However, three theories arise from the literature by Janowitz (1979, cited in Quadagno, 1987), the first one being the availability of reallocatable economic surplus provided by the economic development post-war. Secondly, the adopted Keynesian economic principles supported the reasoning for the welfare state. These principles inherently promoted government intervention in the economy to support demand and social welfare. Lastly, during wartime, governments grew increasingly centralized, increasing the power and capabilities to effectively implement welfare programs. Wilensky (1974, p.8) in his book “The Welfare State and Equality: Structural and Ideological Roots of Public Expenditures” argues similarly to Janowitz (1979, cited in Quadagno, 1987) by concluding that “the economic growth and its demographic and bureaucratic outcomes are the root cause of the general emergence of the welfare state”.

A limited number of nations implemented welfare state models before World War II, the first one being a social insurance model in Germany (Quadagno, 1987). However, most comparable attempts at a welfare state could be categorized as relief systems to alleviate poverty rather than a welfare state program (ibid). After World War II, welfare states emerged in multiple Western nations in a more systematic manner, providing universal benefits and a standard of living (ibid). The Beverage Report published in 1942 outlined a bold strategy for social security in England and became one of the most influential testaments for the future of the welfare states (Abel-Smith, 1992). Although the Beverage Report failed to fulfill its promises, it subsequently inspired leaders across nation borders to develop what now is called the “welfare state” (ibid). The Beverage Report introduced five themes that were later adopted by several nations (Abel-Smith, 1992):

- Universal social security for all citizens
- Unifying the social fund contributes to enhanced equity
- **Universal healthcare**
- Active labor market policy to combat unemployment
- National minimum income

The welfare state model has since continued to evolve, through globalization, economic crises, and demographic changes. For example, Greve (2020) highlights in his work “Welfare and the Welfare State: Central Issues Now and in the Future” the need for modern welfare states to adapt to new social risks posed by the aging population, globalization, and Europeanization. He argues that welfare policies must adapt to focus on social investment and sustainability in order to remain viable in the 21st century. Brady et al. (2007) further discuss the evolution of welfare states, arguing that the increased economic interdependence has forced welfare states to evolve to support a more flexible labor market while continuing to support and provide a safety net for its citizens. The various challenges faced by modern welfare states will be further discussed in section 2.2.2.

The United States, despite its economic dominance, did not apply the European welfare state model. Under President Roosevelt in the 1930s, the New Deal introduced several social paradigms into the United States. However, these did not lead to the comprehensive welfare state seen in Europe. Scholars attribute this divergence to the stronger emphasis on individualism and market solutions over state intervention in the unique political and institutional context of the US. The emphasis on market-based solutions, deeply rooted in the American political culture, prioritized individual responsibility and limited government intervention. (Hacker, 2002)

In contrast, the Nordic European countries embraced more extensive government intervention and universal social rights after World War II. The idea of the government as a guarantor of social welfare was supported and heavily influenced by Keynesian economics. Keynesian principles advocated for government intervention to manage economic cycles and price stability, crucial in shaping the post-war welfare states in Europe. (Jahan et al. 2014)

The post-war economic recovery in Europe, characterized by substantial government spending and social programs and infrastructure, was in contrast with the United States, where private interests and market solutions were prioritized over state intervention. These historical and philosophical differences highlight the distinct paths taken by Europe and the United States in developing their welfare states.

2.2.1 The Nordic Welfare State Ethos

The "Three Worlds of Welfare" by Esping-Andersen (1990) introduces a well-known but debated typology for modern welfare systems (Ferragine E. & Seeleib-Kaiser M., 2011). The philosophical underpinnings of the three dominant political movements from the 20th century are considered to have influenced Espin-Andersen's (1990) categorization. The dominant political movements included liberalism, Christian democracy, and social democracy (Ferragine E. & Seeleib-Kaiser M., 2011). Liberal welfare states are characterized by minimal intervention of the state, market dominance, private provision, low decommodification, and high social stratification (Espin-Andersen, 1990). Christian democratic welfare states are grounded on subsidiarity and dominated by social insurance schemes, with medium decommodification and high social stratification (ibid). A Social democratic welfare state is identified by the universalism of benefits, government intervention in the economy, low social stratification, high autonomy, and high decommodification (ibid). The Nordic welfare state model is classified as a specific realization of the social democratic welfare state model, tailored to the contexts of the Nordic countries, often cited as the successful implementation of social democratic welfare policies, balancing social welfare with economic efficiency (Imsen, Blossing, & Moos, 2017; Svendsen & Svendsen, 2015). A comprehensive analysis of different typologies by Ferragine and Eeleib-Kaiser (2011) also takes a clear stand on the classicization of Finland's welfare system to be socially democratic.

Building on the foundational understanding of the welfare state model in Finland, the next section will delve into a more focused examination of the Nordic welfare state model, leading into the importance of public healthcare as a foundational aspect of the system. The Nordic welfare state model is an iteration of the broader welfare state concept, exemplifying a distinct approach to welfare through extensive and universal provisions (Kuhnle, 2019). The previously discussed historical evolution of the welfare state, as explored through the works of Wilensky (1974) and Sinn (1994), together with the post-WW II expansion of welfare policies set a strong base for understanding the particular ethos of the Nordic model. Building on the general principles of the welfare state model, the Nordic model emphasizes universal social security, equitable social policies, and healthcare, adapting to the specific social, economic, and cultural contexts of the Nordic countries; Denmark, Norway, Iceland, Sweden, and Finland (Marklund, 2017). The following section will dive deeper into the foundations and principles of the Nordic welfare state model, presenting its unique characteristics and attributes.

Standing as a distinct paradigm among other global welfare models, the Nordic welfare state model has been notified for its particularly extensive social protection, elevated level of equality, and prosperous economic performance (Kuhnle, 2019). The model can be collectively identified amongst literature to be characterized through five foundational principles, contributing to its distinctiveness and success. These principles are state-centricity, universal coverage & social security, distribution of wealth through progressive taxation, emphasis on quality & social inclusion, and high quality of life & well-being (Petersen, 2018; Thomsen, 2016; Greve et al., 2020; Kujala & Danielsbacka, 2018; Kuhnle, 2019).

State-centricity

First and foremost, the Nordic welfare state model is based on the extensive presence of the public sector and state in the welfare arrangements (Kuhnle, 2019). The relationship between the state and the citizens is positive, acting “as an agency through which society can reform” (Korpi, 1978). The role of the state is seen in various forms, through public services, public employment, and different tax-based benefit schemes. It is important to note that smaller local municipalities organize most social services, creating an intimate relationship between the decision-makers and the people (Kuhnle, 2019).

Universal Coverage & Social Security

A cornerstone of the Nordic model, universal access, represents a foundational commitment to providing all citizens, regardless of socio-economic status, a broad range of social services and benefits, including for example universal healthcare (Petersen, 2018; Kuhnle, 2019; Greve, 2007). Furthermore, this extends to the provision of education and social security, establishing a safety net for the citizens that supports them from “cradle to grave” (Kuhnle, 2019). This approach not only cultivates social stability but reduces social divergence and fosters equal opportunities for all citizens (ibid). In the Nordic model, the universalistic approach emphasizes access to essential services as a fundamental right of every citizen, rather than a privilege controlled by an individual’s circumstances. This principle has significantly contributed to the ability to maintain great levels of social trust, equality, and cohesion and set the Nordic countries apart in international comparisons of other welfare states (Kuisma, 2007; Antikainen, 2006).

Distribution of Wealth

Funding the extensive welfare provisions is done through the principle of progressive taxation, an integral part of the sustainability and fairness of the Nordic welfare state. The implemented tax system, where an individual’s ability to pay determines their tax rate, is an underpinning of the financial architecture of the model and allows the countries to sustain the high level of public services and social benefits, crucial in maintaining a high standard of living (Thomsen, 2016). This distribution of wealth aligns with the welfare state’s principle of fairness and simultaneously supports economic efficiency, minimizing inequalities and supporting social cohesion (Kuisma, 2007). Progressive taxation is often linked to high global rankings of social welfare, quality of life, and equality (Greve, 2007).

Equality & Social Inclusion

Trademarking the Nordic welfare state model is its emphasis on equality and social inclusion, which aims to minimize economic inequalities and create a cohesive social structure. This is ensured by allowing equal opportunities across all sectors of life and facilitating citizen participation in cultural, political, and social activities (Greve et al., 2020). The dedication to equality is further exemplified through an especially high focus on gender equality, where relative to the rest of the world, significant efforts are devoted to ensuring that equal opportunities and rights are granted to everyone, regardless of their gender. The progressive stance on gender equality sets the Nordic countries apart on the global stage (Lavrentsova, 2021). Through progressive practices and policies, the Nordic countries have designed a model that reflects social justice and equality, where all citizens are given equal opportunity to thrive (ibid).

High Quality of Life and Well-being

Lastly, a focus on securing a high quality of life and well-being for all citizens is a central principle of the Nordic welfare state model. The comprehensive welfare services provided for all, with universal healthcare and preventative care being significant components of all Nordic welfare states, are linked to being key contributors to the Nordic countries ranking amongst the highest in overall happiness (Martela et al., 2020).

2.2.2 Challenges for the Nordic Welfare States

While the Nordic Welfare state model is renowned for its comprehensive social security, high extent of public services, and comprehensive social security, it is also facing a myriad of challenges. Moran (2000) outlines the four integral elements that have contributed to the welfare state crisis: the changes in demography, the evolving labor market, the globalized economy, and increased Europeanization. The challenges are multifaceted with criticism often evolving around economic efficiency and the sustainability of the comprehensive welfare provisions. While Moran's (2000) paper focuses on the overall welfare state crisis, the points are proven to still be prevailing, according to Czarny's (2017) paper "Problems and Challenges of the Nordic "Welfare States".

Aging Demography

The declining birth rates and increased life expectancy in the Nordic Countries have led to overall aging of the population, reducing the workforce, and overloading the public healthcare system (Timonen & Kautto, 2014; Tynkkynen et al. 2022). The demographic of the citizens has changed radically since the introduction of the welfare state programs post

World War II, seeing a steady increase in the median age since 1950 (Moran, 2000). This has increased the demand for healthcare and long-term care, resulting in increased financial pressure on the welfare system. Additionally, the ratio between individuals typically outside of the labor force (aged 65+) to those typically in the labor force (aged 15 – 65), or in other words the old-age dependency ratio, is rising with the aging demography. This means, that an increasingly smaller portion of the population is supporting the larger retired population, further increasing the financial pressure on the Nordic welfare states (Väänänen, 2023).

Labor Markets

Welfare states were originally built on the notion of industrialization to support the challenges arising from it specifically. However, since then industrialized nations have matured and experienced a paradigm shift towards service employment. The service sector does not see as much productivity growth as manufacturing, and productivity growth is what helps economies expand without increasing costs proportionately (Moran, 2000). Paul Pierson (1998) suggests this phenomenon increases the difficulty of nations to fund expansive welfare programs. Simultaneously welfare states are growing to cover more services, inevitably leading to increased spending. Moran (2000) describes this problem as "irresistible forces, immovable objects", where the gap between the financial demands of the welfare programs and the economic ability of the nations is constantly increasing.

Globalization

Further complicating the economic landscape of the Nordic welfare states are the effects of globalization and internationalization of the economy, making economies increasingly vulnerable to changes in the international economy, as proven by the recent global financial crisis (Kuhnle, 2019). Large companies now operate internationally and are not only influential in the countries they are based in, but in all countries, they operate in. This has decreased the power of national governments and shifted it to certain larger MNCs. This challenges the capabilities of welfare states to regulate and tax all economic activity within their borders (Moran, 2000).

Europeanization

Europeanization presents its unique set of challenges for the Nordic welfare states. The member countries of the European Union must adhere to the broader economic and regulatory frameworks set by the EU, while simultaneously maintaining their distinctive welfare models. The European single market model emphasizes the free movement of goods, services, capital, and labor, imposing constraints on member countries' individual fiscal policies. Additionally, the EU sets an economic governance framework on budget deficit and debt levels, which may conflict with the Nordic fiscal policies required to sustain a generous welfare program (Moran, 2000).

It is crucial to understand that the Nordic Model is not static but rather continuously reforming and evolving to adapt to the changing economic, demographic, and political challenges. While it is evident that the Nordic welfare states have been through their ups and downs, they have proven to be relatively robust in the long-term perspective (Kuhnle, 2019). A relatively high citizen trust in the government and government institutions speaks as proof of the legitimacy of the Nordic welfare state construction.

2.2.3 Universal Healthcare

To answer the question 'What has all this to do with the universal healthcare systems in the Nordic countries?', Moran (2000) states:

"Making sense of what is happening to the health-care state is critical to making sense of what is happening to modern welfare state" - Moran (2000)

Moran (2000), in the paper "Understanding the Welfare State: The Case of Health Care", outlines four dominant viewpoints that further prove the major contribution of healthcare in the welfare state:

1. Healthcare is a major part of the countries' resource consumption
2. The healthcare system employs a large percentage of the population
3. Healthcare has played a central role in the historical development of the welfare states

4. Healthcare affects each citizen of the welfare state on a personal level

While Moran (2000) discusses welfare states in general, the viewpoints are especially true in the Nordic welfare states, where universally available healthcare plays a uniquely centric role in providing comprehensive and equal welfare services to all citizens. With the government of Finland spending 10 percent of its GDP on universal healthcare in 2023 (OECD, 2023), the public healthcare system is one of the most resource-heavy aspects of the prevailing welfare state model in Finland.

2.2.4 Finnish Public Healthcare Sector

The global healthcare landscape can be divided into two predominant models: public and private healthcare systems. The difference between these two systems reaches beyond purely operational differences in financing, management, and delivery, to the core philosophy of the healthcare provision of the country. Healthcare can be seen as a fundamental right of the citizens or a service governed by market principles and the financial capabilities of each individual. The underlying ethos of public healthcare is that access to healthcare is a fundamental right of the citizens, whereas private healthcare systems operate on business-driven incentives. The differences between these models raise questions about the optimal approach to healthcare, that balances quality, access, and efficiency. Furthermore, a broader discussion on social, economic, and ethical implications in response to the evolving societal needs arises. This section will elaborate on the nature of the Finnish healthcare industry, more specifically the public sector. The recent healthcare reform and its goals will be discussed in further detail.

Finland has deployed the Beveridge-type healthcare system model in a highly centralized manner (Klavus et al., 2012). The Finnish government funds nationwide healthcare for all residents through revenue generated from general taxation (ibid). In addition to the public healthcare sector, Finland has private-sector service providers (Reponen et al., 2021). However, in the Finnish system, the public sector has the primary responsibility for healthcare, whereas private and third sectors act as complimentary services (Soteuudistus, 2023).

In January 2023, the Finnish public health, social, and rescue services experienced a significant reform by Sanna Marin's government. This reform established a new level of governance, where

Finland’s social, healthcare, and rescue services were consolidated from municipality levels to 21 separate well-being service counties. The goal of the reform was to ensure the availability of equal healthcare nationwide and provide a more sustainable cost structure. The aging population increases the need for services and lowers the tax revenues aimed at sustaining the Beveridge-type healthcare system. (Soteuudistus.fi, 2023).

The reform integrates primary and special care services to manage well-being service counties. The system had previously 195 health and social service departments and 22 rescue departments (Soteuudistus.fi, 2023). After the reform, the public healthcare services include 21 health, social, and rescue organizations and the Hospital District of Helsinki and Uusimaa (ibid). Furthermore, the country has five collaborative areas that divide the specialized service responsibilities (ibid). HUS (Healthcare Authority in Helsinki and Uusimaa), being the largest healthcare organization in Finland, serves approximately 2.2 million residents. HUS operations remained largely unaffected due to a special status given to the Helsinki and Uusimaa area (HUS, 2023).

2.3 Lean Management

This section will introduce leadership and management paradigms, leading up to Lean management. Then, Lean management will be discussed in greater detail, both historically and later in the context of the healthcare setting.

2.3.1 Evolution of Leadership Theories

To preface the literature review on the popularized Lean Management, as the basis of the research, this section will first examine the development of international paradigms of management from the early 1900s to today. After this, the paper will dive deeper into various process management techniques, before delving into Lean Management. Lean Management will be discussed through various ways of understanding the concept and different Lean tools and techniques presented in the literature. The section will conclude with an overview of the current literature on the subject.

Management Paradigms

A writing by Thomas Kuhn (1962) “The Structure of Scientific Revolutions”, is considered to be one of the most influential pieces on the evolution of the philosophy of science. In his work, Kuhn describes science as not evolving linearly through the accumulation of knowledge, but rather undergoing periodic revolutions, called “paradigm shifts”. Since Kuhn’s time, the concept of paradigms has expanded and been adopted in managerial sciences. However, Clarke and Clegg (2000) discuss in their text “Management Paradigms for the New Millenium”, that paradigms are more contentious than established in management sciences, as the field is characterized by several competing paradigms simultaneously. The cruciality of understanding and adapting to the paradigm shifts is highlighted by the rapidly evolving technological, social, and economic environments (Clarke & Clegg, 2000).

From the literature on management paradigms, five main paradigms of the twentieth century can be drawn; scientific management (1900 ->), human relations (1923 ->), structural analyses (1955 ->), organizational culture (1980 ->) and innovation theories (2000 ->) (Barley & Kunda, 1992; Abrahamsson & Brege 1997; Seeck & Kuokkanen 2008).

In Finland, the different management paradigms were adopted relatively late, after the World War II, together with the industrialization of the country and the development of the welfare state (Seeck & Kuokkanen, 2008). Different paradigms have simultaneously been present throughout the decades after the war (ibid). This can be seen through the different management theories implemented throughout organizations, literature, and educational programs (Seeck & Laakso, 2010).

Process Management

In the 1980s, the rapid technological improvements and shift in the operating environment forced private and public organizations to start thinking of new and innovative management theories to ensure competitiveness. One of these theories was process management, described by Elzinga et al. (1995) as “a systematic, structured approach to analyze, improve, control, and manage processes with the aim of improving the quality of products and services.” The concept originates from Michael Porter’s (1985) value chain model and W. Edwards Deming’s (2000) value stream mapping (Porter, 1985; Deming, 2000).

Business Process is defined as follows: “A business process is the combination of a set of activities within an enterprise with a structure describing their logical order and dependence whose objective is to produce a desired result" (Aguilar-Savén, 2004). Business Process Management can be analyzed through the lens of an organization's strategy and vision, organizational structure, customer value, operational control, coordination of activities, organizational learning, and organizational culture (Armistead, Pritchard & Machin, 1999). While separate, these viewpoints are all interconnected and influence what kind of process management culture an organization adopts (ibid). Next, the most common theories in process management are briefly described. This section aims to present the key approaches and methodologies that have shaped process management as we know it today.

The oldest of the theories in process management is Total Quality Control (TQC), invented in the 1950s in Japan. In 1961, Toyota Motors started implementing TQC in their everyday manufacturing operations, making the term internationally known as the Toyota Production System (TPS) (Liker, 2006). Through a management paradigm shift in the 1980s a new theory, Total Quality Management (TQM), was born. The key goal of TQM is to develop the organization through increased quality and competitiveness at lower costs (Deming, 2000; Oppenheim, 2011). The idea of the quality of a product or service refers to the ability to satisfy customer needs, the continuous improvement of processes, and the avoidance of mistakes (Hietschold, Reinhardt & Gurtner, 2014).

A popular process management theory originating in the 20th century, more specifically the 1980s and 1990s, is the Quality Management System (QMS), also known as the Service Management System (SMS). Grounded in the internationally accepted ISO standard, the SMS originally used the term "quality system" to describe all organization's quality-related activity. Over time, this shifted to a more process-oriented approach, to manage both operations and quality within an organization, evolving from "quality system" to "quality management" (Chountalas & Lagodimos, 2018). The latest ISO standards, the ISO 9001, was released in 2015 and it aims to encourage ongoing business operations and focus on increasing customer satisfaction levels. Achieving the ISO quality certificate requires the successful completion of regular external assessments or audits. In Finland, the Finnish Standards Association directs and coordinates the ISO standardization (SFS, 2024). Since the mid-1990s, the ISO standard has seen a significant surge in interest and has continued to be driven by periodic updates to the international standards (Chountalas & Lagodimos, 2018).

Business Process Redesign/Re-engineering (BPR), introduced in 1990 by Hammer, Davenport, and Short, aims for radical change through restructuring key processes of an operation, resulting in cost savings, improved quality, service, or speed of production (Zairi & Sinclair, 1995). BPR can be implemented on various levels, from integrating functions within one company to restructuring processes over several companies or even redesigning a company's core business (Hannus, 1994). Supporting BPR, are a variety of methods, tools, and techniques, including process modeling, change management, IT utilization, benchmarking, process and customer-oriented thinking, and industrial production process development methods (Zairi & Sinclair 1995). Research on BPR has been dwindling in the 2000s and has since not stayed as active as in other process management areas.

Lean Management

The term ”Lean”, was first published in a 1988 thesis “Triumph of the Lean Production System” by John F. Krafcik from MIT Sloan School of Management. In the thesis, “Lean” is used to describe the difference between Western manufacturing production systems and the then-new and innovative Japanese Toyota Production System. In the 1950s, Taiichi Ohno, a Japanese industrial engineer and businessman needed to overcome the economic crisis of the Japanese automotive industry, as he noticed that American car manufacturers were capable of producing nine times more vehicles than Toyota's production system in the same period of time (Leyh, Martin & Schaffer, 2017). As a result, Toyota took measures to create a leaner production system and established the idea of “Do More With Less” (ibid). The new Toyota Production System (TPS) demonstrated significant success, elevating efficiency and reducing waste, ultimately making Toyota a major player in the global automotive industry (Collins & Muthusamy, 2007). In 1990, the Toyota Production System was introduced to the world by James P. Womack's book, “The Machine That Changed the World”, which provided an alternative solution to mass-production, practiced at the time by companies such as Ford. The core idea of the TPS was to acquire the highest possible efficiency and quality with minimum use of resources by focusing on waste elimination, continuous improvement, inventory reduction, improved productivity, capacity maximization, and employee empowerment (Wilson, 2015).

In 1987, Motorola, a multinational telecommunications company, published the Lean Six Sigma quality improvement program based on the continuous improvement of operations through Lean methods. Lean Six Sigma aims at improving the quality of a product or service, improving lead times, operational cost efficiency, and customer satisfaction. More specifically in Lean Six Sigma, the waste, and variation in processes are reduced through DMAIC (Define, Measure, Analyze, Improve, and Control) analysis method (Ahmed, Manaf & Islam, 2013). The research in Lean Six Sigma started in the early 2000s and has continued to the present (Chountalas & Lagodimos, 2018). On top of the manufacturing industry, the healthcare industry has seen a growing interest in the research of Lean, Six Sigma, and Lean Six Sigma since the mid-2000s, and the volume of research has increased rapidly in the 2010s (Henrique & Godinho Filho, 2020).

Since emerging from manufacturing, Lean has been adapted to a variety of industries. While the core of the concept remains at elimination of waste and process improvement, the application throughout industries varies significantly, presenting a diverse array of perspectives and understandings.

Lean as a Philosophy

Many papers reference Lean as a philosophy, including Womack and Jones (1998), who describe Lean as an overall systematic approach to identifying and eliminating waste through continuous improvement by creating a flow of products at the pull of the customer, and pursuing perfection. An underpinning of the philosophical approach to Lean is a cultural shift within an organization, where creating value for the customer, and employee empowerment are paramount. The cultural shift also equates to a shift towards a culture of continuous improvement, inherent to everyone within the organization (Like, 2004).

Lean as a Set of Practices and Tools

Lean is also often referred to as a set of tools and practices that aim for operational excellence. These practices include tools like 5S (sort, set in order, shine, standardize, sustain), Kaizen, VSM, etc., that are used to streamline processes, reduce variability in production, and improve quality. In healthcare, the same tools can be applied to reduce waiting times, improve patient flow, and eliminate errors (Toussaint and Berry, 2013). In the literature currently available on Lean, it is apparent that the interpretations of the concept have considerable variation amongst authors. The academic narratives differ in defining Lean, categorizing it as an approach, a practice, a system, a philosophy, a set of principles, a model, a process, or a methodology. The need for a more unified definition of the concept in varying industries is discussed across the literature.

2.3.2 The House of Lean

This section will delve deeper into Lean Management, to give the reader a better understanding of the process management theory discussed in this research paper. The House of Lean will be used to visualize and better explain the concepts within the methodology, before discussing the varying perceptions and interpretations of the concept of Lean.

Throughout the years, the Lean paradigm has been described and depicted in various ways in different literature. The most common of these depictions is the House of Lean (Figure 1.0), introduced by Jeffry Liker in his 2004 paper "Toyota Way: 14 Management Principles from the World's Greatest Manufacturer". The House of Lean presents the Toyota Production System and its key components as a system, where everything is balanced and operates in unison to achieve an organization's set goals and objectives. More specifically, the organization's operating philosophy, management, and production are all integrated in synergy to create a unified whole (Liker & Morgan 2006).

At the heart of the House of Lean are people and teamwork, the elimination of waste, and Kaizen, or the continuous improvement (CI) of operations. The values and operating philosophy lie as the foundation for all activities and are the cornerstone of the House. This framework highlights the importance of human-centric management practices integrated with the strategic objectives of an organization to cultivate a culture committed to efficiency and continuous improvement (Liker, 2004; Liker & Morgan, 2006). Lean management is shared management where each individual has the responsibility to improve their work and the community, in order to achieve higher quality and customer satisfaction (Huntington, 2018).

Kaizen, a centric concept in the Lean house, has varying definitions across literature. Directly, the phrase translates from Japanese to "change for the better". In Japanese culture, kaizen is a state of mind or a philosophy. The process of continuous improvement relates to each employee and is practiced in problem-solving through various Lean methodologies (Liker & Morgan, 2006). The concept can, however, be viewed from multiple other perspectives as well, either from a managerial top-down or a more employee- or team-centric down-top approach through smaller continuous improvement ideas (Macpherson, 2015). Kaye and Anderson in their 1999 paper "Continuous improvement: The ten essential criteria", list the ten key elements of continuous improvement as follows:

1. Support and commitment from top management
2. Engagement of people in CI
3. Focus on customer needs
4. Integrating CI with the organization's strategic goals beyond departmental boundaries
5. Establishing a culture of CI and engagement
6. People focus
7. Focus on critical processes
8. Standardization and documentation of improvements as a part of quality control
9. Measuring outcomes with an effective feedback system
10. Learning from the results and sharing experiences

Through these criteria, the level of integration of continuous improvement within an organization can be measured and evaluated (Kaye & Anderson, 1999). Through Kaizen and CI, an organization keeps striving for perfection and keeps improving its processes towards the best quality, shortest lead time, lowest costs, and highest personnel morale. This makes Lean an endless loop of waste elimination and improvement in customer satisfaction, better explained in section 2.3.3. "Lean Principles" (Liker & Morgan, 2006).

The control of production is based on visual management, meaning the visualization of information and data to guide key operational processes. Visual management relates to ensuring quality and operations and preventing errors. Some of the most common tools for management visualization include checklists, the Fishbone diagram (Ishikawa, 1953), depicting cause-and-effect relationships, and the Pareto diagram, used for statistical process control (Eaidgah et al., 2016). The standardization of processes and workers' tasks is considered by Taiichi Ohno (1990) to be the most critical principle in industrial production control.

As an example of the benefits of visual management, a study at The University of Texas MD Anderson Cancer Center used Kamishibi Cards, or K-Cards to standardize their processes, increasing patient engagement and promoting staff identification of barriers and solutions. This study found improvements in nurse-sensitive indicators and patient experience metrics, indicating a positive impact from the introduced visual management technique. (Salinas, Villamin & Gallardo, 2021).

Supporting the House of Lean are two pillars, depicting the timeliness of operations (Just-in-Time) and quality assurance (JIDOKA). The timeliness of operations, also referred to as Just-in-Time (JIT) ensures that a product or service and the required resources are delivered precisely when needed – not too late or too early. The aim is to create a seamless continuous flow between work processes, employing the concept of a pull system. A pull system is a control method where products are manufactured and delivered to the manufacturer only when they are needed by a customer or the next phase of the process, meeting just the right need. This prevents the accumulation of excessive inventory and the associated additional costs. Similarly, in a service business like healthcare, services are delivered to customers only upon request or at the precise moment they are needed, ensuring optimal efficiency and responsiveness. This prevents the accumulation of excessive inventory and the associated additional costs. The concept of “takt time” is a way of measuring and planning the production speed relative to demand. (Liker & Morgan, 2006).

On the other pillar lies quality assurance, or Jidoka, ensuring the prevention of errors and problem mitigation. For problem prevention, it is essential to notice and make the problems visible before they arise in the process or in the end product or service. Every employee or personnel that is a part of the process has an active duty to notice and report any problems. Again, visual tools may be used to enhance the reporting of these problems. The number of errors, mistakes, second quality products, work as key indicators directing continuous improvement of the quality of the process, product, and/or service. (Liker, 2004; Liker & Morgan, 2006)

To achieve both timely (JIT) and error-free (Jidoka) production, a standardization of the process is crucial. This also includes reducing variation and waste, or muda, in operations as well as balancing production, or Heijunka. A leveled production simply means a balanced volume of production and the required resources, including personnel workload, materials, etc. in relation to the true demand. (Liker & Morgan, 2006)

The concept of Lean thinking was brought to the western manufacturing industry in the 1980s (Womack & Jones, 2003), and later in the 2000s into the healthcare industry. Originally, Great Britain's National Health Service and the U.S. Join Commission started recommending the implementation of Lean in healthcare services, to increase value for patients and control costs (D'Andreamatteo et al., 2015).

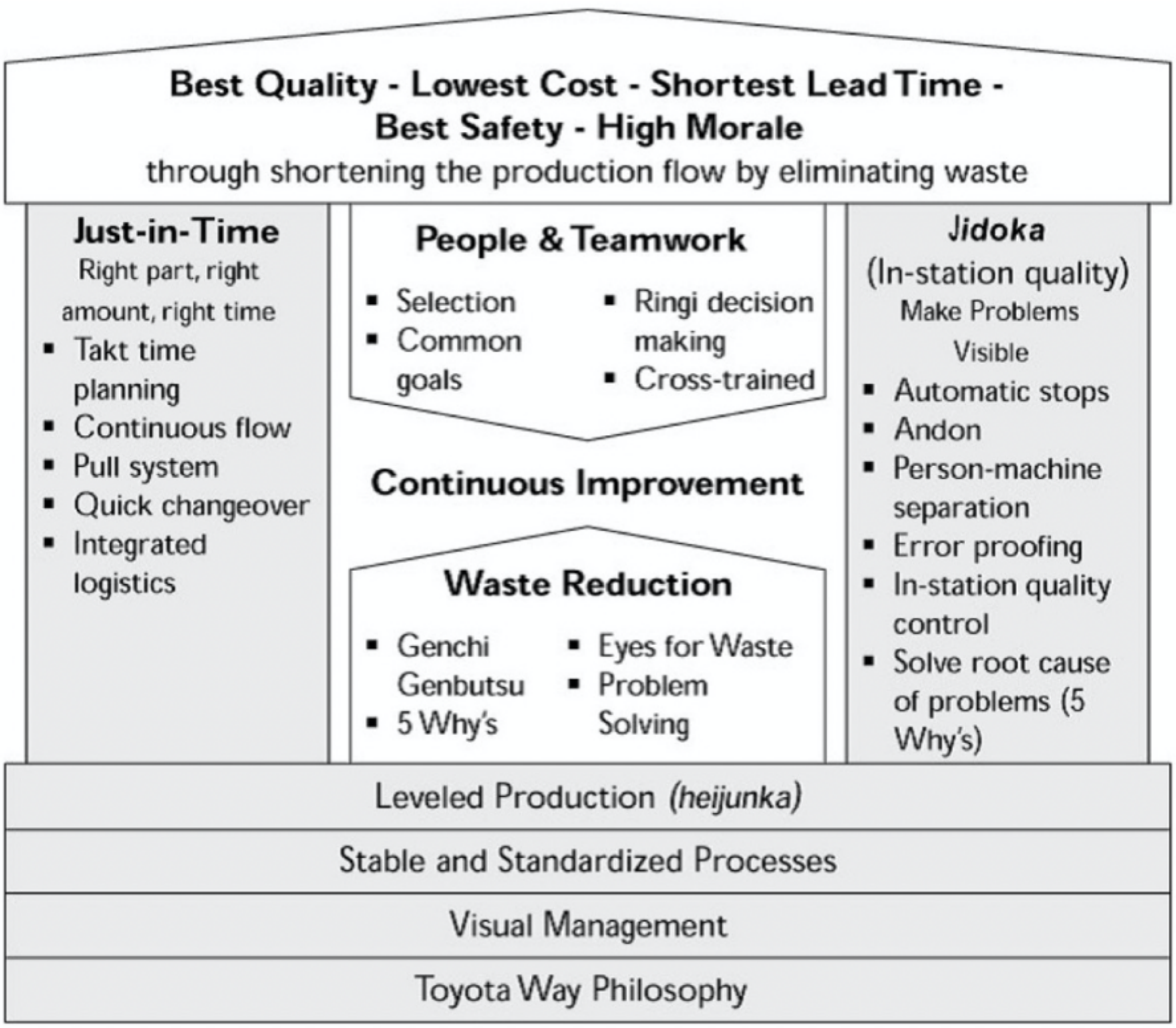


Figure 1.0 (Womack & Jones, 2003)

2.3.3 Lean Principles

According to Womack and Jones (2003), implementing Lean thinking into an organization's operational culture can be divided into five Lean principles (Figure 2.0). The principles present the identification and elimination of waste and act as reference points for process organizing through Lean.

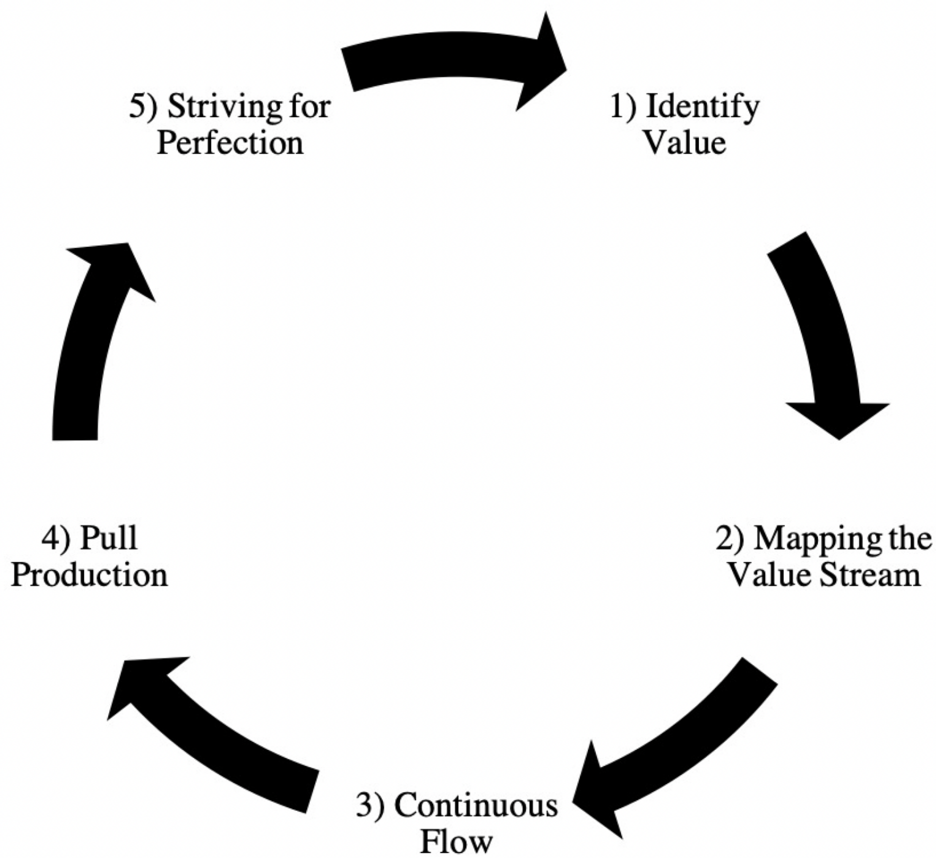


Figure 2.0: The five cycling actions for Lean Implementation (Malavesi et al., 2017)

Identifying value from the perspective of the customer and not the organization is the first step of the waste elimination process. It is crucial to understand the customer's perspective and not only the convenience of the organization. Tools like Brainstorming or Quality Function Deployment (QFD) are often used in this step. The customer often does not want to finance various sources of waste like waiting time, transportation, rework, etc., increasing the importance of waste recognition and elimination. (Liker, 2006)

Value Stream Mapping (VSM) is a fundamental Lean concept, as described by Womack and Jones (2003). A graphical depiction of the flow of materials and information is used to identify where value for the customer is generated, parts that are non-value-adding yet essential, and lastly the waste activities, not contributing to the customer value (Wilson, 2015). This is a pivotal tool for streamlining operations and highlighting areas for improvement (Cerfolio et al., 2016).

Continuous Flow establishes the remaining value-adding steps of the process into a flow without interferences or disturbances. Anything stopping the flow of a process is a waste. Taiichi Ohno describes this phase as the waste elimination phase, recognizing seven forms of waste (or "muda" in Japanese). An additional eighth is described in later literature as wasted human potential (Sharma & Khatri, 2021). The following is a list of the eight different forms of waste, as described in current literature:

1. Overproduction
2. Waiting
3. Transport
4. Overprocessing
5. Inventory
6. Motion
7. Defects
8. Wasted Human Potential

For example, Hagan (2011), after conducting a study at Seattle Children's Hospital, says that most actions and sections of processes do not generate value for customers (patients), stating "of the work conducted by health-care practitioners, 95 percent has no value to the patients they serve", suggesting a great opportunity for enhancing the operations.

Pull production, or pull system, the opposite of the more traditional push production ensures that production is being pulled by the true market demand. An ideal system would be one, where only what is being ordered is produced, eliminating any need for inventory (Spearman et al., 1992).

Striving for perfection, the last and possibly the most critical stage of Lean implementation, focuses on observing and maintaining the previous four stages, remaining as Lean as possible. This process should continuously be improving, as there is no end to the process of reducing efforts, time, errors, or space (Osti, 2020). Malavasi (2016) describes perfection in a Lean perspective to be like infinity:

"Reaching it is actually impossible, but the effort to do so inspires and provides a direction essential to make progress along the path."

2.4 Lean in Healthcare

Healthcare organizations have traditionally sought to increase operational productivity through enhancing the use of resources and overall effective resource management, differing from the more customer and personnel-centric Lean management approach. On top of resource efficiency and personnel efficiency, Lean focuses on the efficiency of flow. The efficiency of flow is traditionally measured by process cycle times, which can be enhanced by designing and organizing production capacity to match precise demand and its fluctuations (Modig, Åhlström & Tillman, 2013). In healthcare, Lean is more focused on the reduction of variability in operations, through standardization or productization of treatment paths and processes for similar patient cohorts. Various approaches to process management have been utilized in healthcare organizations internationally since the 1990s (Antony, 2019).

While the concept of Lean thinking was brought to the Western manufacturing industry in the 1980s (Womack & Jones 2003), it was not until later in the 2000s that it was introduced to the healthcare industry. Originally, Great Britain's National Health Service and the U.S. Joint Commission started recommending the implementation of Lean in healthcare services, to increase value for patients and control costs (D'Andreamatteo et al., 2015). Mazzocato et al. (2010, p.377) in their realistic literature review identified that the Lean approach has been primarily used in cases where the organization has "a need/willingness to improve the organizational performance, unclear procedures, and staff unaware of problems, workarounds, multi-professional and hierarchical organizations, status differences, physician autonomy, inconsistent team communication, and a culture of blame". Kruskal et al. (2012) add that Lean management has been used to reduce clinical and technical errors, waiting times, and costs while simultaneously improving patient outcomes, productivity, and staff and patient satisfaction. However, DelliFraine, Langabeer, and Nembhard (2010) conclude that there are still significant gaps in the literature on whether Lean management improves the quality of healthcare or provides additional cost savings, which calls for future research in the field of Lean Healthcare. Furthermore, the reported failures of Lean implementation are limited, which raises questions on potential bias (DelliFraine, Langabeer & Nembhard, 2010).

Moreover, as the utilization of Lean Management has increased, the need for a clear definition for the method in a healthcare setting has become apparent (Rotter et al., 2019). The definitions for Lean Management in operational management are debated, with D'Andreamatteo, Ianni, Lega, & Sargiacomo (2015, p.11) arguing that especially in the field of healthcare "-- it appears in literature to exist a lack of uniformity in the theoretical conceptualization of Lean. By reviewing the literature, it seems that everything may be Lean --." To fill this gap in the literature, Rotter et al. (2019) developed an operational definition of Lean Management in healthcare. Their (Rotter et al., 2019) definition sets an internationally recognized standard for the utilization of the term Lean Management in the healthcare context. The definition proposes, that from the following framework (figure 3.0) constructed based on the work by Rotter et al. (2019), the organization is expected to use Lean Philosophy and utilize at least one Lean activity. This section of the literature review will introduce Lean management in healthcare settings through Figure 3.0.

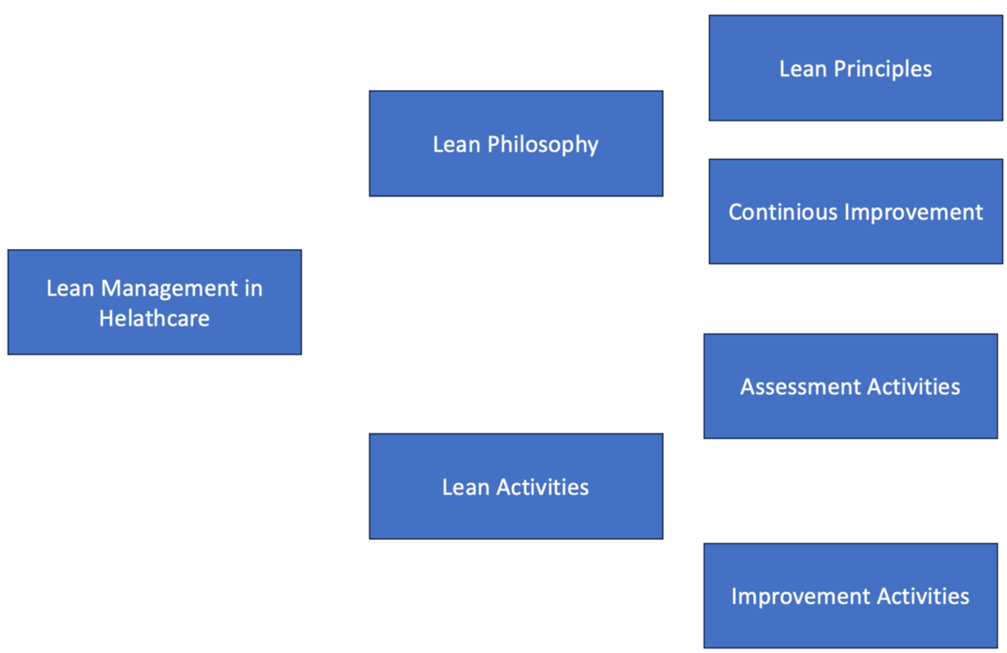


Figure 3.0: Definition of Lean Healthcare adapted from Rotter et al. (2019)

2.4.1 Lean Philosophy in Healthcare

Rotter et al. (2019) propose the first part of Lean management in healthcare to be Lean Philosophy defined as "a set of ideas at the center of Lean". The philosophy can be further divided into two parts: Lean Principles and Continuous Improvement (ibid). It is argued that a healthcare organization must implement these to define its operations as Lean (ibid). This section introduces the aforementioned parts in more detail.

However, before implementing the Lean approach it is crucial to lay the foundation. Lean transformation should be seen as a continuous journey rather than a goal to be achieved. The "True North" is a concept that sets an ambitious horizon where the organization aims to go, which is followed by a set of strategic goals. The engagement and commitment of staff from all levels is also an integral part of the transformation that should not be overlooked. In addition to engagement, the Lean approach highlights the importance of respect and open dialogue amongst all staff, preferably through top-down management. In contrast, healthcare is known for high hierarchical structures, division of work, and silos, which presents unique pitfalls in Lean implementation. To conclude, it is clear from the literature that to implement the Lean approach successfully, the organization must define its North Star and strategic goals, engage and respect all staff members, and ensure internal consensus. Lastly, before the organization undertakes Lean transformation, it is essential to assess its current state. (Kruskal et al., 2012)

Lean principles in healthcare

Kruskal et al., (2012) list the basic Lean principles to be as follows:

1. Equal involvement of and respect for all staff
2. Observation and analysis of processes where they occur; going to the Gemba
3. Elimination of all forms of waste, including any steps in a process that do not add value
4. Standardization of work to minimize variations
5. Improvement of the flow of all processes in a system
6. Use of visual cues to communicate and inform
7. Adding value for the customer

8. Application of lean tools to collect and analyze data, improve processes, and create and sustain change

Rotter et al. (2019) narrow down the concept of Lean Principles to the elimination of waste, adding value to the customer, and improvement of flow, while addressing the other items in the following sections. Lean principles are not short-term goals to be implemented overnight. Rather, the process calls for life-long commitment and continuous iterations and learning (Kruskal et al., 2012; Mazzocato et al., 2010).

Continuous Improvement in Healthcare

According to Rotter et al. (2019), Continuous improvement in healthcare refers to acknowledging that Lean is not a single intervention or a single operational shift, but rather ongoing efforts and interventions that aim to improve the system as a whole. Additionally, they describe continuous improvement to be sufficient when a healthcare organization has a dedicated Lean team or unit and/or the organization has conducted at least two quality improvement projects (Rotter et al., 2019)

2.4.2 Lean Activities in Healthcare

Rotter et al. (2019) divided Lean activities in healthcare into two different categories: Lean assessment activities and Lean improvement activities. Notably, this classification can be debated due to the overlapping characteristics of certain activities. This section will provide an overview of the popular activities in each category with practical examples from the literature.

Lean assessment activities

1. A3

A3 is a Lean tool used for structured problem-solving and results-reporting. The document "guides the team through the event, serves as a reporting template for the event's activities, and is a living document that is periodically refreshed after implementation" (Biffl et al., 2011, p.101). A3 has 9 blocks with different functions in the following order (ibid):

Block 1: Description of reason for action

Block 2: Description of the initial state, includes metrics and process map

Block 3: Description of the desired future state after waste removal

Block 4: Gap analysis between the initial state and future state

Block 5: Brainstorming summary of solutions for the gap

Block 6: Experiments to validate solutions

Block 7: Implementation plan at the task-level

Block 8: Confirmed state through clear metrics

Block 9: Insights and observation to facilitate learning

Biffl et al. (2011) in their article "Leaning the process of Venous Thromboembolism Prophylaxis" studied Denver Health Medical Center's A3 adaptation. In their case, despite significant investment in low molecular weight heparin (LMWH) the hospital was experiencing above average amount of postoperative venous thromboembolism (VTE). The research concluded increased compliance with standards after the implementation of A3, resulting in the reduction of incidences of VTE and the use of LMWH. Furthermore, the reduction of LMWH lead to significant financial savings for the hospital. Biffl et al. (2011) argue that using A3 is crucial for a successful healthcare adaptation.

2. Gemba Walk

Gemba walk is the activity of direct observation of the process location for assessment purposes (Chiodo et al., 2012). Kruskal et al. (2012) encourage teams to regularly visit the locations where the value-adding work takes place. The goal of this activity is to identify sources of complaints, get information on the work environment, talk to the staff, and observe the overall flow of improvement opportunities (ibid). Chiodo et al. (2012) studied a case where a University Hospitals' rehabilitation unit was experiencing a bottleneck which resulted in long throughput times. The team used Gemba walks to identify the bottle neck to be slow discharge time, due to the findings the team was able to address the issue and eventually meet their target where 70% of the patients received care in the same day (ibid).

3. RPIW

Rapid Progress Improvement Workshop originates from the Virginia Mason Medical Center where the Toyota Production System methodology was first applied in the healthcare context to improve patient safety and care. The system called Virginia Mason Production System (VMPS) utilized Lean management to add value to the customers through waste reduction. VMPS uses Rapid Progress Improvement Workshops to drive change in the organization, more specifically “a short-term, in-depth application of Virgin Mason Production System tools to improve process or systems” (Atkinson and Mukaetova-Ladinska, 2021, p.329). In these typically five-day workshops, front-line employees and managers use Lean tools to assess the current state of the process and identify improvement areas. Ideally, the team discovers ways to eliminate waste and optimize the flow of processes. The study conducted by Atkinson and Mukaetova-Ladinska (2012) found improvements in access and quality of mental health services for the elderly after the implementation of RPIW.

4. VSM

Value Stream Mapping (VMP) is often used to understand patient flow and throughput (Kruskal et al., 2012). VMP of a patient flow details “the event location, personnel, and information technology requirements, alternative pathways, key performance elements at each step, and bottlenecks” (Cima et al., 2011, p.86). VMP also distinguishes which steps are value-adding and non-value-adding steps (Jimmerson, Weber, and Sobek, 2005). The relevant streams from the value stream map are identified by multidisciplinary teams and redesigned through waste reduction (Cima et al., 2011).

Cima et al. (2011) studied the surgical process value stream mapping starting from the decision to have surgery until the patient discharge aimed at increasing the operating room efficiency. VMP helped the team to identify improvement opportunities which resulted in reduced overtime, financial benefits, and improved operating room efficiency (ibid).

5. 5S

The 5S approach stands for sorting, straightening, scrubbing, systematizing, and standardizing. It describes five sets of tasks that promote and sustain order in the workplace. The

5S have been found especially advantageous in cases where organization is lacking (Kruskal et al., 2012). Cankovic et al. (2009) introduced a successful Lean intervention in the preanalytical process at the Molecular Diagnostic laboratory, which included a 5S exercise to organize and eliminate non-value-adding elements in the working environment.

Lean improvement activities

1. **Stop the Line Technique**

   According to Furman and Caplan (2007, p.378), when implementing the Stop the Line technique "The goal is to detect and fix every safety hazard (mistake) as soon as it occurs, thus preventing the hazard from creating more serious harm downstream. Stopping the line can mean stopping a person as well as a process." The article emphasizes the importance of culture when implementing these approaches, the staff should feel safe and heard when reporting errors. Furthermore, it is as crucial that the process is stopped until corresponding changes are made to correct the reported mistakes.

   The Virginia Mason Medical Center adopted the patient safety alert system (PSA) to implement this technique in hopes of reducing errors. The PSA meant a "24-hour hotline" for patient safety specialists open for all staff members for reporting. Furman and Caplan (2007) concluded that in the Virginia Mason Medical Center "The PSA system has proven to be the single most important tool to make our care safer."

2. **Leveled Production**

   Leveled production refers to the optimization of resources to improve flow in a pull type of manner. Morrison et al. (2011) studied the optimization of inpatient phlebotomy timeliness in the morning rounds through staffing remodel. A leveled production approach was utilized to improve efficiency and decrease delays by optimizing the staffing model to match the demand. After the implementation, the median time for blood collection was 17 minutes earlier than before, and the amount of associated safety complaints decreased by 80%.

3. **DVM**

   One of the key Lean activities is to visualize the work through visual indicators that guide the staff in different situations. These situations can include, for example, instructions on how to complete tasks and how to respond to issues or visual labels on items and their place. O'Neill and Jones (2011, p.550) recorded that in a nursing process "Work was made visual and standard through the implementation of a visual reordering system, a standardized process for restocking the medication carts, and the use of ''Do Not Interrupt'' vests during the medication rounds to deter interruptions." These changes aimed to redirect the focus of work to the fundamentals of care (ibid).

4. **Standard Work**

   Standardization of processes is used for multiple reasons, the key ones being the reduction of errors and the increase of throughput and performance (Kruskal et al., 2012). In particular, checklists and flowcharts are identified to be useful for the standardization of work (ibid). Kruskal et al. (2012) studied Lean implementation that included standardization work at the radiology department. The chosen standardization method was a mandatory time-out routine consisting of a series of pre-determined questions to staff and patients. The time-out routine initiated a pause just before the procedure, which helped staff to limit variation and reduce errors.

2.5 Research on Lean in Nordic Welfare State Healthcare

This section will give an understanding of the available literature on the topic of Lean in healthcare in the Nordic welfare states. The Nordic welfare states include Finland, Norway, Sweden, Denmark and Iceland. While the healthcare systems are operationally different, the ethos of the welfare states is shared among the Nordic countries in which the systems operate in (Kuhnle, 2019). The goal of this literature review is to uncover the emerging themes and findings of the available literature on the utilization of Lean in public healthcare. Furthermore, this section aims to identify gaps and limitations in the current literature.

A Boolean search is performed to find the relevant literature: lean AND (healthcare OR Hospital) AND (Finland OR Finnish). A similar search is conducted for each of the five countries. The Boolean search revealed 29 articles which were analyzed further with the following criterion:

The criterion for selection:

- The publication focuses on lean in healthcare
- The research is located in a Nordic Welfare state
- The full English version of the research is available and open access

The systematic literature selection was completed in three phases. The first phase consisted of a Boolean search that resulted in 29 articles (n = 29) from four Nordic countries. These articles were then reviewed based on the above selection criterion and duplicates were deleted, 15 articles (n = 15) passed the selection. In the last phase, each article was evaluated based on the relevance of the content for this research. The last phase resulted in 14 articles (n = 14).

Study	Purpose	Methods	Findings	Limitations
Tiirinki et al. (2016), "LEAN thinking in Finnish healthcare", Finland.	To evaluate Lean as a management and development tool in Finnish public healthcare.	A mixed-method approach, including Webropol survey.	- Lean is in its infancy in the Finnish system. - Lean is primarily used for financial benefit and efficiency improvement. - Due to positive results, the system is ready for a deeper Lean implementation.	- Age of the study - Limited coverage and over-representation of only a few organizations
Reponen et al. (2021), Validation of the Lean Healthcare Implementation Self-Assessment Instrument (LHISI) in the Finnish healthcare context, Finland.	To validate the Lean Healthcare Implementation Self-Assessment Instrument (LHISI) within the Finnish healthcare context.	The LHISI survey was sent to over 26,000 employees of the HUS. The data was analyzed through exploratory and confirmatory factor analysis.	- The results indicated that the 43 items used in the original LHISI can be reduced to 25 items, and these items measure a five-dimensional model of the progress of Lean implementation.	- 23% response rate - Data collection only in Finland, the results may not be directly generalizable to healthcare organizations operating in other countries.
Aho & Mankki (2023), 11. Lean management and hybrid masculinization–a case study from Finnish healthcare, Finland.	To investigate how lean management combines masculine and feminine practices in Finnish healthcare, creating "hybrid masculinization."	Analysis of 11 interviews with lean management experts conducted between 2019 and 2020.	- Nuanced blending of gendered expressions through Lean management practices, which both sustain patriarchal dynamics and enhance capitalist frameworks in the Finnish healthcare sector.	- Focus on lean experts' interpretations of lean management's applicability to healthcare and its gendered effects. - The perspectives of healthcare workers are not sufficiently studied.

Reponen et al. (2021), The cross-national applicability of lean implementation measures and hospital performance measures: a case study of Finland and the USA, Finland.	To enhance the understanding of the opportunities and limitations of cross-national benchmarking of lean in hospitals.	The exploratory case study used quantitative comparisons of data from HUS and Helsinki University Hospital in addition to 75 academic hospitals in the US.	- Nearly 90% of the items developed for a US survey were relevant and available from HUS. - Clinical outcomes do not exhibit significant variation between different health-care models, the operational and financial aspects show more significant differences.	- Differences in reporting and coding systems cannot be excluded. - The results are not directly generalizable to other countries.
Ruohomäki, Reijula & Reijula (2017), Evaluating lean thinking and facility design in two university hospitals, Finland.	This analyzes experiences and effects of Lean implementation in hospitals. Emphasizing the facility design process.	Semi-structure interviews and questionnaires in two university hospitals.	- Promising evidence to support the implementation of Lean in the healthcare sector for improving facility design and work processes.	- The age of the study
Edwards, & Nielsen (2011), Improving Healthcare through Lean Management: Experiences from the Danish healthcare system, Denmark.	The purpose of this study is to test 4 hypotheses related to barriers of Lean management implementation in the healthcare sector.	Empirical research from four case studies over one year.	- Multiple processes were identified to be unsuited for Lean implementation "due to the reactive nature of the work", therefore it is suggested to carefully assess "where the prerequisites of lean can be satisfied".	- This paper does not address the gap on how Lean management should be modified to better fit the healthcare sector.
Safi et al. (2023), FRAM and LEAN as tools for describing and improving the referral process between outpatient clinics in a Danish Hospital: Complementary or conflicting?, Denmark.	This study aimed to understand and improve the referral process between internal medicine outpatient clinics at the University Hospital of Southern Denmark, by utilizing RE and LEAN principles.	The data was gathered from diverse sources: interviews, observations, a VSM workshop and registry data on referrals.	- FRAM and VSM methodologies successfully facilitated the identification of quality improvement initiatives. - The study expands the understanding of FRAM and VSM for process optimization.	-The study focused on a single hospital, which limits the generalizability of findings.
Mazzocato et al. (2012), How does lean work in emergency care? A case study of a lean-inspired intervention at the Astrid Lindgren Children's hospital, Stockholm, Sweden.	This study analyzes a lean-inspired intervention in a Swedish pediatric A&E department to expand the understanding of Lean interventions.	A mixed methods explanatory single case study design.	- The study increases the understanding of how lean-inspired changes improved care process management. - Improvements in waiting and lead times were achieved and sustained.	- Study was unable to pinpoint the effect of specific components related to the Lean-inspired intervention.

Holden et al. (2015), Healthcare workers' perceptions of lean: A context-sensitive, mixed methods study in three Swedish hospitals, Sweden.	This mixed methods study researched how hospital employees' perceptions of lean varied in three Swedish hospitals.	This mixed methodology study utilized: standardized surveys, individual interviews, group interviews, and observations.	- Perception of Lean differed based on the hospital - Higher-acuity units reporting more favorable perceptions than others - Nurses reported more favorable perceptions than physicians.	- The study claims to be limited in its ability to draw causal inferences - The study was limited to employee perceptions of Lean
Ulhassan et al. (2013). Antecedents and Characteristics of Lean Thinking Implementation in a Swedish Hospital. Quality Management in Health Care, Sweden.	This study researched the rationale and evolution of Lean adaptation in a cardiology department.	This is an explanatory single case study based on semi- structured interviews, nonparticipant observations, and document studies.	- Contextual factors influence the choice of Lean tools and the sustainability of the change. - Use of Lean varied based on employee's perception of the need for change. - Work redesign, teamwork, and problem-solving were found useful.	- According to the researchers the presence of self-reported data creates limitations.
Lindskog, Halvarsson & Brännmark (2013), Sustainable Development Work (Lean) in Swedish Healthcare: A longitudinal and quantitative study concerning effects of goal settings on participation, Sweden.	The study examines the sustainability of Lean in Swedish healthcare.	The data collection was done through a longitudinal survey: a baseline study and a follow-up study. Approximately 1000 respondents from two Swedish university hospitals participated in the research	- The findings report that organizational formal structures impact the perceived participation and sustainability of Lean. - The study suggests that organizational preconditions are essential when working with Lean.	- Additional follow-up studies are suggested.
Kahm & Ingelsson (2019), Creating a development force in Swedish healthcare, Sweden.	This study investigate first-line healthcare managers' views on their role and ability to utilize Lean.	This study issued a survey for all first-line managers in the studied organization.	- First-line managers role is crucial in improvement work, - The time allocated for Lean work is not sufficient. - Time, support and clear vision were reported to be key success factors.	- More in-depth intervention is suggested.

Antony et al. (2019), An exploratory study into the use of lean six sigma to reduce medication errors in the Norwegian public healthcare context, Norway.	The purpose of this study is to explore how Lean Six Sigma has been utilized in the Norwegian public healthcare context to reduce medication errors.	A mixed method approach: A survey questionnaire for 38 healthcare professionals and semi-structured interviews with 12 healthcare professionals.	- The implementation of Lean Six Sigma is still in its infancy. - Possible challenges are identified: a lack of top management support, lack of LSS training and coaching, and a lack of awareness around the benefits.	- Healthcare professionals from all health regions in Norway were not reached.
Antonsen & Bye (2020). Line managers and employees use of lean task boards in Norwegian municipal healthcare sector: a tool for action learning?, Norway.	The study analyzes the line managers and employees' use of lean task boards over time in Norwegian municipalities using action learning theory.	Qualitative case study data from a Norwegian municipality: 750 internal self-recorded logs from task board sessions and 25 semi-structured interviews.	- The task board helps line managers to make employees responsible for forwarding ideas, solutions and implementation of new actions.	- This study only covered one municipal.

Lean healthcare studies in the Nordic welfare states are relatively scarce with only 14 articles fitting the given criterion. The emerging topics of the literature include the use of Lean for cost savings and efficiency (Tiirinki et al., 2016), the use of Lean in specific healthcare settings (Antony et al., 2019; Ulhassan et al., 2013; Antonsen & Bye, 2020; Mazzocato et al., 2012; Safi et al., 2023; Ruohomäki, Reijula & Reijula, 2017), perceptions of Lean (Holden et al., 2015) and barriers of Lean implementation (Edwards & Nielsen, 2011). Individual studies with unique angles focused on the cross-national benchmarking for Lean (Reponen et al., 2021), Lean practices and gender (Aho & Mankki, 2023), and validation of Lean Healthcare Implementation Self-Assessment Instrument (Reponen et al., 2021). The studies were conducted between 2011 and 2023. Sweden (n = 5) ja Finland (n =4) had the most amount of research, while Denmark (n = 2), Norway (n = 2) and Iceland (n = 0) had the least. The studies use an array of different methodologies, preferencing case studies and surveys. The following section will expand on the notable themes of the available research.

Challenges for Healthcare

Tiirinki et al.'s (2016) study was the first in Finland to assess Lean as a management tool in the public healthcare setting. Similarly to the previously mentioned Nordic welfare state healthcare issues, Tiirinki et al. (2016) also identified the increased cost of healthcare, the aging population, and talent acquisition issues already in 2016. At that time, the respondents in Tiirinki et al.'s (2016) study highlighted the need to change the current healthcare processes. Later in 2023, Aho and Mankki (p.136) also point out how Lean "- has become an attractive model for the healthcare sector, which is struggling to solve managerial, resource, quality, and economic challenges" indicating that similar issues are still relevant to this day.

Interest in the Implementation of Lean in Healthcare

The study by Tiirinki et al. (2016) concluded that the use of Lean in Finnish healthcare was still at its infancy in 2016. However, Lean's awareness was high, and its perceived benefits lay in the patient processes. The study identified positive experiences related to Lean implementation which indicated future potential for deeper Lean adaptation. Consequently, 84 percent of respondents indicated interest in implementing Lean, with the primary reasons reported to be productivity and financial savings. Simultaneously, the study reports the lack of data and systematic reporting to support the notion of significant financial savings after adaptation. However, experiences and expectations related to Lean were positive amongst the respondents indicating a possible increase of adaptation in the future. Tiirinki et al. (2016, p.28) also recognize the pressure of cost savings and increased efficiency admits the Finnish healthcare reform and proposes "deeper and more systematic implementation of Lean in healthcare and more educated Lean experts especially in primary care organizations."

Enablers of Lean Healthcare

Management and staff commitment were described as one of the primary enablers for successful lean implementation (Tiirinki et al., 2016) and sustainability (Ulhassan et al., 2013). Ulhassan et al.'s (2013) study found that history in quality improvement implementation was not correlated to the success of Lean sustainability. Rather, context, implementation, and intervention design had a larger impact on Lean sustainability over time. Especially, leadership support and staff problem-solving were found to promote sustainable change (Ulhassan et al., 2013).

Kahm and Ingelsson (2019) also studied factors that influence the use of Lean in line manager's daily tasks. The importance of the line manager's role in improvement work is recognized but simultaneously the time allocated for it is limited. The study (ibid) highlights the need for time, support, and defined goals in improvement work for successful implementation. Furthermore, Lindskog, Halvarsson, & Brännmark (2013) found that follow-ups on set goals are linked to increased learning which promotes the sustainability of Lean.

A recent study by Safi et al. (2023) evaluated the combination of the Functional Resonance Analysis Method (FRAM) and Lean for the Danish hospital referral process. The implementation process identified organizational factors that could eliminate one-third of internal referrals. The study provided practical lessons that could be implemented in various improvement projects. Firstly, and similarly to Ulhassan et al. (2013) and Kahm & Ingelsson (2019), leader support and employee engagement were found to be key factors for success at all organization and process levels. Secondly, change that leads to work reduction is possible (ibid). Third, it is vital to provide the findings and data in an actionable format (ibid). Lastly, improvement projects can be overwhelming to the stakeholders and the key is to set boundaries (ibid).

Challenges in Integration

Despite the positive outlook on Lean in healthcare, the study by Tiirinki et al. (2016, p.26) found that 50,8% of physicians and 20,3% of nurses resisted development projects, the most common reason being "the will to maintain old ways of doing things (36.4 per cent)." Similarly, Holden et al. (2016) found that nurses preferred Lean more than physicians.

Edwards & Nielsen (2011) research four hypotheses for barriers in Lean healthcare implementation in Denmark. Three hypotheses were confirmed based on the case: there is a lack of understanding of Lean, the nature of healthcare work hinders the adaptation, and the diverse views on customer value create barriers. The study (Edwards & Nielsen, 2011, p.3) suggests a "transformative" and contingent approach to Lean management where "the universal principles of Lean philosophy are respected, but the tools and concepts within the Lean toolbox are adapted to specific contexts of healthcare." Tiirinki et al. (2016) found that Lean activities are more often utilized than the entire philosophy, due to the challenging nature of the implementation.

Some of the healthcare functions are argued by Edwards and Nielsen (2011) to be unsuitable to be combined with Lean due to the reactive nature of the tasks. The study recognizes the opportunities of Lean in certain areas of healthcare but deems it inappropriate for others. "It is suggested the successful implementation of lean requires a transformative approach to lean where the basic assumptions within lean and within healthcare are challenged. There clearly is a strong need to go beyond the standard approach to Lean known from industrial production.” (Edwards and Nielsen, 2011, p.24)

The study by Ruohomäki, Reijula and Reijula, (2017, p.194) also identified challenges in Lean implementation related to “poor communication between employees; leadership and work process improvement needs; waste in, for example, certain hospital bottlenecks logistics and inventory management needs; dispersed hospital units/silos; and the need for a more dynamic organization.” However, it is added that these issues can be overcome by utilizing Lean in everyday work.

Employee involvement and commitment are reportedly the most significant challenges since these require employees to change their mindset and put additional effort into their daily work. Incorporating continuous improvement while performing daily tasks is considered to increase workload. The paper also argues that “thinking outside the box” is not natural in the healthcare environment and the process is additionally hindered by traditional hierarchies. Despite these findings, the study encourages the use of Lean. (Ruohomäki, Reijula and Reijula, 2017, p.194)

Norwegian public healthcare has introduced Lean as a way to reduce medical errors in daily work. However, at the time of the study, the implementation was at its infancy due to various implementation challenges. Additional three inhibiting factors were identified: “a lack of top management support, lack of LSS training and coaching, and a lack of awareness around the benefits of LSS in healthcare” (Antony et al., 2019, p.2) Similarly, the study by Mazzocato et al. (2012, p.1) listed inhibiting factors such as “a mismatch between job tasks, licensing constraints, and competence; a perception of being monitored, and discomfort with inter-professional collaboration.”

Aho & Mankki (2023) outline the contrast between the widely, in the Western healthcare sector, adopted New Public Management (NPM) market-based management style from the 1980s and Lean management. Lean Management, also originating from the private sector, challenges the NPM-thinking by focusing on process flow and team-based leadership over resource efficiency, which would naturally lead to resource optimization. In contrast, the article also brings to light criticism of Lean management by questioning its applicability to the public sector, false promises of staff involvement, and execution difficulties. A crucial angle to consider when implementing Lean management, studied by Aho & Mankki (2023), is the evident devaluation of work, projected in low wages and inexcusable working conditions, in the heavily female-dominant healthcare sector. The study (ibid) argues that the implementation of Lean in a Nordic Welfare state, often characterized as progressive and egalitarian, can reinforce traditional gender roles and continuing patriarchal relations. It is concluded by Aho and Mankki (2023, p.147): "While the hybrid masculinization of lean advocates for the inclusion of feminist potential, lean may become a way to both repeat and obscure the hegemonic gendered and classed power relations - whereby care work is already under-resourced and undervalued as reproductive work - that lie at the heart of capitalist production and the Nordic welfare model, including Finland."

Positive Outcomes

Ruohomäki, Reijula and Reijula (2017) reported early-stage positive result from two public hospital's Lean implementations. Similarly, experiences and expectations related to Lean are positive amongst the respondents in Tiirinki et al., (2016) study indicating possible increase of adaptation in the future. More specifically, Ulhassan et al. (2013) reported that Lean interventions improved staff communication and coordination through Lean encouraged teamwork, which led to better care performance. Furthermore, Antosen and Bye (2020) concluded that Lean task boards were found to be beneficial for managers in chaos elimination and learning promotion. The board aided line managers to empower staff and take part in continuous improvement.

Mazzocato et al. (2012) study in a Swedish Children's hospital emergency care unit reports improvement of 19-24% in waiting and lead times after Lean implementation. The study (Mazzocato et al., 2012, p.1) identified the following success factors related to the use of Lean: "(a) standardized work and reduced ambiguity, (b) connected people who were dependent on one another, (c) enhanced seamless, uninterrupted flow through the process, and (d) empowered staff to investigate problems and to develop countermeasures using a "scientific method."

Importance of Cultural Context

Reponen et al. (2021) cross-national study is based on the notion that the cultural context is highly relevant when assessing Lean implementation. They (Reponen et al. 2021, p.2) highlight aspects such as “cultural beliefs about health and illness, licensing regulations and laws, the way healthcare providers and organizations are paid for their services, the extent and nature of clinicians’ participation in managerial decision-making, and the role of labor unions.” In contrast, while healthcare systems and contexts might vary, large healthcare organizations around the world often battle with similar challenges in Lean implementation. As the majority of Lean Healthcare literature originates from pioneering countries like the US, research in non-pioneering countries is suggested to expand the available literature. Similarly, Holden et al. (2016) and Ulhassan et al. (2013) studies confirm the importance of context when implementing Lean, Holden et al. (2016) suggest further national research.

In conclusion, the literature review reveals both challenges and opportunities of Lean implementation within the varying Nordic welfare state public healthcare systems. While Lean has started to gain traction in addressing cost, efficiency, and quality challenges in some Nordic healthcare systems, the implementation phase raises barriers and resistance due to some healthcare professionals, organizational complexities, and contextual factors. The studies highlight the importance of management and staff commitment and staff engagement as enablers for a successful implementation. Furthermore, the nature of healthcare work, with reactive tasks and complex organization structures may pose some unique challenges to the implementation of Lean methodologies. Lean’s focus on efficiency and resource optimization may undermine the quality of patient care and well-being. Overall, the current studies remain inconclusive on the overall effectiveness of Lean in public healthcare in the Nordic welfare states, leaving a gap for further research.

2.6 Context of the Empirical Research

In order to understand the complex topic of this thesis and preface the empirical research, the literature review provided an overview of the key theoretical frameworks related to the research topic. It examined the current research and academic literature on management paradigms, process management techniques, and the welfare state with a specific focus on the Nordic welfare state, the Finnish welfare system, healthcare, and the application of lean management in healthcare. Additionally, a review of the literature on Lean in healthcare in Nordic welfare states was performed, elaborating on the purpose, methodology, limitations, and main findings of the research currently available on the topic. This was done to further establish the research gap this thesis aims to answer.

Lean management was defined as a process management technique designed to "do more with less" by eliminating waste, improving flow, and including everyone within an organization in continuous improvement to create value for customers, or in the context of healthcare, patients. As the debate on the definition of Lean and Lean Healthcare is an ongoing process, for consistency, Rotter's definition of Lean management in healthcare was chosen as the theoretical framework for this thesis. Rotter et al. (2019), by synthesizing the characteristics of Lean and establishing an operational definition through a comprehensive literature review. They developed an evidence-based operational definition of Lean management in healthcare, identifying two core characteristics of Lean Healthcare: Lean philosophy and Lean activities.

As the objective of this study is to assess the compatibility of Lean management in relation to the Nordic welfare state ethos, explore the emergence of Lean management in the public sector healthcare in Finland and to contribute to the academic research, the findings of the research will be mirrored with the foundational characteristics of the Nordic welfare states. The high level of state intervention, equality, distribution of wealth, social security, and high quality of life and well-being, all central to the Nordic welfare state ethos, provide a critical lens through which the success of Lean management can be viewed through. This research will specifically assess if Lean management methodologies in the healthcare sector align with and contribute to the objectives of the Nordic welfare state model.

Current research on Lean healthcare within the Nordic welfare states, while scarce, provides a landscape of cautious optimism, outlines challenges, and an evolving understanding of the topic. Despite positive outcomes in staff communication, improved process flows, and patient waiting times, a research gap remains in understanding how Lean integrates with the fundamental ethos of the Nordic welfare model.

By drawing the similarities and differences between the Nordic welfare state ethos and Lean, the study will contribute to the ongoing discussion on management strategies in the public sector. The aim is to also offer implications for policy, practice, and future research in public sector management.

3 METHODOLOGY

This section starts by elaborating on the positioning of the study within the interpretivist paradigm and introducing the chosen research methodology. Furthermore, this section provides an understanding of how the sample selection, data analysis method, and research process support the research. Lastly, the limitations of the research are discussed.

3.1 Positioning of the Research

Fraser and Robinson (2004) define paradigms as follows: “A paradigm is a set of beliefs about the way in which the particular problem exists and set of agreements on how such problem can be investigated” (p.59). Kamal (2019) argues that different paradigms convey the set of values and beliefs in which the researchers observe and examine the world. From the research point of view, the paradigms guide the actions of the researchers (ibid). This highlights the importance of elaborating on the underlying paradigms of the research. In addition, Fraser and Robinson (2004) state that understanding the paradigms is crucial for evaluating the limitations and weaknesses of empirical research.

Research paradigms can be divided into four main types: positivism, realism, critical theory, and interpretivism (Young, Housing & Kamarudin, 2021). This research adopts the interpretivist paradigm, which Tashakkori and Teddlie (2003) also refer to as constructivism or naturalism. Young, Husing, and Kamarudin (2021, p. 5859) outline the interpretivist paradigm as follows: “-- interpretivism holds that truth is a particular belief system contained in one specific context. Similar to critical theory, interpretivism enquires about the ideologies and values that lie behind a finding so that reality consists of “multiple realities” that people have in their minds.” From the research point of view, Creswell (2014) states that researchers within interpretivist paradigm aim “to make sense of (or interpret) the meanings others have about the world.” Alharahsheh and Pius (2020) list seven qualities defining research within interpretivist paradigm:

1. The research emphasizes the whole phenomenon rather than specific aspects of it.
2. The research development of questions and problems is influenced by the interest of the researchers.

3. Interviews and discussions are designed to facilitate in-depth conversations about individual experiences.
4. The research utilizes qualitative methodology to gain insights into human experiences.
5. The research emphasizes the value of individual experiences to support scientific research.
6. Researchers gain in-depth insight into experiences beyond general measurements and expectations.
7. The integration of experience within subjects and objects is a key feature in drawing findings.

In order to draw a comprehensive understanding of the paradigm, it is essential to expand on the following components of the paradigm: ontological, epistemological, methodological, and method (Alharahsheh and Pius, 2020). According to Hitchcock and Hughes (1995, p.21): “ontological assumptions will give rise to epistemological assumptions which have methodological implications for the choice of particular data collection techniques,” Therefore, this section will position the study in relation to the interpretivist research paradigm in four parts: ontology, epistemology, methodology and methods.

Ontology, according to Antwi and Hamza (2015), expands on the views concerning the nature of truth and reality. The interpretivist paradigm states that truth is subjective as it is shaped by individual experiences, implying that each perception of reality is unique (ibid). Bunniss’ and Kelly’s (2010) description of the interpretivist paradigm defines that “there is no one ultimate truth”. Therefore, the paradigm emphasizes in-depth examination and individual experiences in order to understand reality (Antwi & Hamza, 2015).

Ontological views on the nature of truth and reality guide epistemological questions about what can be considered knowledge (Antwi & Hamza, 2015). Epistemology explores the validity and nature of knowledge (Kamal, 2019). In qualitative research, the interpretivist researcher views the world as constructed and experienced through social interactions where knowledge is gained through understanding the experiences of individuals (Kamal, 2019). The aim is to gain an understanding of a certain phenomenon rather than provide generalized knowledge of a population (Alharahsheh and Pius, 2020).

Methodology refers to the way of acquiring knowledge (Antwi & Hamza, 2015). Kamal (2019) highlights that the methodology should be aligned with the ontological and epistemological views of the research. According to Antwi and Hamza (2015), research within an interpretivist paradigm benefits from qualitative methodology as it facilitates unique interactions. Furthermore, Saunders, Lewis and Thornhill (2019) state that in cases where the study does not aim to deliver direct results but rather deepen an understanding of a topic or phenomenon, an explorative research method is especially advantageous.

Consequently, researchers within the interpretivist paradigm prefer research methods "which enable rich and detailed, or thick description of social phenomena by encouraging participants to speak freely and understand the investigator's quest for insight into a phenomenon that the participant has experienced." (Antwi & Hamza, 2015, p.219) Interviews, such as semi-structured interviews, are the widely used method for data collection by interpretivist researchers (ibid).

In conclusion, the interpretivist perspective has led the researchers of this thesis to employ a qualitative exploratory research method, utilizing semi-structured interviews. In addition to the alignment with the paradigm, an explorative research method is recommended, according to Cooper (2014), in cases where the research variables are not clearly defined. Due to the infancy of adaptation and limited literature on Lean Healthcare in Finland (Reponen et al., 2021) the nature of this study aligns with Cooper's (2014) criterion for an explorative study.

3.2 Data Collection

Sample selection

The chosen interviewee selection method is purposive sampling. According to Patton (2002) a small sample size can result in significant findings in cases where the interviewees are purposefully selected. Purposive sampling assures that the chosen individuals are information-rich in the area of the study (Cooper, 2014).

The selection criterion for the healthcare interviewees:

1. Role in Healthcare: Currently in a managerial or leadership role in a hospital setting.

2. Experience in a managerial role: A minimum of 5 years of experience in a healthcare-related managerial role.

3. Current employment: Actively working in HUS

The selection criterion for the Lean consultant interviewees:

1. Role in Lean Consulting: Currently in a senior role within a Lean consultancy

2. Experience in a managerial role: Minimum of 10 years of experience in Lean consulting

3. Current employment: Actively working on Lean projects

The above criterion was chosen to ensure that the interviewees had a sufficient level of personal experience and up-to-date knowledge in the field of healthcare management or Lean management. Prior knowledge of Lean management for healthcare professionals is not required since the study also aims to explore the current state of the understanding of the concept. In order to interview HUS employees, the researchers have completed the research permit application process, and HUS has granted approval for the research. The research sample consists of 6 healthcare professionals and 2 lean consultants who meet the criteria.

Interviewee Number / Name	Role	Interview date	Mode of interview	Length of interview
1	Lean professional at HUS	21.3.2024	Online	60 minutes
2	Lean professional at HUS	21.3.2024	Online	60 minutes
3	Director at HUS	2.4.2024	In Person	45 minutes
4	Head Physician at HUS	3.4.2024	Online	60 minutes
5	Nurse Manager at HUS	4.4.2024	Online	60 minutes
6 / Isto Sahi	Lean Consultant	4.4.2024	Online	60 minutes
7	Lean Consultant	13.5.2024	Online	45 minutes
8	HUS Management	21.5.2024	Online	60 minutes

Table 1. Interviewees

Semi-structured interviews

Semi-structured in-depth interviews are the primary data-collection method of this explorative qualitative study. This interview style consists of a set of predetermined open-ended questions.

According to Patton (2002), qualitative research methods like semi-structured interviews can provide in-depth insights, given that the interviewees are information-rich individuals. Furthermore, semi-structured interviews are effective when the collected data is qualitative and open-ended in nature, and the interviewee can freely express their thoughts, feelings and beliefs (De Jonckheere & Vaughn, 2019). Lastly, this research is compliant with the three-point list from Saunders, Lewis and Thornhill (2019) that states the suitable conditions for a semi-structured interview:

1. Broad number of questions
2. Questions are open-ended
3. The order and logic of questions should be changeable

All of the interviews were conducted in-person or online using Microsoft Teams. The participants could choose to use English or Finnish. The interviews were recorded and transcribed for further analysis. The participants could choose to be anonymous to protect their privacy. Meetings were 40 to 90 minutes long to facilitate an in-depth interview setting.

3.3 Data Analysis

In this study, the thematic analysis method is used to analyze the collected data. The method utilizes a bottom-up approach to the data set to identify emerging themes (Braun and Clarke, 2012). Braun and Clarke (2012), describe thematic analysis (TA) as a way to systematically identify, organize, and offer insights into themes emerging in the collected data. They further state that TA allows the researcher to combine collective experiences for a broader image of the subject in question (Braun & Clarke 2012).

The collected data will be directly aligned with the research questions. For example, factors promoting and inhibiting the use of Lean in hospitals will be a key focus. Also, themes related to the effectiveness of Lean management principles will be examined, to understand their impact on operational efficiency in the hospitals.

Steps of the Analyses

1. Data Preparation

- Transcribing interviews accurately in written text
- Removing any participant's personal identifiers to ensure anonymity
- Possible translation of transcription from Finnish to English

2. Data Familiarization
   - Thorough reading of transcripts to gain an in-depth understanding of the content
   - Initial notes on patterns, ideas, and themes that emerge
3. Data Coding
   - Systematically coding areas of interest
   - May include highlighting, color coding, labeling, etc.
   - Grouping the codes in a meaningful way, to gather all the data relevant to each code in the form of a mind map:

Picture 1: Mind map

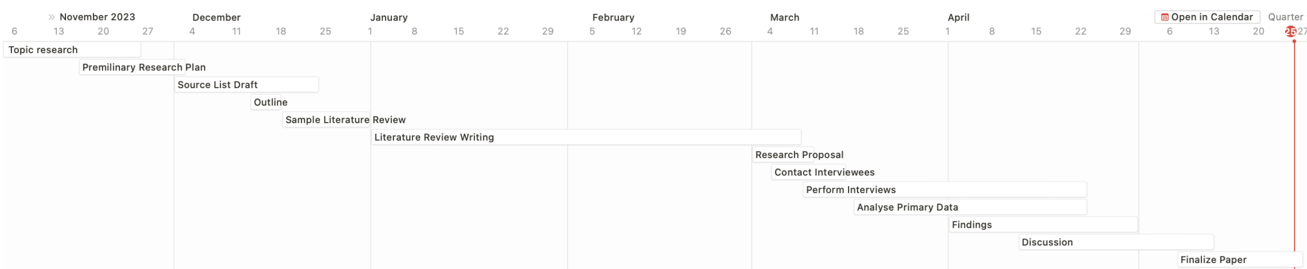
4. Theme Development
   - Defining and naming various emerging themes
   - Reviewing the themes, to ensure the relation to the extracts
5. Analyses and Interpretation
   - Analyzing and interpreting the themes for broader meaning and implications
   - Analyzing the relation to the research questions and literature review
6. Final Report

- Presenting a detailed final report of the findings, demonstrating themes and patterns in relation to the research questions

7. Ensuring Quality and Rigor
   - Reflecting on biases and assumptions that may have influenced the analyses
   - Discuss findings with peers and/or interview participants to ensure correctness and credibility

3.4 Assessment of the Research Process

In this section, the research process and the pair thesis aspect will be analyzed in order to draw attention to the limitations of the study from the process point of view. This study is a 20-credit Master's thesis written in a pair, which should be noted in the evaluation of the study.



Picture 2. Thesis Process Gantt Chart

The above Thesis Process Gantt Chart (Picture 1) illustrates the timeline of the research. The process began in November 2023 with topic research and a preliminary research plan, followed by an outline draft. The literature review process lasted approximately two months, from January 2024 to February 2024. The official research proposal was submitted in early March 2024. The majority of the interviewees were contacted and interviewed by the end of the consecutive month. The primary data was analyzed in tandem during March and April. The completion of the findings and the discussion sections of the study took place through April and mid-May 2024. In addition, the researchers completed the application process for the HUS research permit, which was successfully granted. In total, the research process has lasted seven months, from November 2023 to May 2024. The strict timeline of the 20-credit Master's thesis process imposes limitations on the scope of research.

The researchers chose to write the thesis as a pair, which made it possible to complete the process within the above-introduced timeline. The Global Management program recommended a pair thesis due to the relatively short thesis process time. Lean Healthcare, in relation to the Nordic Welfare state ethos, proposes vast research possibilities; a pair thesis allowed the researchers to choose this topic and complete it within the timeline while maintaining the quality of research.

The division of work was as follows:

Joint effort	Introduction, Methodology, Interviews, Conclusion, HUS research permit, Discussion
Pettersson	Literature review: Lean Healthcare, Research on Lean healthcare in the Nordic Welfare states. Findings: 4.1, 4.2, 4.3
Paavola	Literature review: Nordic Welfare state, Lean Management. Findings: 4.4, 4.5, 4.6, & 4.7

Despite the division of work, both researchers take full responsibility for the research and the final work. The process moved in stages: the larger sections, such as the literature review, were first discussed together, followed by the division of responsibilities. After completing the sections, each reviewed and revised the other's sections. This approach facilitated a continuous review of the work.

The researchers held informal discussions with each other about the topic and process daily to share experiences, findings, and ideas. In addition, as the topic of the research was fairly novel to the researchers, they conducted informative discussions outside the scope of research with industry specialists to gain a deeper understanding and knowledge. As the healthcare sector is not sufficiently covered in the business curriculum, the researchers were incentivized to gather background understanding from healthcare professionals in addition to the available literature during and before the research process to ensure accuracy.

The interpretivist paradigm emphasizes the meaning and context of human experiences. From an interpretivist paradigm point of view, having two researchers is an advantage, especially in data analysis, as two individuals can provide richness to the interpretation as opposed to an individual perspective. In addition, two researchers can challenge each other's views and assumptions, leading to a more nuanced and in-depth interpretation of the data.

On the contrary, as the sections of this research are divided between two individuals the consistency of quality and depth has a possibility to vary based on the person's expertise in the topic. The researchers have aimed to minimize this and possible bias by revising each other's sections. However, a pair thesis requires compromising in the decision-making process, which is not ideal from the research point of view. Additionally, by combining two writing styles it is possible to weaken the delivery of arguments and cohesion of the research. Lastly, competing interests may enforce biases: Paavola has a stronger interest on Lean management regardless of the sector whereas Pettersson has a stronger focus in the varying operations of the healthcare sector.

3.5 Limitations and Trustworthiness of Research

This section of the study will analyze the limitations and trustworthiness of the research. This qualitative study utilized semi-structured interviews to gather empirical data in order to explore Lean management in the public healthcare sector in a Nordic welfare state setting. A case organization from the Finnish public healthcare sector, HUS, was chosen to gain insight into the implementation of Lean management in the given context. The goal of this research was additionally to uncover avenues for future research and add to the academic literature. The study interviewed six (6) employees of HUS with managerial experience and two (2) external Lean consultants. This section will elaborate on the limitations and possible shortcomings of this research.

Trustworthiness

Lincoln and Guba's (1985) foundational take in their text "Naturalistic Inquiry" on research trustworthiness of qualitative studies are used to evaluate the credibility, dependability, confirmability, and transferability of this research. Credibility refers to the accuracy of the findings which can be increased through prolonged engagement, triangulation, peer debriefing, persistent observation, and member checking. Dependability studies the longevity of the data in similar circumstances over time: audit trail and dependability audit are suggested to assure the dependability of the research. Confirmability highlights the degree to which the findings are based on the data from respondents rather than shaped by the researcher's bias. The researcher's bias should be minimized by utilizing reflexivity and confirmability audits. Transferability examines the generalizability of the findings in other contexts, detailed descriptions and case data are suggested.

Firstly, credibility in this study is achieved through the depth and focus of the semi-structured interviews. Each interview is structured through a coherent interview guide, to gain insight into the use of Lean methodologies within healthcare. Triangulation methods, comparing the gained data to the existing literature are then used, to further enhance credibility through various perspectives. Triangulation was also achieved by having two researchers as each researcher examined the data first individually and then as a pair to find the emerging themes. In addition, this study utilized peer debriefing to increase the credibility of the findings. The findings of the study were discussed with peers with expertise in healthcare and Lean to promote accuracy.

In terms of credibility, the sample size of six (6) HUS employees and two (2) external consultants can be considered small. However, Patton (2002) states that if the sample consists of information-rich individuals, a limited sample size for semi-constructed interviews is sufficient to gain an in-depth understanding of the topic. The interviewees of this study were chosen based on their unique experiences and their understanding of the public healthcare sector or Lean to guarantee information-rich data.

Dependability and confirmability are ensured by a consistent methodological approach and a clear description of the research process, data collection, and data analyses. Also, examining the authors' roles, biases, and influence on the overall research process are taken into account in the section above, to practice reflexivity.

From the transferability point of view, it is relevant to note that there is no unified Nordic healthcare model between the Nordic countries. Therefore, this research focused on exploring Lean Healthcare in relation to the concept of the Nordic welfare state ethos. The similarities within Nordic countries are debated, and from the transferability perspective, the results of this study should be further researched in each country's context. From the interpretivist paradigm point of view is critical to note that the aim is to develop an understanding of a phenomenon rather than generalized knowledge of a population.

Limitations

While this qualitative exploratory research approach offers deep insights into the research problem, it has its inherent limitations. Firstly, with a relatively small sample size, this research is limited to the experiences of six employees at HUS and two external consultants, which leaves room for future research with a broader sample size. Patton (2002) notes in his writing, that qualitative research findings may often not be generalizable to wider areas of the research scope, due to being context-specific.

Secondly, both the interviewees and the researcher's biases and preconceptions influence qualitative research. The researchers also recognize that Lean-positive individuals were more likely to participate in this research, which creates a Lean-positive bias for the findings. To mitigate the bias, reflexivity was practiced during the study, but the challenge of achieving full objectivity in qualitative research must be considered (Morrow, 2005). However, the aim of this study is not to discover objective truths but rather to gain knowledge on a phenomenon through individual experiences; therefore the findings of this study are inherently subjective.

Thirdly, the shortcomings of semi-structured interviews as a primary data collection method must also be taken into account. While semi-structured interviews allow for rich and detailed exploratory data, there is a great dependence on the interviewee's ability and willingness to express their thoughts and experiences (De Jonckheere & Vaughn, 2019). Lastly, the time constraints of the thesis process should be considered. The 20-credit thesis proposed limitations to the scope of the research. The research timeline added pressure to complete the study in a timely manner while upholding high-quality research.

In conclusion, this research aims to present the findings as plausible rather than objective truths. The results, derived from a comprehensive and holistic analysis, represent the most credible findings possible while simultaneously remaining open to interpretation and inherently subjective.

Ethical Considerations

In qualitative research, ethical considerations concern consent, confidentiality, and protection of interview data. All participants of the interviews are informed of the research objectives, their rights to anonymity and confidentiality of the given responses. This research also adheres to the General Data Protection Regulation (GDPR), further ensuring the protection and privacy of each participant's data. Fisher and Anushko (2008) discuss the importance of adhering to ethical guidelines to not only be a legal requirement but also a moral imperative in research.

4 FINDINGS

The objective of this study is to assess the compatibility of Lean management in relation to the Nordic welfare state ethos, explore the emergence of Lean management in the public sector healthcare in Finland, and add to the academic research. This section will present the findings of the semi-structured interviews with the selected target group. The interviews were designed to seek answers to the research questions of the thesis and provoke further research on the topic. The findings of the research will be presented according to dominant themes and trends that emerged across the interviews. Key points and arguments provided by the interviewees are presented, with specific quotes from the interviewees. Statements will be cited according to the interviewee number presented in Table 1.

4.1 Public Healthcare State and Characteristics

The COVID-19 pandemic enhanced the existing challenges in the public healthcare sector of the Nordic welfare states, including Finland. These challenges include an aging demographic, tighter budget constraints, prolonged waiting times, and issues with employee satisfaction (1, 2, 4, 5). This study explores the application of the Lean methodology in the public healthcare sector of Finland, highlighting the inherent differences between public and private healthcare organizations.

A key distinction in public healthcare is its mandate to provide necessary treatment based on genuine need. In contrast, the private sector prioritizes service-based patient demand (1). This distinction is summarized by an interviewee (1):

"A private company must offer a service when patients feel they need it. Our job (in the Nordic welfare state public sector) is to produce treatment for the patient when the patient genuinely needs it." (1)

The distinction between private and public healthcare sectors is further described by one of the Lean professionals, who has significant experience working in both:

“I would say the private sector, the role of it would be to have something more, for lack of a better word, more personalized, or more high-end care and treatment for patients that are willing to pay for extra quality.” – (7)

This statement portrays the private healthcare sector as a luxury service available to those who are capable and willing to pay for it. In contrast, public healthcare is a functioning system of healthcare, available for everyone regardless of their monetary capabilities.

Public healthcare organizations, like HUS, face operational constraints unique to the private sector. They serve a diverse population without the ability to impose limitations based on communication capabilities (e.g. digital) or disease types. For example, patients with underlying conditions, who pose a higher risk in surgery or anesthesia, are predominantly treated in the public sector. (4)

Additionally, political decision-making and a professional structure based on physician leadership further characterize the public healthcare sector. Decision-making in public services involves a democratic process that tends to move top-down through various organizational layers. The hierarchical structure with physician leadership is a notable feature, where medical professionals have a significant influence on organizational operations. A certain profession rarely defines directions in an organization's operations as strongly as physicians in public healthcare. (1)

HUS, the case organization of this study, aims to “deliver the right treatment at the right time” as mandated by law and medical necessity. The Finnish law guarantees medical care within 180 days, yet due to long queues, waiting times often exceed this period in various departments (1). An interviewee elaborated on the goals of HUS:

“We mainly consider two things: that we deliver smart, high-quality, and efficient value for tax money, but also high-quality, good care for patients. We need to take really good care of those who are here, but we have to also think that we have a lot of patients (at home).” – (5)

The quote highlights HUS's dual focus on providing high-quality, efficient care that maximizes value for taxpayers while also ensuring excellent care for patients both in the hospital and at home.

An additional distinction of the Finnish public healthcare sector from the private sector is that they are government-funded, meaning their budget is fixed and not dependent on the number of patients treated (1). This type of funding coupled with the Procurement Act, slows down processes like acquiring items that could enhance care, compared to the private sector. The goal of the public sector is not profit, but rather a zero-sum financial outcome. In contrast, the private sector can increase service offerings whether treatment is needed or not, whereas the public sector must aim for cost-effective treatments without unnecessary procedures (1).

4.2 Lean in HUS

Inspired by successful outcomes from international examples, HUS began its Lean implementation around the year 2016 (1, 4). Top management at the time showed keen interest and actively supported the new management methodology. It is stated in an interview, that the human-centeredness of the methodology, especially important in healthcare, is what led to the selection of Lean in HUS (4). The implementation was started through a pilot approach, where interested units and departments began adopting and testing the methodology (1).

The current state of Lean implementation at HUS varies drastically across units (1, 2, 4). As a large organization, the adoption of any development method is uneven (4). Some units have fully embraced Lean, while others use only certain elements or have not implemented it at all (1, 2, 4). This disparity is due to a modular approach, where the method is developed in certain units, and then spread to other units (4).

A member of the top management at HUS (8) describes the Lean implementation at HUS as having taken steps backward for two reasons: the COVID-19 pandemic and a change of leadership:

> *"Prior to the pandemic, each action was assigned to someone. Each activity had a sponsor, meaning a person responsible for it. It started to run quite smoothly, but then the coronavirus came, and meeting in person was no longer possible. After that, the CEO changed, and then the organization changed."* – (8)

The Lean culture had not grown to be a part of the culture of the organization and therefore was not resilient enough to persevere through the large operational changes brought by the pandemic.

Additionally, the change of CEO during the same time is described to have negatively affected the Lean implementation process:

> *"It (Lean implementation) starts from that, that the CEO is behind it and in a certain way demands it and continues to push it forward. At least so far, the current CEO has not expressed such wishes."* – (8)

Worries about the lack of top management involvement in Lean initiatives, are expressed throughout the interviews with HUS personnel.

A Lean unit was established in HUS to provide systematic training and support development projects across clinical units (4). However, due to excessive treatment queues, the primary focus of the Lean unit has shifted towards addressing these delays rather than the full organizational implementation of the Lean management system (2). Despite challenges, Lean is becoming more embedded in some units, and becoming an integral part of their daily activities (4).

Lean tools are used in interventions to dismantle the long waiting times. However, implementing the management system on an organization-wide scale requires more resources. Furthermore, the Lean unit does not "have an open invite to start thinking of an overall management style in the entire organization", due to their limited resources being used in combatting challenges in only some units (1). Similarly, another interviewee (4) recognizes that Lean has not yet reached the threshold level that it would be utilized as the entire organization's comprehensive management and development system, and it is not expected to happen shortly (1,4). However, in units where Lean methodologies are rooted and established the management system is not expected to deteriorate.

Despite promising results in some departments, a comprehensive implementation of Lean across the entire organization is still a work in progress. The Lean unit's limited scope and emphasis on "putting down fires" means it cannot enforce an organization-wide culture shift (1). However, units, where Lean is embedded, provide a robust framework and example for further deployment of the methodology.

4.3 Understanding the Cultural Transformation

A successful adaptation of Lean methodologies within an organization requires a profound cultural transformation that extends beyond simple procedural adjustments. This section will uncover a dominant trend that emerged in all interviews, the essential role of understanding Lean implementation as a comprehensive cultural shift. This trend was discussed by both, the healthcare professionals who have engaged with Lean initiatives within HUS (2, 3, 4, 5), as well as external Lean consultants (6, 7). The section divides the finding into several themes: the most common misconceptions surrounding Lean, the need for a comprehensive understanding of the concept of Lean, sustainable implementation, and suggestions by various professionals.

The concept of Lean as a culture is discussed throughout all interviews. The shift to a Lean organization is not merely about adopting new tools or changing processes, but fundamentally changing how an organization operates and how the people within think and work (6). A prevalent misconception amongst healthcare employees of Lean as "a toolbox for bettering operational efficiency and cutting costs" often leads to a negative connotation to the word "Lean". A unit manager (5) describes the initial challenges of perceiving Lean as a relevant methodology for healthcare, a fundamentally different organization type from its origins in automotive manufacturing. The initial skepticism spreads amongst all levels of employees in the healthcare sector, where the focus is on humans rather than machines. The same unit manager however, after successfully comprehending the concept and implementing Lean in the unit, effectively reducing their outsourced service costs amongst other metrics, said to have recognized the potential to enhance efficiency while improving patient care. One of the Lean consultants (7) also acknowledges the initial worries of implementing a management system originally from the manufacturing sector, stating:

"The first time we explained that patient changeover in an operation room would be something similar to a tire change in Formula One. We almost got insulted." - (7)

This quote exemplifies the initial skepticism healthcare employees often have when Lean is introduced to them. He continues by describing how he has no problem stating that Lean originates from the automotive industry, as nowadays, the manufacturing sector represents only 50% to 60% of the sectors Lean has been implemented in. Outside of the manufacturing industry, Lean has successfully been implemented in for example city halls, law firms, logistics, telecommunications, laboratories, the pharmaceutical industry, etc. (7). He concludes by stating:

"Lean and Kaizen in the end are a set of principles, management tools, and methodologies that can be applied everywhere." - (7)

He states how he believes that Lean is something that can be applied to any process, no matter the sector or industry.

Isto Sahi, the CEO of Kaizen Institute Finland and a Lean consultant with over 10 years of experience, states a key element of Lean is a culture of problem-solving and continuous improvement, distributed across the whole organization. While this does not necessarily reduce the number of problems initially, it increases the number of people capable of solving the problems, ultimately leading to a more resilient organization where challenges are met efficiently and effectively (6). This shift to a problem-solving mindset reflects a broader cultural change, where Lean is not viewed as a toolkit or a range of operational adjustments, but a foundational shift in organizational culture, backed by all eight of the interviewees (1, 2, 3, 4, 5, 6, 7, 8). One of the participants (4) describes the cultural shift:

"Integrating Lean at every level of the organization is essential, not just as a set of tools, but as a new way of thinking and working. It should spread across the organization's culture, affecting how every employee approaches their work and interacts with each other, fostering a mindset of continuous improvement that becomes second nature." - (4)

In this quote, Lean integration is depicted as a way of thinking, rather than a set of tools. Additionally it is described how this way of thinking should be spread across all levels of the organization.

The low state of understanding the deeper philosophy and cultural shift aspect of Lean is exemplified by two (3, 5) of the interviewed unit directors expressing their initial thoughts about Lean being only a set of tools or operational maneuvers, prior to proper training. The focus was described (3) to have shifted from top-down directives to a more collaborative approach, where feedback loops and problem-solving, supporting continuous improvement, have become a part of everyday operations for all levels of employees in the unit.

Three of the interviewees (4, 5, 6) discuss Lean as a sociotechnical system. Understanding that a comprehensive implementation of Lean requires consideration of both technical processes and the social dynamics within the organization is crucial (3). It is stressed that the social aspect is often the limiting factor between achieving full integration versus partial integration. An interviewee (3) states:

"As long as it (Lean) is a separate block that is carried out separately in addition to one's work, there are limits to how far one (the integration) can go." – (3)

All interviewees (1, 2, 3, 4, 5, 6, 7, 8) collectively underscored that implementing Lean and creating a Lean organization is fundamentally about creating a culture of continuous improvement, problem-solving, and efficiency at all levels. One of the Lean consultants highlights the importance of the social nature of Lean:

"People involvement at all layers and professional areas is critical" – (7)

Neglecting the social nature of Lean will hinder the effectiveness of the technical solutions provided by Lean methodologies.

The introduction of Lean into an organization or a unit is discussed to be a crucial and often deciding factor between a successful and unsuccessful implementation (3, 4, 5, 6). When Lean is implemented without everyone's understanding of the full picture of why and how, Lean often becomes a mandatory but superficial addition to daily work (5). While short-term goals may be reached, the results are not sustainable, and falling back to the old ways is almost inevitable (5, 6). This phenomenon was exemplified by various examples from a range of units within HUS and external cases (1, 5, 6).

A comprehension of the concept of Lean, while important on all levels of an organization, is especially important at the managerial levels (1, 2, 3, 4, 5, 6, 7, 8). The comprehension of Lean from the leader's perspective was discussed by all interviewees (1, 2, 3, 5, 6, 7, 8). One interviewee (3) described initially believing Lean to be a set of practices and methodologies she could easily distribute down to her subordinates, but promptly recognized that each individual must engage in their own intellectual labor themselves to fully comprehend the fundamental ideology of Lean. This changes the leader's role in Lean implementation from a mere distributor of tools to a facilitator of deep understanding and transformation within an organization. This finding will be better explained in a later section "Role of Leadership".

4.4 Internal Initiative and Customization

Another factor crucial to the implementation phase is the internal interest and initiative. If the initiative to begin Lean comes externally the probability of failure is significantly higher (5). This is further explained through an example from Canada where several provinces got a governmental order to begin using Lean management in some of its hospitals, which ended in a multitude of failures (5). It is explained that Lean takes customization and tailoring to the circumstances, operating methods, and operating culture of the specific system or unit. "There is no single correct way to implement it (Lean) into an organization, nor is it likely that one will ever exist" (5). The most successful implementations of Lean in healthcare systems internationally have happened when the method has first been thoroughly understood by the highest level of management, after which the specific and most suitable application has then been developed according to the organization's starting point (5). Often the word "Lean" is not even used in these cases but for example the "Cleveland Clinic Improvement Method", following customized terms for principles and tools that highly correlate with those of Lean principles and tools (5). According to the interviewee, it has often been the key to the people of the organization accepting the new development or quality management method better and faster. However, a Lean consultant with extensive experience introducing Lean into various healthcare settings describes the customization to be a linguistic adaptation, stating:

"You don't need to adapt the concepts and the principles of lean, but you need to adapt the way you explain them and the language that you use." – (7)

Adapting to the "healthcare jargon" and using examples that healthcare workers understand is therefore important.

"For example, when you're talking about waste, you can say, look, a patient that is in a bed, in a corridor, waiting to go into one of the operating rooms, is something that they understand. You are giving a real-life example." – (7)

This exemplifies the importance of understanding the operating setting – understanding the language and culture where Lean is being implemented. To avoid building negative connotations to the concept of Lean, consultants must be very cautious with the wording and language they use from first contact. (7)

It is also suggested that additional training and education on what Lean is and is not, is required within HUS, in order to facilitate sustainable change (4). The need for additional training for employees, both doctors and nurses, is mentioned by a majority of the interviewees within HUS (1,2,3,4,). The need for training is mentioned to be especially important for leaders and ongoing training programs should become a standard part of every leader's basic package (4).

Furthermore, it is suggested that the recruitment strategies for leadership roles should include assessing candidates' commitment to the Lean management system and its principles (4). The aim should be for the successors to not only passively accept but actively endorse and fully commit to continuing the methodologies previously established. This proactive approach to leadership recruitment would decrease the chances of undermining advancements made in Lean implementation. Such shifts in direction could not only risk wasting previous efforts but also raise barriers to initiating similar future endeavors, as sudden changes can decrease trust in the system (4). Change of leadership was described by an interviewee from the top management of HUS, to have been one of the reasons why the Lean implementation process slowed down in HUS (8). This real-world example from HUS exemplifies the importance of successors actively continuing Lean efforts. This level of strategic planning represents an aspirational level that is yet to be seen in HUS (4).

A recognized challenge within the HUS organization is the inherently temporary involvement of the Lean unit. While effective in initiating Lean interventions across various units, their duty is not to manage the units' prolonged implementation (2). The responsibility of continuing the Lean implementation is left to the unit leadership (2).

"Everyone can pick up their pace for a moment, but for long-term and lasting results, it requires very disciplined effort and everyone's commitment to work every day exactly as agreed in the development process. If we start to deviate from that, then often gradually, not instantly, but gradually, the process begins to change in some way and then it gradually drifts back closer to the starting situation." (4)

The experiences shared by both internal HUS staff and external consultants highlight that for Lean to be more than a transient phase, it requires a shift in organizational culture embraced by all – frontline staff to top management. One of the Lean experts concludes by stating:

"Improvement with no cultural change is not sustained and thus is only improvement and not continuous improvement." – (8)

4.5 Role of Leadership

The integration of Lean within the healthcare context is a complex process, requiring deep understanding and a proactive commitment from leadership at all levels. The findings reveal that effective leadership is not only influential but essential in fostering a Lean culture within an organization. This section focuses on the role of leadership in the successful implementation of Lean, as identified through the insights of the interviewees of this study.

The commitment and enthusiasm of leaders are marked as significant contributors to the success of Lean integration. Leaders must be willing and eager to improve their units and be active in the change process (4). This is reinforced by interviewee 5, who notes that most problems with Lean integrations stem from a lack of active leadership. Leaders who fail to fully commit or lack a deeper understanding of the Lean philosophy, discussed in the previous section, are often the root cause of a failed implementation. All interviewees had a similar emphasis on the importance of committed leadership, with one stating:

"To achieve success, Lean necessitates resolute and proactive support from the leadership. Its effectiveness is significantly influenced by individual enthusiasm. When a leader within an organization demonstrates a strong commitment to promoting Lean principles, progress tends to occur at a much faster rate compared to environments where the leadership remains passive." - (4)

This quote highlights the importance of a proactive, supportive, and enthusiastic leader.

The importance of leaders adopting the attitude of a teacher is highlighted (5). This means allowing time for change and learning, a fundamental shift from traditional micromanagement practices towards a more empowering management style. This approach involves leaders taking a step back and allowing employees to discover and rectify errors on their own, facilitating an environment of experiential learning and individual accountability (5).

A problem within the healthcare sector arose from the interviews – a lack of trust in the employee's capabilities (5). This problem stems from the deep-rooted hierarchical nature of healthcare organizations, where leadership typically flows top-down, with strict authority and a lack of flexibility for lower-tier decision-making (5).

The principle of leading by example is also noted by several interviewees (3, 4, 6). As noted by interviewees 3 and 6, the physical presence of managers in various operational settings, like working stations, operating rooms, etc. is important. The direct involvement of leadership enhances the visibility of management and strengthens the bond between employees and management (6). Interviewee 4 also explains how the visibility of management at the operational level also enhances the trust of the employees in new approaches, as it represents the interest and commitment of the management (4). Sahi (6) expresses the essence of this approach where effective leaders must embody the principles they advocate for, stating:

"Leaders must lead by example. They need to be the first to embrace the principles of Lean and demonstrate how to apply them in practice. When leadership is committed, it creates a foundation for the entire organization's transformation." - Sahi

This quote from Sahi describes leadership's commitment to Lean initiatives as the foundation for organizational transformation.

Transitioning to a Lean organization requires a shift towards a self-sustaining culture. The ability of employees in the Finnish healthcare system to currently affect their work is described to be relatively low (5). Nearly all interviewees (1, 2, 3, 5, 6) articulated their goal in the Lean transition to be to develop an organizational culture where their strategic role in advocating and teaching Lean becomes redundant. In this culture, teams are empowered to run, think, and improve independently, simultaneously improving efficiency and work satisfaction (3).

For Lean integration to infuse within the whole organization, there must be full strategic commitment from top management (1, 2, 3, 4, 5, 6, 7, 8). While effective leadership at the unit level can allow for partial integration, in order to achieve a comprehensive organizational transformation, the full support and active involvement of the highest level of management is required (5, 6). Interviewee 8 states:

"For Kaizen and Lean to work, it must not only be a culture, but a culture fueled by top management." – (7)

He further backs this by stating a quote by Masaaki Imai:

*"There are three main things needed for Kaizen to be implemented and become a culture: **top management involvement, top management involvement, and top management involvement**" – Masaaki Imai*

Top management involvement is described to be the most crucial aspect of successful and sustainable Lean implementation. More specifically, the role of the CEO is described by multiple interviewees (4, 6, 7, 8). Passive support and acceptance of the Lean principles are not sufficient for the widespread adoption and sustainability of Lean practices. Instead, there needs to be an active and visible leadership presence that not only supports but champions Lean initiatives (4, 6, 8). The strategic dialogues must be effectively translated into actionable insights down to all managerial layers (3).

4.6 Balancing Operational Efficiency and Quality of Care

The integration of Lean within an organization is often misconstrued as only an approach to reduce costs (5, 6). Insights from the interviewees however dispute this, clarifying that proper Lean application should go beyond cost-cutting, to simultaneously enhance the quality of care while maintaining efficiency. This section explores the balance of operational efficiency with high-quality patient care, as discussed by the healthcare professionals within HUS and external Lean consultants.

A prevalent initial misconception among healthcare employees is that Lean aims to cut costs, potentially at the expense of quality care (6, 7). This preconception is challenged by all of the interviewees, who emphasize that Lean's underlying philosophy of doing more with less does not directly equate to diminishing care standards but rather optimizing resources without compromising quality care (1, 2, 3, 4, 5, 6, 7). Sahi emphasizes this point, stating that the number one thing in Lean has always been quality (6). If Lean is perceived solely as a way to increase speed or reduce expenses without true waste elimination, there is a risk of degrading the quality of patient care (5). Interviewee 5 expresses the fundamental misunderstanding of Lean:

"People often think that the purpose of Lean is just to make things more efficient. I think that we produce value sensibly. All the unnecessary fuss and adjustments and everything else should be removed. That way, more value is generated for those whom it is supposed to be generated for."

The quote clarifies that while Lean is often seen as merely a tool for increasing efficiency, its true purpose is to create value sensibly by eliminating unnecessary activities, thereby generating more value for the patients.

In the public healthcare sector, hard statistics, on time and money spent, central to Lean, are often viewed as antagonistic quality of patient care (4). However, contrary to this perception, quicker care often means better outcomes for patients as well, not only in the number of patients taken care of but also on an individual level (4). For example, reducing the time a surgical wound is kept open, decreases the risk of infection (4). This simultaneously aligns with Lean's efficiency goals while increasing care quality.

An ongoing discussion within healthcare management often revolves around balancing the patient throughput rate with the quality of care on an individual level (3). While doctors typically aim and advocate for the highest possible quality of care for each patient, it is the manager's job to maximize patient throughput (3, 5). This, while somewhat of a balancing act, does not imply compromises in the quality of care, but rather focuses on optimizing the processes to the core competence of the unit, to ensure consistent, high-quality treatment for all (4, 5). Several unit managers expressed the importance of process standardization in ensuring patients receive consistent and equitable treatment, regardless of when they receive care or who is on duty (3, 5). A unit manager describes the transformative impact of successful Lean integration:

"In units where the Lean implementation has been successful, the standardization of processes has allowed a more fluent patient flow and therefore more patients to be taken care of." - (5)

While ensuring equal access to care remains the fundamental goal of the public healthcare sector in Finland, the definition of what constitutes as equal access remains a divisive topic (3). Weather access should be uniform across all citizens, or resources should be allocated to those with greater needs. This remains a topic of discussion amongst healthcare professionals at HUS as well (3). To aid this conversation, Lean has enhanced communication within units, across hierarchical levels, exemplified by the use of Gemba boards (3). The various tools provide equitable communication opportunities, where doctors and nurses are able to express concerns and suggest improvements directly to the management on a daily basis (3). Additionally. Lean provides clear metrics for evaluating treatment equality, through efficacy, duration, quality deviations, and other factors (3, 5).

The interview insights clearly illustrate Lean to not merely be about cutting costs or increasing the speed of services. Instead, with proper application, it is about enhancing operational efficiency while simultaneously upholding and often improving the quality of patient care. Through continuous improvement and standardized processes, Lean methodologies ensure most patients receive high-quality care, further supporting the broader objectives of equality in public healthcare.

4.7 Lean as an Effective Management Methodology in Public Healthcare

All interviewed healthcare professionals around HUS have had positive experiences after Lean implementation (1,2,3,4,5). The most identified benefit was reduced waiting times as the units studied were all able to increase their patient throughput without added resources (1,2,3,4,5). Additionally, Lean management has provided transparency within units (3), harnessed the problem-solving capabilities of the staff (5), and streamlined daily operations (4). In these cases, unnecessary preliminary visits or examinations have been removed and the process on the day of the treatment has been streamlined. Consequently, queues have been significantly shortened or eliminated completely, at least momentarily (4).

> *"The unit's activity grew by 140 percent last year: over 3,000 more patients have been treated with the same resources, and no nurses and doctors have been added. This was achieved by giving the staff who do the work, free hands to think about how things can be done better."* - (5)

This quote portrays the success a unit within HUS has achieved through the implementation of Lean. Specific metrics are given, to further prove the success.

The process development through Lean management principles has been an integral part of shortening the long waiting times. For example, a surgery unit monitored empty room time and identified hour-long empty slots. Since the patients treated at the unit come from home to surgery and emergency room patients are rare and cannot fill these empty slots, the operating room team proposed to call in extra patients who were waiting for an easy one-hour procedure. If an operating room performed beyond initial projections, they would fit these patients in for their procedure. This way the unit has been able to improve throughput rates in the operating rooms. Likewise, another unit has added thousands of treatments with task transfers from doctors to nurses, while maintaining the same number of resources (3).

"My own experience, both from the primary healthcare side and now from HUS, is that the Lean methods are a good way to make processes work well and to produce more customer value." (2)

This quote further proves that Lean has not only been effective in improving the efficiency of processes, but has also increased overall customer value.

It is evident from the long waiting times that change can be inherently transient (2). There are cases where good results have been obtained at the beginning, but the lack of long-term follow-up or maintenance has caused the progress to revert to the initial state (4). The importance of the maintenance structure is highlighted (4):

"Quick wins are easy to take home, because everyone can speed up their running for a while, but long-term and permanent results require discipline and commitment to do development every day as agreed. If we start deviating so often little by little, not in an instant, the process starts to change and get closer to the starting situation." - (4)

The quote emphasizes that while achieving quick results is relatively easy, sustaining long-term and permanent results requires daily discipline and commitment to continuous improvement. Deviating from agreed-upon practices can gradually revert the process to its original state, ultimately wasting any improvement efforts.

Consequently, there have been initiatives to start thinking about the whole management model of the organization from the Lean management point of view. Unit managers and directors (2,3,4,5) report positive experiences after implementing Lean management in a managerial role, describing an increase in transparency and ease of work. It is reported that units that have invested in Lean management for several years as a daily management system and development tool can move forward more smoothly in various everyday activities (4). The units are more capable of solving problems and thereby improving access to treatment or the flow of care in a unit-oriented way, without the support of a Lean development unit or external consultants (4).

"Lean management style definitely makes my job easier. My job would be much more difficult without Lean Management since it gives me transparency about what happens in my unit." - (3)

"It has now been noticed that when it (Lean Management) has been implemented as a management system, it works". - (2)

These quotes prove Lean as a management system to work in favor of all stakeholders. In addition to better managerial experiences, staff morale has significantly increased in fully Lean units. Continuous improvement, a cornerstone of Lean management, relies on initiatives from all staff levels. For instance, a manager from a Lean-managed unit (5) shared how the unit's injection nurses, who typically perform 21 – 22 injections per day, proactively sought to observe practices from another injection unit in Finland, where more injections were administered per day. By observing and identifying improvement opportunities from the other unit, they were able to increase their output to over 25 injections a day. This example highlights the profound impact of Lean culture, where staff are voluntarily eager to enhance their productivity and performance.

The Lean management culture differs from the traditional hierarchical way of leading in healthcare. In units that have been established through Lean management, employees have been able to influence their work from the beginning, starting from the planning. As the staff changes, and people from different units join the culture, it takes around 1,5 years to adapt to the new way of working that involves continuous improvement. It is also found that Lean-led units are sought-after workplaces. (5)

"Little by little, when they (new employees) are in the energy that is here, they start to come out of their shell, and after a year and a half, they also start to voice their ideas: "I thought if we could do this like this, could we try?". That is when I know the magic is working. We have a lot of people from different units, with different backgrounds and personalities, everyone is involved in this (Lean culture) in their own way. It is the (Lean) culture that has been created that has made our unit a sought-after workplace. We have never suffered from a labor shortage. Not at

any point. For example, during the previous recruitment, that was opened, I had to call HR to shut it since the inbox was completely full." - (5)

On top of positive outcomes within HUS, one of the Lean experts describes examples of successes of Lean integration within the public healthcare system in Portugal. Firstly, they have been able to decrease the time of patient changeover by 30% to 50% in the operating theatres. They have been able to cut in half the startup time at the beginning of the day for surgeons, effectively increasing the occupation of the operating room. An example of Lean working during the time of the COVID-19 pandemic is also provided:

"One example that we're proud of is supporting the Portuguese government by defining the logistics circuits and warehousing processes, and designing the delivery routes of the COVID vaccines. We were one of the countries with the highest percentage of people vaccinated and the lowest number of vaccines lost due to expiry dates, quality, etc. That was a huge success and with all the Lean principles behind it working in the flow of the vaccines." – (7)

This also highlights a difference between a deeply rooted Lean culture within a public healthcare system and partial integration of Lean methodologies. In Portugal, the healthcare system was able to leverage Lean thinking to combat the pandemic, whereas in Finland, where Lean had not fully integrated into the culture, the implementation took back steps due to the pandemic.

In summary, the implementation of Lean management in the units of HUS interviewed has shown remarkable benefits. Reduced waiting times, increased patient throughput, and enhanced transparency are among the significant improvements noted in the interviews with healthcare professionals. A Lean culture has empowered staff to engage in problem-solving and continuous improvement, leading to streamlined operations and higher staff morale. Units that have fully embraced the Lean culture not only perform better but are also becoming more desirable workplaces, attracting motivated and innovative staff. These positive outcomes highlight the potential benefits of Lean as an effective management methodology in the Finnish public healthcare system, fostering a culture of efficiency, collaboration, and continuous improvements in patient care.

5 DISCUSSION & ANALYSIS OF RESEARCH

5.1 Discussion

The purpose of this thesis was to examine the compatibility of Lean and the Finnish healthcare system, and to further assess Lean's alignment with the ethos of the Nordic welfare state. This section will synthesize the findings from the literature review and the empirical research to address the research questions (1-3). The discussion will be a generalization of the interviewee's experience- and knowledge-based views and literature on the topic of Lean healthcare and Lean management in a Nordic welfare state. Furthermore, the limitations and the contribution of the research will be analyzed.

Can Lean management principles be effectively applied to enhance operational efficiency and performance in the public Finnish healthcare sector?

This section will focus on the applicability of Lean in the public Finnish healthcare sector from the point of view of operational efficiency and performance. Insights from the literature and interview data from HUS are combined to draw a conclusive answer. Finland's ongoing healthcare reforms and increasing pressure on the healthcare system to manage resources efficiently while maintaining high-quality patient care underscore the relevance of this analysis.

At HUS Lean was strategically introduced to tackle specific operational inefficiencies at the operational level. Originally, various pilot Lean projects were organized in units with the most acute needs, to test the applicability of the management methodology. Additionally, a separate Lean unit was established to further push continuous improvement across units, provide Lean training and combat the units with the most need for efficiency improvement, or "fight fires", as described by multiple interviewees (1, 2, 4, 5). In many instances, Lean interventions within HUS units have been successful, for example streamlining surgical procedures, decreasing the wait time for elective surgeries, and improving patient throughput without additional resource allocation (2). Importantly, the improvements described by interviewees were often measurable and not only claims. Sahi brought up the importance of measurable results and hard statistics as indicators of acknowledged Lean integration. The positive results validate a successful implementation of Lean and justify further development and investment into the methodology. Commitment to measuring outcomes and following metrics is essential for ensuring Lean delivers real, lasting benefits to patients and healthcare providers.

Lean integration should not be introduced into an organization as a mere toolkit, but rather as a comprehensive cultural shift. This was a major finding not only from the interviews but also literature. Tiirinki et al. (2016) state in their study that only Lean activities are more often utilized than the full philosophy. The insights from the interviews revealed that while solely the Lean activities might have been the initial understanding of Lean for many managers still, further training quickly allowed them to grasp the idea of the full philosophy of Lean. While the challenging nature of the implementation within the public healthcare context as stated by Tiirinki et al. (2016) remains valid, the acknowledgment of sufficient training in the introduction phase suggests a move in the right direction within HUS.

As stated before, Lean's origins in the manufacturing sector often led to apprehension of the applicability of the methodology in the service sector, as the processes are undoubtedly different. According to the insights from the literature and interviewees alike, Lean has been customized to fit the specific needs of the healthcare systems. The most successful Lean integrations in healthcare according to the literature and interviewees come from healthcare organizations, where the word Lean has been replaced with a custom improvement method (e.g. Cleveland Clinic Improvement Method), suggesting that the adaptation of Lean principles to fit the specific organization culture and language may allow for greater acceptance and effectiveness. Supported by Edwards & Nielsen (2011) suggesting a transformative approach, where the universal principles of lean are respected, but the tools and concepts are adapted to the specific contexts of healthcare. This approach allows the foreign terminology of Lean to be seamlessly integrated into the existing operational framework, reducing initial resistance and increasing the engagement of employees.

Skepticism of the applicability of Lean in public healthcare organizations has been and continues to be high, with fears of prioritizing efficiency over patient care. Overcoming this initial skepticism requires time, persistent communication, and demonstration of how Lean can truly enhance the quality of care by reducing errors and streamlining patient flow. The findings from the interviews and the literature on Lean both accentuate the focus of Lean being on creating value for the customer, or patient in the healthcare context. Shifting the narrative from efficiency at any cost to efficiency as a means to enhance care quality can be done by emphasizing the primary objective of lean being improved patient outcomes. The focus on patient outcomes additionally aligns with the overarching goals of public healthcare.

Edwards and Nielsen, in their 2011 study deemed Lean to not be suitable for some healthcare functions due to the reactive nature of the tasks. Our research, while underscoring some challenges in the implementation, did not find concrete evidence of any healthcare functions to be unsuitable for Lean. Rather Lean is deemed as a method for managing operations, suitable for any process. The challenges inhibiting the use of Lean are better discussed in the next section.

Factors Promoting and Inhibiting the Use of Lean in the Public Healthcare Sector

This section will explore the most critical factors promoting and inhibiting the use of Lean management methodologies in a public healthcare setting, based on insights combined from the literature and the interview data. Lean integration has proven to be successful in some units within HUS, as well as public healthcare organizations worldwide, but failed attempts are also not uncommon. Therefore, it is important to explore why Lean integration can vary significantly in its success. Identifying and addressing the most common pitfalls in the implementation process can increase the success rate and sustainability of the improvements.

Firstly, a significant inhibitor of successful Lean integration is the lack of responsibility delegated to the teams. An eighth form of waste (Muda) was recognized and introduced to the original seven recognized by Taichii Ohno – human potential. Not recognizing the untapped human potential in each employee is natural within the hierarchical organizational structure of public healthcare organizations with strict top-down authority and a lack of lower-tier decision-making. The oversight of human potential is supported by the interviewees, stating that there exists a clear lack of trust in employee’s capabilities (5). Liker (2004) states that the underutilization of human potential hinders innovation and continuous improvement, fundamental elements of Lean. Interviewee 1 emphasizes the empowerment of frontline employees by involving them in everyday decision-making processes, not only enhancing their commitment to the broader organizational goals but also providing unique insights, invisible to higher management levels. Similarly, Mazzocato et al. (2010) and Tucker and Edmondson (2003) recognize this participatory approach, arguing that staff at all levels possess critical knowledge about inefficiencies in their workflows, yet lack the authority to implement the changes. This results in an array of missed opportunities for improvement. Recognizing and harnessing this human potential, while not natural for traditional public healthcare organizations, is a fundamental step toward a Lean organization.

Secondly, the standardization of processes is considered by Taiichi Ohno (1990) to be one of the most critical principles of Lean. This is supported by several interviewees expressing that standardization of healthcare processes ensures that patients receive consistent and equitable treatment regardless of when or by whom they receive their care (3, 5). However, the differences between industrial production and healthcare processes, often raise questions about the viability of standardization within the healthcare context. Interviewee 5 provided examples from their unit, where the core procedure they perform has successfully been standardized, effectively increasing patient throughput and allowing them to treat more patients. Physicians, however, see the variability of possible treatments as an inhibitor to standardization. Units like emergency departments or psychiatry see patients with a wide variety of symptoms and conditions that require highly individualized treatment approaches. In contrast, in units like radiology or routine laboratory testing, processes are relatively uniform and predictable and therefore more amenable to standardization. With defined core elements, guidelines with built-in flexibility, and a modular approach to standardization, the authors of this research believe standardization to be feasible in all healthcare settings. This hypothesis does however require additional testing and research.

Thirdly, employee involvement and engagement are discussed in the literature and touched upon in the interviews as well, to raise significant challenges in the implementation of Lean (Ruohomäki, Reijula and Reijula, 2017). Employees feel that incorporating additional effort in continuous improvement activities while performing everyday activities increases their workload. In the authors' opinion, this represents a wrongful introduction of continuous improvement activities, as the core idea is to reduce the workload, to streamline processes, and ultimately foster a more stress-free work culture. This is supported by Kahm & Ingelsson (2019) and Ulhassan et al. (2013), stating the Lean implementation should lead to work reduction, capturing Lean's fundamental goal - "do more with less".

Above employee commitment, the authors conclude from the interview insights, that management commitment is the most crucial factor in successful and sustainable Lean implementation. Tiirinki et al. (2016) and Ulhassan et al (2013) support this, describing management commitment to be one of the primary enablers for successful Lean implementation. The literature mainly discusses the importance of line/unit management. Kahm and Ingelsson (2019) highlight in their study, the need for increased time allocation and support in improvement work. Lindskog, Halvarsson and Brännmark (2013) support this, stating that regular follow-ups on set goals have been proven to be linked to increased learning, promoting sustainability of the implementation of new methodologies. While the authors of this thesis acknowledge the importance of line managers, a higher importance of top management is highlighted in the interviews. As Lean should not be solely unit-focused, but rather a full organizational culture shift, the cruciality of top management involvement and commitment is emphasized. A lack of top management commitment to Lean in HUS is discussed by interviewees as an inhibiting factor of a full organizational shift towards a Lean culture.

A repetitive theme amongst the literature and findings of this research is the lack of a unified understanding of Lean healthcare. Employees across industries misunderstand the primary goals and activities of Lean, leading to an overarching negative initial connotation to the word. To successfully implement Lean, a unified, clear understanding of the concept must initially be achieved. On top of additional training and education within the healthcare setting, this requires more research to conceptualize the topic of Lean Healthcare, especially in a public healthcare setting, to simplify the topic, for smooth integration.

Lastly, traditionally public healthcare organizations are organized into silos, where units and departments operate somewhat independently from others, as discussed in the Findings section (1, 2, 5). This compartmentalization leads to challenges in fostering effective and transparent communication and collaboration across the different professional groups, effectively inhibiting the implementation of Lean on an organizational level. Additionally, the problem becomes evident when a patient requires treatment across multiple departments.

Alignment of Lean Management and the Nordic Welfare State Ethos

From an operational point of view, drawing from the findings of the empirical research, it is important to note that Lean on its own is neither inherently good nor bad - no matter the process, Lean can be adopted to enhance the operation's processes. The impact instead depends on how Lean is understood and therefore ultimately implemented (Interviewees 1, 4, 5).

Lean management's emphasis on efficiency, waste reduction, and value maximization all theoretically align with the principles of Nordic welfare, providing high-quality, accessible public services to all citizens. Additionally, both seek to improve the well-being of people, with Lean's focus on creating more value with less work, therefore indirectly improving employees' quality of life, and the Nordic model directly prioritizing individual welfare through social support, aiming to maximize societal well-being (Kuhnle, 2019). This is also highlighted in the interviewees, with multiple interviewees emphasizing the sociotechnical character of Lean (4, 5, 6). Lean may however challenge the inherently risk-averse approach of the employees of the public healthcare system, which focuses on extensive care rather than mere efficiency (interviewees 1, 4). Understanding Lean's sociotechnical aspect becomes increasingly crucial in shifting from a system focused solely on efficiency to a more human-centric philosophy.

To truly understand the synergy beyond efficiency improvement it is important to delve into the philosophical underpinnings that form the basis of Lean management. Implementing Lean practices in a public healthcare environment aligns with the core values of the Nordic welfare state by enhancing the quality and accessibility of healthcare services – which are foundational aspects of this welfare system (Esping-Andersen, 1990). Instead of simply cutting costs and speeding up processes Lean aims to make optimal use of resources to ensure that all patients receive prompt and effective care whenever they need it irrespective of circumstances, embodying the welfare state's dedication to universal and equal healthcare. The successful instances where Lean methods have been incorporated in departments at HUS serve as evidence that when applied thoughtfully, Lean management can complement and reinforce the principles upheld by the welfare state.

While the inherent compatibility of Lean and the Nordic welfare state ethos is evident, the correct understanding and implementation of Lean is crucial. Ethical and egalitarian considerations are essential, as incorrect implementation of Lean may potentially challenge the fundamental principles of the Nordic welfare state ethos. The hierarchical structure of the Finnish public healthcare system, physician leadership, and democratic decision-making pose challenges in the implementation of Lean, typically thriving in less vertically structured organizations (Womack & Jones, 2003). This requires a deeper understanding of the cultural shift that extends beyond mere operational efficiency to a holistic approach to comprehensive care and equity. As marked by previous research, the level of comprehension of Lean in the Finnish healthcare system is not yet sufficient enough, for a full organizational shift. This requires additional training and commitment from the top management.

Political Consideration

Challenges that the Finnish healthcare system is facing, evidently transcend beyond pure operational issues of the healthcare system. The public healthcare institutions in Finland like HUS, operate within a political framework that heavily influences the decision-making and operational structure of the organization. Unlike private healthcare providers, public organizations are shaped by policies and decisions made within the political sphere, adding a layer of complexity to solving the issues at hand. As Kuhnle (2019) states, the Nordic welfare state model is based on the extensive presence of the state in the welfare arrangements. As the literature and findings of the empirical research emphasize the importance of leadership, top management, and key decision-makers in Lean implementation, the high political governance of public healthcare institutions raises a compelling question about the potential benefits of applying Lean principles to the key decision-makers of the whole public healthcare sector, the political system. This would promote transparency and efficiency in public sector governance. While the Finnish welfare system is often cited as a successful implementation of social democratic welfare policies, balancing social welfare with economic efficiency (Imsen, Blossing & Moos, 2017; Svendsen & Svendsen, 2015), one may question the successfulness of a system where legally defined health guarantee waiting times are not met.

Evaluating the alignment between Lean Management and the Nordic welfare state ethos requires recognizing both the synergies and areas of tension between the concepts. Lean's core idea of improving efficiency and patient care in a human-centric system deeply aligns with the welfare state objectives of high quality of life and universally accessible public services. However, the fundamental principles of Lean must be well understood to fully respect the comprehensive nature of public healthcare.

5.2 Academic Contribution

During our research process, we observed a research gap in the literature regarding the integration of Lean with the socio-political and cultural ethos of the Nordic welfare states. Our literature research revealed that while Lean has been extensively studied in the context of manufacturing and healthcare, the application within public healthcare systems in the Nordic welfare sates, characterized by egalitarian and welfare state principles, remains relatively underexplored.

This thesis contributes to the research gap, providing an analysis of Lean Healthcare in the context of the Nordic welfare state ethos. This thesis operates on two levels: a more practical level, providing concrete examples and guidelines for applying Lean in public healthcare, and a broader ethos alignment level that examines how Lean principles can harmonize with the core values of the Nordic welfare states. This contribution adds a new dimension to Lean healthcare research, expanding its applicability and relevance to a broader range of public organizations operating within the Nordic model.

In summary, this thesis has contributed to academic research on Lean Healthcare by integrating Lean principles with the Nordic welfare state ethos. The contribution is based on a holistic and comprehensive analysis, and is inherently interpretative and subjective, as discussed in the methodology section. The aim was to present the most plausible findings within the research context. The findings of this study expand the theoretical framework of Lean Healthcare to a broader range of public organizations, while simultaneously setting a direction for future research. Suggestions for future research are better discussed in section 6.2.

6 CONCLUSION

This thesis set out to explore the synergy between Lean management methodologies and the Nordic welfare state ethos within the Finnish public healthcare setting, using HUS (Hospital District of Helsinki and Uusimaa) as a case study. By examining the theoretical foundations and philosophical underpinnings, the research aimed to provide insights into if and how Lean management could be integrated into public hospitals or other public organizations within the Nordic welfare state setting.

The study found that Lean management aligns well with the Nordic welfare state ethos by promoting efficiency and improving service delivery while maintaining or even improving high-quality care. Practices in Lean, such as continuous improvement, waste reduction, and staff empowerment can result in notable improvements in operational efficiency and service quality if integrated carefully and correctly. These improvements as well as the process support the welfare state's commitment to universal access, and equity, ensuring an efficient use of public resources that benefits all citizens.

On top of the philosophical alignment, several practical factors to consider in Lean integration within a public organization emerge. Strong leadership on all levels of the organization, with an especially important role of top managers is crucial for a successful implementation. Leaders must demonstrate an active and positive commitment to Lean initiatives and foster a culture of continuous improvement. Engaging all levels of staff in the methodology is vital to ensure collective ownership of Lean initiatives – a cultural transformation. Additionally, Lean should always be adapted to the specific needs and contexts of different departments within the organization. While this process is not quick, a full adaptation and a clear attitude shift of all employees is crucial for sustainable change.

Tailored and continuous training and education are also critical for the successful integration and sustainability of Lean methodologies. This is necessary to build a comprehensive understanding of what Lean truly is. Additionally, training so-called Lean experts within the organization that can guide and support continuous improvement efforts ensures sustainability and eliminates the risk of falling back to the old ways of doing things. Staff at all levels should be encouraged to identify and solve problems daily. This also requires a culture of open communication, transparency, and collaboration across all levels of the organization.

Monitoring and evaluating systems must be set in place to track the progress and impact of Lean initiatives. Data-driven insights should be used to refine and adjust strategies to ensure sustained improvements over time. Additionally, positive outcomes, proven by various metrics, work as a way to promote the methodology to departments across the organization, aiding employees to have a positive attitude toward change.

In conclusion, this thesis demonstrates Lean management to be promising in enhancing the efficiency and effectiveness of public healthcare within the Nordic welfare state. While the journey towards HUS being fully Lean is still ongoing, with sustained efforts and commitment starting from top management, Lean has shown its ability to create a more resilient and responsive healthcare organization. This research provides both theoretical insights and practical guidance to support the transformative process of Lean implementation.

6.1 Empirical Findings

The following list concludes the empirical findings of this research:

1. Lean management aligns well with the Nordic welfare state ethos by promoting efficiency and improving service delivery while maintaining or even improving high-quality care.
2. Practices in Lean, such as continuous improvement, waste reduction, and staff empowerment can result in notable improvements in operational efficiency and service quality if integrated carefully and correctly.
3. Strong leadership on all levels of the organization, with an especially important role of top managers is crucial for a successful implementation.
4. Engaging all levels of staff in the methodology is vital to ensure collective ownership of Lean initiatives – a cultural transformation.
5. Lean should be adapted to the specific needs and contexts of different departments within the organization.
6. A clear attitude shift of all employees is crucial for sustainable change.
7. Tailored and continuous training and education are also critical for the successful integration and sustainability of Lean methodologies.
8. Monitoring and evaluating systems must be set in place to track the progress and impact of Lean initiatives.

9. This thesis demonstrates Lean management to be promising in enhancing the efficiency and effectiveness of public healthcare within the Nordic welfare state.

6.2 Suggestions for Future Research

As the objective of this thesis was to contribute to academic research on Lean Healthcare in a research setting that has been underexplored to date, it is important to suggest future topics and present remaining academic research gaps.

Based on the thesis, the following proposals for future research can be presented:

1. The fundamental definition of Lean Healthcare requires additional research.

Due to the relatively new concept of Lean Healthcare, a clear definition of the concept is still missing. While the definition provided by Rotter et al. (2019) sets a good base for understanding Lean Healthcare, a universally accepted and tested definition remains unestablished.

2. Research on Lean implementation in the varying Nordic healthcare models is needed.

It is important to note that public healthcare models in the Nordic countries differ from each other. As this research evolved around the Finnish public healthcare system, additional research on Lean implementation in other Nordic countries' healthcare systems is required.

3. Further research on the standardization of processes in various healthcare settings is required.

As standardization of healthcare processes remains a difficult-to-understand concept for some healthcare professionals, more research on specific healthcare departments and their process standardization possibilities needs additional research. According to this research, all processes within healthcare can and should be standardized to some extent. However, the prevailing skepticism around this topic calls for further research.

4. Studying the effectiveness of different Lean training programs could help improve the integration process.

As this thesis concluded, a successful Lean integration requires well-executed Lean training for managers and employees. For this reason, researching the effectiveness of various training programs and teaching methods within the healthcare context would be beneficial, to optimize Lean healthcare training.

5. Research on Lean's potential to help in managing healthcare crises, like pandemics.

As evidenced by insights from the interviewees, Lean can be an effective tool in managing healthcare crises, such as pandemics. On the other hand, these healthcare crises have also proven to be capable of hindering Lean adoption, like in the case of HUS. Researching how Lean could aid in crisis management within the healthcare context, could simultaneously prevent the collapse of Lean initiatives during crises and present an effective management tool for healthcare crises.

6. Investigating how Lean can be applied to the broader public sector, including political decision-making in Finland.

As discussed in the thesis, the challenges faced by public healthcare, and the welfare state in Finland, do not fully stem from the healthcare organizations, but rather the broader political scene. Therefore, researching the implementation of Lean in the broader public sector and political system could be beneficial.

7. Factors promoting and inhibiting the commitment and involvement of medical staff to Lean initiatives should be further studied.

As the active commitment and involvement of all employees and managers was found to be critical, yet often a challenging aspect of Lean implementation, researching how this can be enhanced is important. What are the factors promoting and inhibiting employees' and managers' commitment to and involvement in Lean initiatives?

6.3 Researcher's Reflection and Insights

As we reach the culmination of the study on the synergy between Lean Management and the Nordic Welfare State ethos, more specifically in the context of the Finnish public healthcare system, we will share our personal insights and opinions developed throughout the research process.

We believe that Lean management holds profound potential in not only transforming public healthcare in Finland but around the world. Throughout the case study of HUS, and discussions with external Lean professionals, it became evident that Lean management, when implemented thoughtfully and understood correctly, does indeed enhance operational efficiency and the quality of care. The foundational principles of waste reduction, continuous improvement, and employee empowerment align well with the ethos of the Nordic Welfare State. In fact, we believe that in addition to mere alignment, Lean management has the potential to enhance the current public healthcare system in Finland, to align it better with the values of the Nordic model, which prioritizes equity, accessibility, and high-quality public services. In many ways, it is the current healthcare system that does not align with the Nordic Welfare State ethos, as citizens' well-being is being compromised by excessive waiting times.

The integration of a new organization-wide management system is not without challenges. Lean management in a traditionally hierarchical and resource-constrained environment like public healthcare, poses some significant obstacles. Most commonly, however, the perception of misalignment between Lean and public healthcare organizations is due to a misunderstanding of what Lean truly means. The misconception and consequent wrongful application may end up hindering the quality of patient care, no longer aligning with the Nordic model. For this reason, proper education and training as well as careful adaptation are pivotal in our opinion. Lean is not a set of tools, but a philosophy that can drive positive change.

However, the current healthcare system in place in Finland has deep-rooted issues, that cannot be solved from within the healthcare system alone. While Lean has the potential to aid the current healthcare system to a certain extent, the larger issues stem from the overarching political influence.

This is why we believe that researching the potential of Lean integration on a broader nationwide scale, starting from the political system, would be intriguing.

Reflecting on the overall research process, we have grown to appreciate the complexity and potential between Lean Management and public healthcare within the Nordic Welfare States. The journey has been intellectually stimulating and rewarding. We have significantly broadened our understanding of both management theories and the intricacies of public healthcare.

As we conclude this thesis, there is a sense of optimism about the future. The positive outcomes of Lean integration in HUS and other public healthcare organizations suggest that with the right approach, Lean Management can play a pivotal role in aiding the Finnish healthcare system in addressing some of the challenges it faces today. This research is a contribution to the growing body of knowledge that encourages public healthcare organizations to explore Lean Management, ultimately leading to more efficient, equal, and high-quality healthcare for all.

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