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Master's Programme in Supply Management

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**THE IMPACT OF A CLOUD-BASED ERP SYSTEM IN PUBLIC
HEALTHCARE PROCUREMENT**

Master's Thesis, 2021

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ABSTRACT

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Digitalization and digital transformation have an immense effect on the way organizations operate in the current environment. With the constant change in trends and the need to improve, organizations have a need to adapt to their surroundings. The purpose of this research is to study the impact of digital transformation of an ERP system in HUS Logistics' procurement department. The goal is to find the different effects that the change from an on-premise ERP system to a cloud-based causes in the organization's procurement processes and in its personnel. The effects are divided into three categories: organizational efficiency, financial impact and personnel's emotions and attitudes towards the change.

For this thesis 8 individuals were interviewed one-on-one from the HUS Logistics procurement organization. The findings highlight the positive and negative effects in healthcare procurement during and after the change. The key findings include the increased costs from the ERP system update with the increased efficiency and convenience in the system usage. As change management is a crucial part of changes, it was also a prominent part in this thesis. Findings from the interviews concluded that the success of change is partially built-in sufficient communication and trust in HUS Logistics.

This thesis was conducted with a case study method on the digital transformation in HUS Logistics' ERP system. The goal was to find the most prominent factors and effects that have impacted the change and the procurement organization during and after the change.

TIIVISTELMÄ

Tekijä:	Anniina Sääsä
Tutkielman otsikko:	Toiminnanohjausjärjestelmän muutos on-premise -versiosta pilvipohjaiseen -versioon ja sen vaikutus julkisen terveydenhuollon hankintaan
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Digitalisaatiolla ja digitaalisella muutoksella on suuri vaikutus organisaatioiden toimintaan nyky-yhteiskunnassa. Tarve pysyä mukana kilpailussa sekä toimialojen trendeissä luo painetta vastata ympäristön luomiin haasteisiin. Tämän tutkimuksen tavoitteena on tutkia HUS Logistiikan toiminnanohjausjärjestelmän (ERP-järjestelmän) digitaalista muutosta on-premise-versiosta pilvipohjaiseen -versioon ja sen vaikutusta hankintaorganisaation prosesseihin sekä henkilöstöön. Vaikutukset on jaettu kolmeen kategoriaan: organisaation tehokkuus, taloudellinen vaikutus sekä vaikutus henkilöstön tunteisiin sekä asenteisiin.

Tätä tutkimusta varten haastateltiin kahdeksaa HUS Logistiikan työntekijää henkilökohtaisissa haastatteluissa. Keskeisimmät havainnot empiirisestä tutkimuksesta sisältävät huomioita nousseihin tietoteknisiin kustannuksiin samalla, kun organisaation tehokkuus sekä uuden ERP-järjestelmän käytön mielekkyys ovat lisääntyneet. Muutoksen johtamisen ollessa iso osa muutoksen menestystä, otettiin se myös mukaan tarkastelun aiheeksi tutkimukseen. Löydökset osoittavat haastattelujen pohjalta, että muutos vaatii menestyäkseen avointa kommunikaatiota sekä luottamusta HUS Logistiikassa.

Tämä tutkimus tehtiin tapaustutkimuksena HUS Logistiikan toiminnanohjausjärjestelmän digitaalisesta muutoksesta. Tavoitteena oli löytää muutosta hidastavia sekä edistäviä tekijöitä sekä muutoksen vaikutus hankintaorganisaatioon enne muutosta ja sen jälkeen.

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In Lappeenranta, 12.4.2021

Anniina Sääski

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1. INTRODUCTION

Digitalization has a strong impact in today's society due to the fact that almost everything is linked to the digital world. (Parviainen, Tihinen, Kääriäinen, Teppola 2017, 64) In the last 30 years, digitalization has helped organizations to access new resources. This trend has helped supply chains to access the industry's ground-breaking innovations, such as the Internet of Things (IoT), analytics, advanced robotics and big data. These innovations have changed the image of supply chains from mere logistics operations to independent management departments. This change has established new and more analytical demand planning, as well as integrated sales and operations planning in many companies and therefore has helped different isolated functions to be integrated into other operations. To keep up with these new trends and changes, companies need to be able to change much faster and have faster and more precise supply chains with new technology. (Alicke, Rexhausen, Seyfer 2017)

This thesis will be written for Helsingin ja Uudenmaan sairaanhoitopiiri (HUS). The goal is to look into HUS's digitalized enterprise resource planning (ERP) system and find benefits, disadvantages and risks that have surfaced in the process of switching to a cloud-based ERP system. Aspects that will be taken into account are reflected mostly on the KPIs HUS's procurement as an organization uses. These KPIs are already implemented into HUS's management and strategy and therefore the intent is not to create or find new ones. One aspect that will be looked into, is the preferences that cloud based ERP system's users have and how they have felt the change from traditional ERP system to the new cloud based one. This change in systems has also brought changes to personnel's work tasks and therefore is the main focus of this thesis.

The reason this topic was chosen for this thesis, is because it is a very current topic for HUS and therefore will touch upon everyone who uses HUS's public healthcare services.

This thesis will introduce HUS's supply chain organization with the information found on the HUS's website and from other information found on the internet. This will be done with the idea that public information benefits all individuals and organizations. Therefore, the goal of this thesis is to not only look into the changes, challenges and benefits inside HUS, but to also provide information on digitalization in procurement in this scale.

1.1. Background on HUS

Hospital District of Helsinki and Uusimaa (HUS) is the public health care district of Uusimaa region, with 24 member municipalities. In the year 2019, HUS had over 26 000 staff members and they had over 2500 million euros operating income. This makes HUS the biggest health care provider and the second largest employer in Finland. (HUS 2020a) (HUS 2020b)

The joint authority of HUS's 24 municipalities also cover five different hospital areas, which are Helsinki University Central Hospital, Hyvinkää Hospital area, Lohja Hospital area, Porvoo Hospital are, and Länsi-Uusimaa Hospital are. This joint authority provides support services, administration, property management and procurement and logistics for the entire HUS area. (HUS 2020c)

HUS Logistics, which is HUS districts' procurement and logistics department, serves the entire HUS area with additional specific areas of responsibilities. (HUS 2020d) These additional specific catchment areas contain Päijät-Häme area, Kymenlaakso area and South-Karelia area. (Terveyskylä 2019; HUS 2021a)

1.1. HUS organization's Procurement Department

HUS being one of the biggest employers in Finland and therefore its supply chain department has a vast number of products and services put out for tender. HUS being a public sector organization, put different legal restraints on the procurement process of HUS. This creates different challenges for the organization and for the flexibility of the procurement processes. The tendered products and services need to follow strict protocol and the fact that HUS is providing healthcare services for a huge amount of people in Finland, guides the procurement processes as well. The choosing and tendering process is done in cooperation with healthcare professionals to ensure the quality, compatibility and safety of the healthcare personnel and patients. (HUS 2020e)

HUS's procurement has a goal to ensure the non-disturbed operations of the healthcare system in all of its regions in an economically smart way. (HUS 2020e) This requirement stems from the fact that HUS is a public sector organization and is funded from the public tax money.

1.2. Research Questions

This master's thesis will have one main question and at least two additional supportive questions that will help in the process of finding solutions and conclusions for this thesis. In this chapter these questions are presented. The research questions for this thesis are formed with the idea that the first questions will focus on the main topic of this research. The two supportive sub-questions are formed to support the main question. These questions help to understand the main question and have more in-depth aspect on the research topic.

The first research question's goal is to find answers to the phenomena that is being researched in this thesis. The findings will help the HUS procurement organization to determine the requirements for their future investments in information technology that is being used in procurement and selection management purposes.

RQ1: What kind of impact does cloud-based ERP system have on the procurement processes and the organization?

This main research question will be supported with couple of additional questions. These questions are based on the additional support that is needed to understand the main research question better. The aspects in S-Q1 is to look into the more economic side of effects that may come from change, for example monetary savings or efficiency. The aspect in S-Q2 is on the other hand, to look into the emotional state of organization's personnel based on the change that has happened.

The second question will try to find different ways to measure success or failure. This will look into measurements in monetary savings, time used with new information systems and for example changes in organizational structure. This question also tries to find an answer to how the organization has taken measuring success or failure into consideration during the change process. This question might include other aspects of measurements, which have not been determined yet as it is not fully clear at this point that what kind of means of measurements the researched organization uses.

S-Q1: How can this impact be measured in the organization?

The third question was chosen to support the first and main research question. The question will try to find the impact of change in personnel's attitudes towards the new ERP system and its implementation process. This question includes the feelings, experienced efficiency and everything that will be brought up during the interviews. The goal is to find aspects that affect the attitudes of the personnel.

S-Q2: How has the procurement department's personnel adapted and felt towards the change?

These questions will be answered through analysing the one-on-one interviews conducted with HUS organization and with the interviewees.

1.3. Key Concepts

In this chapter, the key concepts that play crucial role in the thesis will be presented. The goal is to introduce these concepts briefly to understand the core idea and later connect them to the theoretical and empirical parts of the thesis. These key concepts include digitalization, supply chain management, enterprise resource planning system, cloud-based systems, cloud-based enterprise resource systems, management of digital change in organizations and key performance indicators.

Digitalization: According to Gartner Glossary, digitalization has been defined as the use of digital technologies in addition to develop the existing business model, to provide new revenue and to create new opportunities to add value to the already existing business activities. (Gartner Glossary 2020)

Supply Chain Management (SCM): Supply chain management has been defined as the active management work of supply chain activities. Management is meant to be done as effective and efficiently as possible. The goal is to achieve competitive advantage and maximize customer value. (Handfield, 2020) Therefore, SCM is the combination of purchasing, logistics and operations. It is being recognized as the management of relationships across the entirety of the supply chain. (Lambert 2004, 19)

Digital Supply Chain (DSC): Digital supply chain is to accumulation of development in the field of information systems combined with innovative technologies. This has the effect to

improving and strengthening the supply chain and therefore having an effect on the chain's customer service, sustainability and performance in the organization. (Aregon, Bentahar, Gunasekaran 2020, 133)

Enterprise Resource Planning system (ERP): Enterprise resource planning systems are software applications designed to be integrated enterprise-wide to gain and manage knowledge of the organization's operational and managerial processes. ERP systems are usually semi-finished packages that can be moulded into the needs of each company that wants to implement the system into their organization. (Shang, Seddon 2000, 1005)

Cloud Computing: Cloud computing is the combination of virtualization, service-oriented architecture and utility computing. This creates a platform, where IT services can be accessed through web and used with local tools and applications that are usually located in web browsers. (Karnouskos, Colombo and Bangemann 2014, 2) What differs cloud computing from traditional ways of databased systems is the use of on-demand network to access a pool of computing resources. These resources include for example networks, storage, services and servers. (Mell, Grance, 2011, 2)

Key Performance Indicators (KPIs): Key performance indicators (KPIs) are the core of performance measurements in an organization. KPIs represent the most critical aspects of organizational performance for current and future success. KPIs should be monitored continuously daily or weekly and one of the most important characteristics for KPIs is that they are current- or future-oriented measures. This means that KPIs never measure past phenomena. (Parmenter 2007, 3, 6)

Change: Change can be determined in various ways, but in this master's thesis it will be referred to as to the difference between the previous or current situation and the following situation that will be surfaced due to inner or outer influences. (Lewin 1947, 151)

1.4. Limitations

The limitations for this thesis will provide a clearer image on the end goal in which this research will be headed. First limitation is, that the time frame for this research will be kept in under a year. This limits the collected data into a smaller amount and might cause the end result to be different than it would be in a for example with a five or a ten-year time frame. For this reason, the research will not try to answer the research questions in a long run impacts aspect.

The second limitation centres around the empirical part. Due to the fact that this research is conducted in co-operation with HUS organization's procurement department, only small number of interviews will be conducted. This keeps the focus inside the organizations and helps to get more in-depth information with one-on-one interviews. As the aim of this study is not to gather data that could be generalized across all industries, this limitation is justified.

The third limitations will leave the impact of outside forces out of this research. Even though outside forces do have an impact on the implementation and outcome of a new enterprise system, this will not be taken into account. The focus will only be in the forces and attitudes inside the HUS procurement department.

The fourth limitation will target the people who will be interviewed in the data collection process. For the anonymity of the interviewees, none of their information will be presented in this thesis. This also includes the exact position, how long they have worked in the organization, their educational background and their relationship to the other interviewees. With these limitations, the interviewees' right to anonymity will be ensured.

The fifth limitation regarding this master's thesis, is that some information provided by the research organization HUS, will might need to be kept anonymous due to the fact that the information might be confidential during the time that this thesis will be made. This limitation might not be used in action, but to make sure that there will not be any misunderstanding on why some information will not be released, this limitation is written in this thesis.

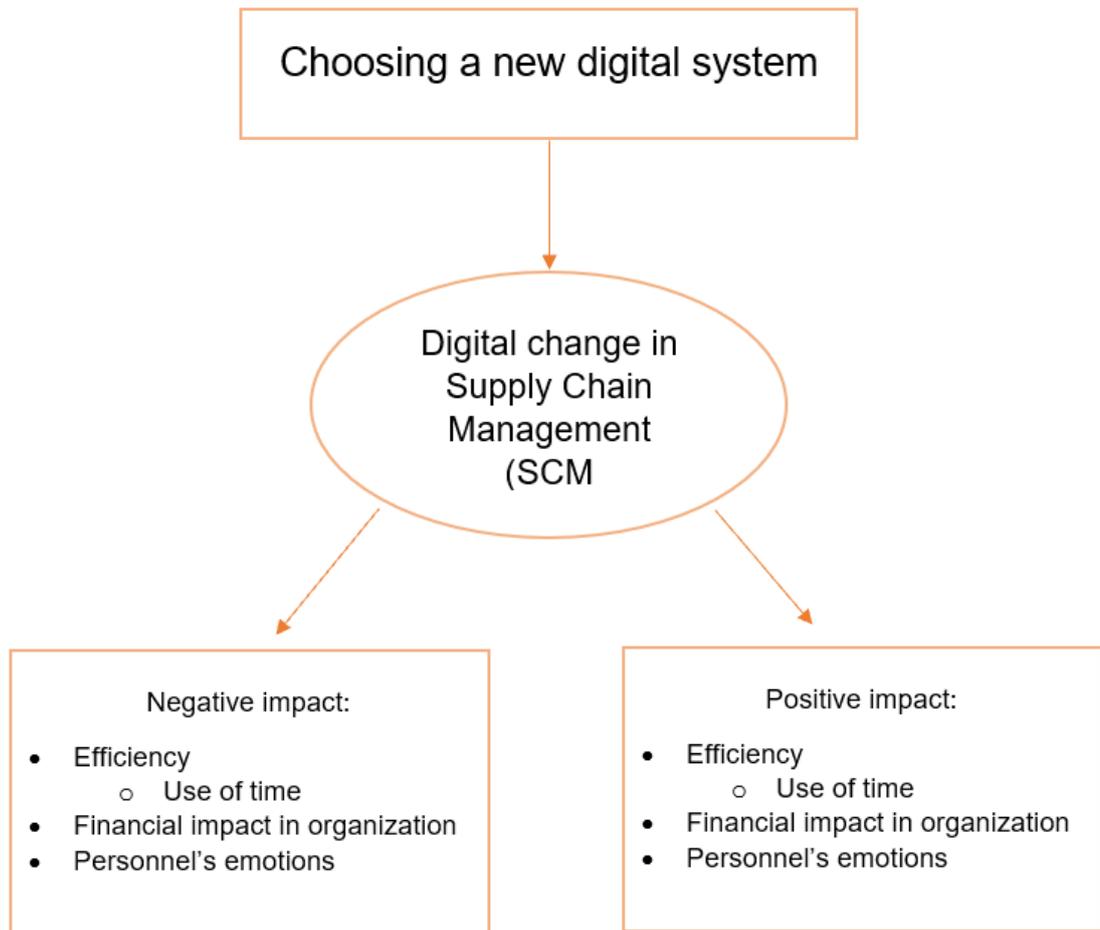
1.5. Conceptual Framework

In this chapter, the conceptual framework is presented. The framework is combined from two different theoretical ideas. The first one is Hendricks, Singhal and Stratman's (2007) finding that investments in supply chain management (SCM) systems have an overall positive impact on the organization's financial performance. (Hendricks, Singhal, Stratman 2007, 1-2) From this theoretical finding, the impact on efficiency is derived due to the fact that efficiency is closely related to organization's financial competences and success. In the framework, the "use of time" implies to the time used to implement the new system into the organization. This includes time periods from the implementation and post-implementation time.

The second part in the framework is the inclusion of human reactions to change. This is derived from a research conducted by Klarner, Todnem and Diefenbach (2011). In the

research, it was found that since the future change is being announced, the emotions and attitudes of people may be triggered according to their past experiences with changes. The origin of the stimulated emotion depends on the situation and the people studied. (Klarner, Todnem and Diefenbac 2011, 336) Therefore, this theory is chosen to complement the framework to gain a better understanding on the organization's personnel's reaction and their attitudes towards the new digital system and change.

The framework excludes all of the steps that lead to choosing a new digital system for the organization, and therefore it begins from the choosing stage. This leads to digital change in the organization's supply chain management operations. The change, in this framework, has two options for impact. Both, negative and positive impact, have same areas of impact. The areas are efficiency, especially time used in during the change and post change, financial impact in the organization and personnel's emotions and attitudes towards the change.



Picture 3. Conceptual framework of the effects on digital change in supply chain management. Derived from Hendricks, Singhal, Stratman 2007 and Klarner, Todnem and Diefenbac 2011.

The conceptual framework for this master’s thesis has been collected from the findings of previously conducted research on the topic of investing in and implementing new digital systems in organizations. Hendricks, Singhal and Stratman (2007) conducted a study on the effects of investments in Enterprise Resource Planning (ERP) system in Supply Chain Management (SCM). They interviewed all together 186 participants who had implemented ERP system into their organization in the time period of five years. In the study, researchers found that the investment in ERP systems yielded into mixed findings. The study showed that the financial improvement four years post implementation in the organizations was overall positive. While observing the implementation and post-implementation periods, the changes in Return of Assets (ROA) and the Return of Sales (ROS) were generally positive on the organizations that had invested in supply chain management systems. Hendricks, Singhal and Stratman also pointed out that “our results are not uniformly positive across the

different enterprise systems (ES), they are encouraging in the sense that despite the high implementation costs, we do not find persistent evidence of negative performance associated with ES investments.” This combined with the statement that the overall results from the study imply that investments in supply chain management systems have a positive effect on organization’s profitability. (Hendricks et al. 2007, 1, 74-75.)

The reason for dividing the impact into a negative and positive sides in this framework, is due to the fact that during the implementation of new enterprise system, organizations usually face difficulties and setbacks in the process of the implementation. Even though the long run result might be fully positive, the process of implementation is not known to be as smooth as it may be portrayed as. This can be caused by change resistance. Change resistance is described as a natural phenomenon that rises from the individual’s personality and their interactions with the surrounding world in a dynamic way. (Coghlan 1993, 11) This may cause dissatisfaction in personnel and therefore affect the efficiency in the way personnel work and through that affect the economical side of supply chain management in the organization. It has been reported by researchers that even though change may be seen as a positive aspect to the continuum of organization’s success, it has been frequently found that employees resist this change. (Liu & Perrewe 2005, 264) This theory on change resistance has therefore been chosen for this thesis due to the fact that it plays a big role in the success or failure of a new investment in organizations.

The theory of change resistance will be given reasoning with Lewin’s force-field analysis (1951). This theory will help to understand why people behave in certain way in changing situations and how group settings influence this behaviour. This behavioural science approach will help to combine the thoughts from change management with the research done on change resistance and emotions.

1.6. Structure of the Thesis

This thesis is structured in the following way: first there is the introduction for the thesis with research questions will be presented. These include the main question as well as the additional supportive questions. This chapter also includes the key concepts regarding the research, limitations and conceptual framework.

After this, the theory used in the study will be presented in literature review. The literature review section will start with defining supply chain management (SCM) in public sector. Digital transformation in general will follow and then move from digital transformation in the

public sector to digital transformation in supply chains. After this, the future predictions for digital supply chain management (SCM) will be presented with Industry 4.0. as well as management of digital change will be touched upon. Key performance indicators (KPIs) as measurements of success will be presented after that.

Literature review will follow into change management with Wick and Quinn's episodic and continuous change and from there present internal and external factors of change. This will be followed by Lewin's force field analysis to support the theory of behaviour in change. After this emotions and attitudes in change will be discussed with change resistance.

After the literature review, research methodology will be presented. This thesis will be done as a qualitative research with case method. Data collection process and how data analysis is made will be presented in this chapter with research reliability and validity.

The fourth chapter will include the empirical of the thesis. As this thesis is made as a case, personnel from HUS will be interviewed on their views of the digital change and implementation of new cloud-based ERP system. After the empirical analysis, the findings will be presented and reflected to collected theory. The research questions will be answered based on the findings. The final part for this thesis, will be conclusion, ideas for future research topics and recommendations for HUS for implementation of new digital systems to support supply chain management.

2. LITERATURE REVIEW

This chapter focuses on presenting findings and discussion from previously conducted research on each given topic. As the outcome for this master's thesis is to find the impact digital change and implementation of cloud-based ERP system has on public healthcare service provider, the literature that will be presented is linked to the research strongly. Key topics that will be presented will be touching digitalization in business, digitalization in supply chains, future of supply chains, supply chain management (SCM) in the public sector and Key Performance Indicators (KPI) as measurements of success in change. Key performance indicators (KPIs) will be presented as measurements of success in change and this will be followed by introduction to change management and digital change management. The theory of behaviour of people in change will be introduced with Lewin's Force Field Analysis (1951). This chapter will present the key framework of Lewin. After this, the emotions and attitudes that are linked to change resistance will be presented. This last chapter will contain research on the reason why change resistance is prominent in change and how to deal with it. As change resistance has been widely researched, this chapter will also dive into some solutions that have been discussed to tackle resistance in organizations during and after change.

2.1. Supply Chain Management in Public Sector

Supply chain management (SCM) in public sector has been described to be different from the SCM practiced in private sector organizations. (Larson, 2009, 222) The actors that operate in public sectors include generally governmental departments, municipalities and healthcare units who work together with their suppliers and "customers". Customers in this context refer to public organizations' stakeholders whose goals may differ and depend on political convictions. The definition of the customer is certainly vague and it differs according to organizations as it can be defined as the end user of a certain service, the service providers such as hospital workers, the citizen, the system, the politician or the employees of the organization. The difficulties in defining the customer leads to difficulties in defining to whom is value added while implementing new processes and while creating improvements. (Arlbjorn, Freytag, de Haas, Jonsson 2011, 280, 288, 290)

In a study conducted on Canadian supply chain management professionals, it was found that procurement professionals in public sector do not view SCM with as wide of a

perspective as the professionals working in private sector. The second finding made in the same study was that professionals working in the public sector have different perception on the importance of tools and techniques to support their work and performance. (Larson, 2009, 222) Some characteristics for the public sector procurement can be derived from the characteristics of the organization's that operate in that said sector. These generally include less freedom to operate flexibly, higher level of diplomacy, patience, accountability and transparency. The latter ones are greatly scrutinized due to the amount of stakeholders the public sector usually has. (Newman 2003, 1)

Researchers Leenders, Fearon, Flynn and Johnson on the other hand described public sector supply chain management with having emphasis on competitive bidding instead of negotiations, having lack of confidentiality while dealing with different suppliers, having lack of transportation expertise and having lack of inventory carrying costs and interest expenses. Other characteristics that differentiate public SCM from private SCM is focus on the purchasing price instead of the total cost of ownership, tendency for long-term supplier relationships, lack of collaborations and free of board (FOB) destination buying. (Leenders, Fearon, Flynn & Johnson 2002) This has been very prevalent in Newman's findings while comparing private and public sector's supply chain management. In his article, Newman highlighted that the environment in public sector procurement is based on policies, legislations and process while in private sector procurement has more enterprising dynamics. (Newman 2003, 1)

Lambert identified 8 key supply chain management processes in his research. These eight processes link supply chain management to organization's other processes and therefore work as value creation tools. These eight processes are customer relationships management, customer service management, demand management, order fulfilment, manufacturing flow management, supplier relationship management, product development and commercialization and returns management. With the proper usage of these eight managerial fields with supply chain management, organizations are able to create valuable processes and optimize product flows. All of the fore mentioned eight keys have both strategic and operational elements. The strategic elements help the organization to establish and manage the supply process while the operational elements execute the process. (Lambert 2004, 20, 22)

In Lambert's research, he concluded that the strategic elements need to be managed by a team that is comprised of representatives from different functions. These functions should include representatives from marketing and sales, purchasing, production, logistics, finance

and research and development. The team's main goal is to develop the organization's SCM processes and implement these at the strategic level. This has an impact on the organization's day-to-day activities in each functional area as well as in the organization's supply chain management. (Lambert 2004, 22)

2.2. Digital Transformation

In the private sector, innovations such as digital transformation has seen as the key factor in value creation and creation of competitive advantage. This can ultimately be measured in economic terms. On the contrary, public sectors efforts in innovations and the measuring of them have been described as more complex as the key goal is not to create profit. (European Commission 2013, 13)

Digitalization and digitization are two overlapping terms that often get confused with each other. These terms can be used while having a conversation on the digital aspects of a business, but their meanings can easily be distinguished. (Bloomberg 2018, 2) Digital transformation as a term, has been adopted from private sector and it is strongly associated with the demand to stay competitive in the internet age with the newest technology. Even with existing research, researchers have yet found a clear reason why digital transformation initiatives succeed or fail. (Mergel, Edelmann, Haug 2019, 2)

VTT Technical Research Centre of Finland defines digital transformation as a change in roles and business offerings, models of working, adaptation of digital technologies in an organization or in the environment that they operate in. (VTT Technical Research Centre of Finland Ltd. 2016, 7) This definition can be supported with Parviainen, Tihinen, Kääriäinen and Teppola as they added four levels where change happens. These levels are process, organizational, business domain and society levels. Each level has its own approach to change. In process level the goal is to adopt new digital tools and to reduce manual steps in processes. In Organizational level the main idea is to discard practises that are no longer in use, offer existing services in new ways and to offer new services. In the business domain level, the change happens in the ecosystem s by changing roles and value chains. In the last, society level, the idea is to change the society's structures such as what influences decision work and what types of work exists. (Parviainen et al. 2017, 64)

Digital transformation impacts organizations in many ways through the organization's operational environment and the way organizations internally work. It has been recorded that through digitalization, organizations have been able to introduce new business models

and opportunities as well as change in the roles of operations in value chains. (VTT Technical Research Centre of Finland Ltd. 2016, 63) The impact for digital transformation can be ruled into three categories. The first one is internal efficiency which includes the re-planning of internal processes and the improved way of working through digital means. The second category is external opportunities, and this includes for example new opportunities for businesses in already existing business domains and the possibility to gain new services and new customers. The third category is disruptive change in which digitalization creates completely new roles in business through change. (Parviainen et al. 2017, 66-67)

In digital transformation, as well as in every other type of transformation, in order to build value, leaders need to take risks. For this reason, it is foremost important that organizations have the capabilities to lead these transformations to success by understanding how to manage change, risks and avoid pitfalls that potentially harm the already gained benefits. (McKinsey & Company 2017)

In this chapter the main point of view is to look into digital transformation in public sector and in supply chains. These two aspects are the most important links for empirical section and therefore they have been chosen to be looked into.

2.2.1. Digital Transformation in Public Sector

The purpose of this chapter is to look into the impact of digital transformation in public sector's viewpoint. The topic has been studied widely, but it does not have much systematic insight on how public administrators view digital transformation and how it is approached. In literature, the concept of digital transformation is strongly related to digital government, transformational government and e-government. These different concepts are closely linked together, and they share a common ground of examining the phenomena on how public sector uses information technology and how it affects their value creation process. (Mergel et al. 2019, 1-2)

The European Commission conducted a research on the topic of digital transformation on public sector in the European Union area in 2013 and according to that research, the public sector has been investing and growing the innovations that largely benefit the private sector as well. This creates new opportunities in the private sector and builds new infrastructure. (European Commission 2013, 4)

On this topic researchers Mergel, Edelmann and Haug highlighted that the pressure for digital transformation mainly comes from the demand that is driven by external factors, such as private sector's change in digitalization. This creates a new type of demand in the public organizations' environment, level of technology and their stakeholders' requests. The main driver for public sector's pressure to digitalize can be ruled to be private sector's level of change, but researchers and public administrators highlighted that citizens have a much more important role in this than the private sector. This notion can be derived from the fact that citizens, private businesses and politicians who experience the technological change, expect the public sector to adapt to this change accordingly and provide services in the same level of digital transformation. (Mergel et al. 2019, 2)

In their research, Mergel, Edelmann and Haug found out that most interviewees pointed out that the demand for change comes much likely from external factors, rather than internal demand. This need for change comes the pressure to respond to the digital transformation that happens around them. (Mergel et al. 2019, 7) This does not rule out the demand from internal factors, but it does make the impact much smaller. The internal impact that leads to change and to digital transformation, is mostly focused on improving the management of the organization rather than responding to a pressure. (Mergel et al. 2019, 8)

In European Commission's report on innovation and digital transformation, the researchers highlighted that innovation in public sector is about new and improved ways in processes which focus on internal changes and improvement of services which have an external focus on change. When the focus is internal or external, the innovation usually happens in the public sector. Innovations with these types of focuses, usually enhance the public sectors efficiency, improve services and outcomes for businesses and citizens. In contrary, when the focus is in promoting innovation elsewhere, the innovation happens through the public sector. In this type of focus, the improvement happens in other sectors. (European Commission 2013, 11)

2.2.2. Digital Transformation in Supply Chains

Digital transformation affects the field of operations and supply chain management in multiple ways. Büyüközkan and Göçer defined digital supply chain (DSC) as the technological systems that have the best capabilities for massive data disposal and for excellent communication and cooperation considering digital hardware, software and networks. In their research, DSC has been described to support and synchronize trans-

organizational interactions by making services more accessible and affordable. This creates more effective and agile outcomes consistently and has had a great impact on supply chains and logistics industry. (Büyükozkan & Göçer 2018, 634)

It has been identified that digitalization allows the redistribution of activities across different landscapes, such as organizational and geographical. It also enables and facilitates the interactivity between digital artefacts and external environment inputs. One of the advantages that organizations gain from digitalization, is that they are able to asynchronously organize activities. Due to this, organizations are able to execute and organize individual activities independently for each physical object and replicate this through the entire supply chain process. This way different processes are not binded to each other anymore and they do not need to be executed sequentially in the process. (Holmström, Holweg, Lawson, Pil & Wagner 2019, 728-729) This lets the process chain to move more elastically than in a non-digital platform.

One of the major transformations in supply chain management has been the integration of Enterprise Resource Planning (ERP) systems. Alone in the year 1999, organizations spent world-wide 90 billion to 180 billion US dollars on ERP systems alone. These investments have been made with a long-term scope as most organizations intend to use ERP systems for years. This change in supply chain management has affected different sides of procurement departments with incorporating new technologies to support daily supply chain management activities. With ERP systems, organizations are able to use knowledge and data from for example organization's customer relationship management (CRM) systems and from different data warehouses and E-commerce platforms. The benefits from implementing ERP systems to organization's activities can be divided into five different dimensions. These dimensions are operational, managerial, strategic, IT infrastructure and organizational dimension. (Shang & Seddon 2000, 1005) Next the dimensions will be presented in table 1 and explained more in depth in the chapter after that.

Dimension	Benefits
Operational	<ul style="list-style-type: none"> • Cost reduction • Cycle time reduction • Productivity improvement • Quality improvement • Customer service improvement.
Managerial	<ul style="list-style-type: none"> • Better resource management • Performance improvement • Improved planning and decision making
Strategic	<ul style="list-style-type: none"> • Build business innovations • Build cost leadership • Support business growth • Support business alliance • Product differentiation and customization • Build external linkages to customers and suppliers
IT Infrastructure	<ul style="list-style-type: none"> • IT costs reduction • Increased IT infrastructure capability • Building business flexibility for current and future changes
Organizational	<ul style="list-style-type: none"> • Empowerment • Building common vision • Supports organizational changes • Facilitates business learning

Table 1. Attainable Benefits from ERP System Implementation (Shang & Seddon 2000, 1005-1007)

The first dimension for attainable benefits is operational ones, which includes reduction of costs and cycle time and in contrary improvement in productivity, quality and in customer service. Investments in ERP systems have conventionally automated businesses and therefor these benefits can be attained by these types of investments. The second dimension includes informational benefits for managerial departments through ERP systems' built-in data analysis and databases. This includes benefits such as improved performance and resource management as well as improved decision making and planning.

The information that will be obtained from ERP systems is beneficial in managerial level during decision making process in different operating divisions in the organization. The third dimension that Shang and Seddon included was the strategic dimension. In this dimension include support for business growth and alliances, building linkages to customers and suppliers and building strategies for business innovations and cost leadership. ERP systems support these strategic capabilities. The fourth dimension includes benefits that are linked to organization's IT infrastructure. With the support from ERP systems, organizations are able to provide an infrastructure that enables a more flexibility for future changes and increased the capabilities for quick and economic implementations. On top of these the implementation of ERP systems reduces IT costs and marginal costs for organization's business units. The last dimension for benefits that Shang and Seddon identified were organizational benefits that include empowerment, building of common visions support for organizational changes and facilitating an environment for business learning. Through ERP systems, organizations are able to affect organizational capabilities in a positive manner. (Shang & Seddon 2000, 1005-1006)

2.2.3. Industry 4.0

For the future of digital supply chains, researchers have highlighted multiple plausible topics that can be expected to be seen in the context of supply chain management. As the first three industrial revolutions have brought mechanization, electricity and information technology (IT) (Qin, Liu & Grosvenor 2016, 2), the term industry 4.0 refers to the Fourth Industrial Revolution with edge cutting technologies. (Queiroz, Pereira, Telles, Machado 2019, 4) The most prominent trait for industry 4.0 is the interactions that different machines and objects (Lee 2015, 230) have as well as topics such as artificial intelligence (AI), internet of things (IoT) and big data analytics (BDA). One of the biggest differences to previous industrial revolutions is that in industry 4.0, the components such as machines and objects have the ability to exchange information and operate independently as well as autonomously. (Qin, Liu & Grosvenor 2016, 2-3).

The performance and improvements that industry 4.0 brings to organizations should be measured with financial and non-financial measures depending on the operating organization. With this approach, organizations are able to find the exact operational levels that have the biggest impact on the organization's success. Since information technologies regarding industry 4.0 have a major role in organizations performance in different

operational levels, these should be measured to ensure an accurate and smoothly working value chain between supply chain partners. (Aregon, Bentahar, Gunasekaran 2020, 135)

Globally it can be seen that digitalization creates new business opportunities that match customers' needs with a better fit, enables changes that mould the shape of the current industries, increases competition and the ways customers can be served. These trends enable service design, management and provisioning in the field of logistics with the possibilities of developing co-creation environments. (VTT Technical Research Centre of Finland Ltd. 2016, 75)

Even though industry 4.0 has been an established concept that includes various achievements in today's technological and manufacturing fields, it has not yet been fully achieved in many fields and therefore it has not been attainable for many organizations. This is due to the fact that the criteria of industry 4.0 has yet been specified and organizations are therefore still researching for this concept and trying to achieve it. (Qin, Liu & Grosvenor 2016, 1).

2.2.4. Management of Digital Change

As digitalization becomes more and more prominent part of organizations' strategies and it is implemented into everyday processes, management faces new challenges. These challenges mostly circle around the concept of change management, managing digital change and how to implement these new technologies into the organization's processes. As managing digital change is closely related to the research topics of this thesis, it will be discussed in this chapter.

The reasons why organizations tend to fail in their attempts in digital change is strongly related to organization's culture. Some of the biggest reasons for failure in change lack of focus, running out of money, fear of the unknown, lack of sufficient competence, lack of discipline, failure to learn and going too slowly and alone. (McKinsey & Company 2017) In order to understand why these reasons have been listed as the main reasons, one needs to get an idea on how these concepts affect organizations in the long run.

Lack of focus refers to the approach that many organizations have adopted and practice as having too many competing initiatives at the same time. This creates an environment where management's focus is not on the ideas that need resources in order to succeed. This often leads to short-term gains that are not sustainable and do not add value to the organization.

The second reason, running out of money, refers to a situation where digital transformation faces obstacles and therefore the costs increase or expected revenue does not match the expectations. Fear of the unknown occurs when organizations lack correct information and therefore go back to trusting their gut feeling. This lack of facts creates fears and uncertainty amongst the organization. This can be linked to lack of sufficient competence in organizational change. Due to this problem, organizations may have a wrong idea of what digital transformation includes and therefore having wrong idea of what digital change consists of. Organizations often tend to miscalculate the time building capabilities takes and, in some cases, they do not even know what kind of talent they are looking for. Organizations also tend to stop learning during times of change. This easily leads to employers being scared to take risks and therefore limiting their potential. Lastly, one of the most prominent reasons why digital transformation projects tend to fail lies in organizations' desire to work on their own without any cross-organizational cooperation and missing opportunities when it comes to staying in the front line of development (McKinsey & Company 2017)

Karna highlighted three main topics on how to successfully manage digital transformation. The first thing is to overcome panic that rises from doubts and uncertainty with sufficient communication, stakeholder engagement and with efficient leadership commitment. The second thing is to overcome personnel's concerns and address them accordingly. This will help dealing with change resistance and personnel's perception on change. The third and last thing is to keep a steady pace and timing in change. This way organizations are able to stay focused and this way minimizing chances for errors and disengagement. (Capgemini 2017)

In order to succeed in digital change, organizations need to focus on the right kind of initiatives that matches the needs of customers and has the biggest overall impact. According to Arora, Dahlström, Groover and Wunderlich, organizations that are able to identify the processes where value is created and destroyed, will gain a deep analysis on the organization and will develop a clearer picture on the elements of their business that add the most value as well as on the structural disadvantages. After organizations have been able to identify the regions where problems lie, they have a better idea on what type of skills they need to solve those said problems. While having the needed skills, organizations still need to have well-lead teams. One of the most effective ways to lead teams especially in digital transformation has been noted to be agile project management. With agile learning teams are able to create an ecosystem that supports speed as well as constant learning with the support of team members. (McKinsey & Company 2017)

One effective way for organizations to gain more insight on their ongoing transformation is the usage of KPIs. Even though KPIs are a great way to find the parts that create value and help to find the most impactful processes in the organization, it is also important to focus on certain and limited amount of KPIs. With a set number of KPIs, leaders are able to design smaller projects and set milestones for their teams that create a sense of accomplishments to boost their motivation. (McKinsey & Company 2017)

2.3. Key Performance Indicators (KPIs) as Measurements of Success

To measure and visualize trends, organizations have adapted to the use of customizable business metrics called Key Performance Indicators (KPIs). With KPIs organizations are able to measure the progress concerning chosen objectives with the usage of an actual value compared to a target value. Some commonly used KPIs for organizations indicate changes in sales, net profit or debt ratio. (Guzik, Netz, Bezic 2004, 12) With the usage of KPIs, organizations are able to achieve targeted success on project by adapting the strategies that are supported with KPIs. In the contrary, KPIs themselves are not success factors, but rather compilations of data measures that are used to access the performance of different operations. (Toor & Ogunlana 2010, 229)

In earlier research, it has been difficult to settle a definition on what is performance management as it differs across organizations. As KPIs are performance measurements and a collection of data it needs to be differentiated from performance management which in the contrary is the definition of what is done with the collected data. Performance management, which is closely linked to success in organizations, has to be clearly linked to strategic priorities. With the usage of performance measures and performance management, organizations are able to focus on the core processes and therefore improve their performance. (Atkinson 2012, 48)

Due to the fact that every organization is different and performed projects have a different nature, it is difficult to determine KPIs that every project could use and generalize. (Toor & Ogunlana 2010, 229) Even though KPIs work well for supporting decision making and are a good tool for visualizing change, there has been some critique for them in practice. The problem lies in the fact that every decision maker can often calculate their KPIs differently and this therefore causes a problem with the inconsistency while defining organizational goals and consequently in KPIs. (Guzik, Netz, Bezic 2004, 12) Even with these limitations, the focus in KPIs needs to be in the way different projects are carried out with the usage of

KPIs. This can be supported and used as a learning opportunity for organizations in the context of change and project management by using already existing cases that have similar context and targeted outcomes. (Toor & Ogunlana 2010, 229)

2.4. Change Management

Change in organization can be defined as transformation that happens in an organization between two points in time. In most cases this transformation can be observed through comparison of the organization before and after transformation. Change has another dimension that is needed to be discussed while studying organizational change. The second dimension, concerns aspects such as the speed, sequence of activities, communication and decision-making systems and possible encounter of change resistance. (Barnett & Carroll 1995, 219)

Change is often seen as a chance of an opportunity or as a crisis inside an organization. (Fox & Amichai-Hamburger 2001, 85) Researchers Weick and Quinn have highlighted that during the 21st century, organizational change has been a popular topic for discussion amongst researchers. Change in organizations can be triggered by different sources, external or internal. (Weick & Quinn, 1999) It has been noted that as change occurs in organizations, it is important for the personnel to view the situation and their organization as an open system that is and will be influenced by its environment. (Fox & Amichai-Hamburger 2001, 88)

In their study Weick and Quinn also divided change into two categories depending on its rate, rhythm, pattern of work and activity. The main difference between these two approaches is the distance in the observer's perspective (Weick & Quinn 1999, 362). First, we will look into episodic and continuous change characteristics.

2.4.1. Weick and Quinn's Episodic Change

The first one is called episodic change which can be described as more of a short-run adaption to change. (Weick & Quinn 1999, 361-362, 366) In this category, change happens during periods of dividence and when it is infrequent, discontinuous and intentional. Episodic change usually derives from the difference between what the organization's structure is, and what kind of environmental demands they have. For this reason, episodic

changes are externally driven, as the organization tries to adapt to new environmental changes. (Weick & Quinn 1999, 366)

This type of periodic changes can rise from external events such as technological changes or from internal factors such as change in personnel. (Weick & Quinn 1999, 365) Episodic change is described as Lewinian, which refers to its inertial, linear, progressive and goal seeking nature that requires intervention from an outside force. The process of change in episodic approach has three important focuses. These are inertia, replacement and triggering of change. Episodic change targets the organization's meaning systems by creating new ways of communication, building coordination and commitment and by re interpreting revolutionary triggers. (Weick & Quinn 1999, 366)

2.4.2. Weick and Quinn's Continuous Change

The second type of change that Weick and Quinn categorized in their research, is called continuous change. This type of change can be described as constant, evolving, cumulative and it is frequently associated with self-organizing organizations. On the contrary to episodic change, continuous change tries to have longer-run point of view and approach to change. The core idea in continuous change is that the organization is driven by instability and alert reactions on daily basis. This creates cumulative small efforts to change. Continuous change process has multiple aspects that cumulatively direct change to the correct direction. The process includes recognizing and reframing current patterns, enriches the dialogue, new identity and defines the meaning of new language in the organization. (Weick & Quinn 1999, 366))

2.4.3. Internal Factors of Change

As this master's thesis focuses on the internal forces that affect change, it is important to explain the meaning of internal forces. According to Weick and Quinn, internal forces in change mean series of actions that are initiated from higher organizational levels and carried out according to a set plan. These changes can be for example change in key personnel, which highly affects the dynamics of organization structure. (Weick & Quinn 1999, 365) Barnett and Carroll concluded that organization's age and size can also be included as internal factors of change. This is due to the fact that in previously conducted research, it has been found that organization's that are larger usually have more resources

that are needed in change process. On the contrary, larger organization's usually face problems with stricter bureaucracy and therefore are not as likely to change rapidly. One aspect that Barnett and Carroll empathized in their research is that chance of change occurring grows when change occurs. (Barnett & Carroll 1995, 221) This means that for example if a company merges with another company, this is the change that has occurred, and this increases the chance for new type of change.

2.4.4. External Factors of Change

According to Weick and Quinn, external factors in change are characterized as forces that come from outside the organization. These forces can be for example new requirements for technology which is needed in the industry that the organization operates in. (Weick & Quinn 1999, 365-366) External forces can also be for example political regulations that force organizations to change their protocol. (Barnett & Carroll 1995, 221) It is important for organizations success to be able to respond to these external factors that usually dynamically change the environment. (Weick & Quinn 1999, 365-366) One form of external force that organizations need to take into account is the competitive field that they operate in. Even if the organization strives for monopolistic position in the market, they still should behave as if they operate in a competitive market. This is very essential in keeping the organizations potential and not getting too comfortable in the current environment. (Ulen 2010, 136)

2.5. Force-field analysis

Lewin's work on behavioural sciences and contemporary theories of applied behavioural sciences has been praised for decades and therefore his contribution in this field is notable. His research highlighted the importance of strong moral and ethical belief in democratic institutions and democratic values in society. The reason why Lewin's Field theory is popular in understanding behavioural patterns, is due to the fact that it helps to map out the forces that affect individuals, groups and organizations. (Burnes 2004, 978, 982, 986) His research's adaptability is the reason why this theory will be looked into during this master's thesis. The force-field analysis will help to understand the reasoning for people's behaviour in situations of change.

Lewin viewed change as a constant state that groups of people are in. In this state of change, different forces maintain the current situation. This means that every group of people have their own distinction habits and behavioural patterns based on the forces that control their lives. These forces can be for example the environment that the group lives in. This example explains the development of cultures that differ between people who live in geographically different places. (Lewin 1943, 172) From this can be derived the idea that different forces, big or small, change constantly the dynamics that different groups operate in and this creates patterns.

In a situation that change occurs, there is a presence of forces that leads to a conflict. (Lewin 1947, 144) The conflict does not always mean a negative occurrence and therefore it implies more to a crossroad of the present and the future. The conflict enforces the group and the individuals in it to consider their behaviour which leads to possibly more change. This leads to Lewin's statement that "group life is never without change, merely differences in the amount and type of change exist" (Lewin 1947, 199) This constant change may create opposing forces to interfere with the possibility to change. (Lewin 1947, 144)

The theory's core idea is that to be able to understand why individuals, groups and organizations behave in certain way, one needs to identify, plot and establish the potency of forces affecting the situation. This way one could also define the forces that need to be diminished or strengthened to be able to create change. The change process in organizations is deemed to be a slow process, but Lewin saw that in case of a crisis, the forces can affect quickly and radically. This type of crisis can be for example a personal, organizational or societal crisis. (Burnes 2004, 982)

In conclusion, Lewin identified two requirements for resolving conflicts. First requirement is "to analyse and understand how social groupings were formed, motivated and maintained", followed by the second requirement, which is "to change the behaviour of social groups". By identifying these requirements, it is possible to change groups dynamics and the direction where said group is heading. (Burnes 2004, 986)

2.6. Emotions and Attitudes in change

Change in organization is often described as an event that brings up different emotions. As the news of a possible change spreads through the organization, people often start to experience stress and anxiousness. (Fox & Amichai-Hamburger 2001, 85) Liu and Perrewe highlighted in their study that during change, personnel often feel intense negative emotions

such as anger, fear and frustration, when met with organizational change. (Liu & Perrewe 2005, 263) On top of these emotions, people often feel are denial, objections, stress, reduced organizational commitment and cynicism towards the change and its benefits. This often results in slow change action implementations as well as termination of unnecessary actions. (Fox & Amichai-Hamburger 2001, 84)

Change is a dominant part of organization's ability to maintain competitive advantages in ever changing environment they operate in. (Liu & Perrewe 2005, 264) The concept of emotions and different behavioural patterns have been long studied in the aspect of change management. These studies have shown evidence that it is important for organizations to adapt to dynamic environments. (Klärner, Todnem, Diefenbach 2011, 332) Therefore it is important to take behavioural point of view, when discussing the success or the failure of change management in organizations.

In the light of emotional models in change management research, researchers have argued that people's emotions towards change go in four sequences. These sequences represent the emotional stages that people go through in organizational change processes. In the first and second stages, appraisals and mixed emotional experiences turn into either negative or positive results in people's feelings and attitudes. These experiences on emotions, influence people's coping behaviours in the third stage. Researchers argue that in the last stage, emotions that have a distinct action on people's behaviour, will enter the equation. (Liu & Perrewe 2005, 263)

2.6.1. Change Resistance and Dealing with it

Change resistance is a dynamic the combination of negative emotions that people feel towards change. (Liu & Perrew 2005, 263) (Coghlan 1993, 11) Resistance is a natural phenomenon in situations where change is present and it has many different causes, but the most common ones are uncertainty, feelings of lost control, mistrust and the process of change implementation that brings new factors to organizations. (Fox & Amichai-Hamburger 2001, 85) To understand any change process, it is important to understand resistance as it originates from individual's interactions with their surrounding environment as well as from their personality. In addition, to emotional aspects such as feeling of being under a threat, resistance also has cognitive elements. (Coghlan 1993, 11-12)

While dealing with resistance, organization's generally view it from the perspective of the people who promote change rather than from the opposer's position. And as the resistance

can appear in different degrees, it is important to be taken seriously and be acted on. (Coghlan 1993, 11)

One of the most important aspects on change management has been argued to be proactive communication. (Liu & Perrewe 2005, 264) In uncertain situations such as organizational change, when there is an absence of adequate information, individuals create their own version of the reality. This generally creates distortions of the reality and leads to resistance. (Coghlan 1993, 12) The goal of proactive communication is to create an environment inside the organization, where personnel does not feel overpowering negative emotions towards change. This can be achieved by changing a cold rigid system that represents the organization, to a more welcoming, warm and flexible system. (Fox & Amichai-Hamburger 2001, 88)

According to Fox and Amichai-Hamburger, one of the most effective ways to overcome resistance is to have open communication in the organization. This helps to prevent uncertainty, demonstrates the benefits that change brings, builds trust between different organizational levels and helps to strengthen personnel's sense of control. Researchers Fox and Amichai-Hamburger divided communications into two different aspects; rational and emotional. The difference between these two is that emotional communication delivers information by focusing on emotional elements. Rational communication's goal is to transfer information from one person to other. (Fox & Amichai-Hamburger 2001, 85)

One of the ways to reduce change resistance is to use emotional arguments in communications. By acknowledging both rational and emotional aspects in communications leads to a more understanding environment for the personnel. Organizations should focus on addressing the negative messages and emotions that personnel have faced during the change process. This decreases the possibility for emotional distraught that may occur if the change fails. After the change has occurred and the process has been carried out, communications should focus on positive appraisals and optimism towards the change process and the outcome. (Fox & Amichai-Hamburger 2001, 88)

Incorporating metaphors into communications has been noted to be one of the many ways that management can use to reduce the level of resistance in change. By using metaphors in delivering information, management can create a symbolic meaning for change and with that gain understanding from the personnel on an emotional level. Metaphors help to bypass logic in people's thoughts and work on an emotional level. Researchers have noted that usage of metaphors is a great way to bring unity to the organization. (Fox & Amichai-Hamburger 2001, 88)

In addition to dealing with resistance, organizations should approach it with an environment that creates understanding and acceptance between the opposers and the people who are promoting change. This way organizations are able to decrease alienation and resistance through a person-centred approach while avoiding misunderstandings. The goal in people-centred approach is to help personnel to evaluate the change and the situation in an environment that supports their decision-making process on how to respond to change. (Coghlan 1993, 13)

3. RESEARCH METHODOLOGY

In this chapter, empiricism of the thesis will be presented and discussed. The structure of this chapter is built followingly. Steps start with methodology, which in this thesis is qualitative method. After that data will be collected and transcribed. After that analysis will be performed for the data and lastly the results will be presented and discussed.

In this thesis the data will be collected from HUS organization's personnel with one-on-one interviews. The interviewees will have a chance to familiarize themselves with the questions before hand and discuss about them during the interviews. The goal is not only to get answers to the questions, but to have conversation on the topic surrounding the questions and the researched phenomenon. The interviewees will be kept anonymous and their title's will not be presented in this thesis for privacy security reasons.

3.1. Qualitative Research and Case Method

The research method chosen for this study is qualitative since it suits best for the collected data in this case. This is due to the fact that data for this research has been collected with one-on-one interviews and the goal is to find explanations and to understand the change that has happened in the HUS organization during and after digital change. Qualitative research method also suits the research questions better than quantitative method as the goals is not to find numbers or percent that would describe the researched phenomena, but rather to find characteristics and causalities between different actions and different points in time as well as to describe the research topics such as feelings and attitudes amidst the change. This approach allows interviewees to discuss their opinions, experiences and attitudes towards the research topics in a way that supports discussion around the questions (Daly, Teague, Kitchen 2003, 161)

The general characteristic of qualitative data is to explore a particular phenomenon with emphasis on the uniqueness of each case studied. (Gibbs 2008, 6) Even though qualitative research method allows one to find the nature and the depth of relationships between different factors that are being researched. On the contrary, qualitative research method has some limitations to it as it does not use statistical data. Due to this it does not prove statistically the relationships between variables that are under investigation. (Daly et al. 2003, 161)

In this thesis, the research questions include “how” and “what” and therefore a case study approach has been chosen to support the research. Case study approach provides great tools for researching a more complex phenomena (Baxter & Jack 2008, 544) and therefore is suitable method for this thesis. A research can be defined as a case study when the focus is mainly on finding answers to questions such as “why” and “how”, it is not possible to manipulate or shape the behaviour and answers of the people involved in the research, the main focus is on covering contextual conditions as they are believed to be relevant on the studies phenomenon or context and phenomenon cannot be fully divided from each other. (Yin 2003, 9-10)

These aforementioned four characteristics are something that most case studies have as well as the nature of being flexible and rigor method to research certain topics and phenomenon. With case study method, it is possible to conduct a study of a complex situation in a simpler way and take into consideration the fact that researched phenomenon is influenced by the situation in which the case is located in. (Baxter & Jack 2008, 544, 556) With case study method, it is possible to build completely new theory, elaborate already existing theory or test the credibility of existing theory. (Puusa & Juuti 2020, 200)

3.2. Data Collection Method

Data for the research is collected with one-on-one interviews with before planned questions. This makes the interviews half-structured as the questions do not have pre-set response options (Eskola & Suoranta 1998, 63) but they do have mostly the same questions for every interviewee. The goal is to create an environment where the interviewees are allowed to express their sincere feelings and attitudes concerning the studied phenomena. The questions are sent to the interviewees beforehand and therefore they have a chance to think of their answers and topics surrounding the questions. This supports the idea of having open conversation and deeper data of the studied subject. Interviews have been described as a great tool to figuring out what people think and what kind of motives they have towards something (Eskola & Suoranta 1998, 63).

The research questions are based on the idea that a change has occurred in the organization and as organizations go through changes, there is always an outcome of the situation. In order to find out the outcome, the research questions have been chosen to represent both financial and non-financial aspects of change. Research questions were divided into three sets of questions. The first questions are targeted for employees who

work in the procurement department and use the new ERP system in their daily work or have used it in their previous work tasks in the organization. The ERP system that is being used in the HUS-organization is called “Harppi” and the system is being addressed with this name in the questions. These questions are named as “Kysymyksiä hankinnan työntekijöille / Questions for procurement employees” (Questionnaire 1). The second set of questions are targeted to find out how the change has affected the organization’s performance and how changes in performance have been measured during and after the occurred change. This set of questions is called “Kysymyksiä liittyen suorituskäyttöön ja sen mittaamiseen / Questions about performance and its measurement” (Questionnaire 2). These questions are presented for employees who have knowledge of the ERP system in the organization and potentially have knowledge on the effects of the change and on the potential key performance indicators that have been used in the procurement department on a larger scale. The third set of questions is targeted to people who have been in the core of decision making or have had a larger impact on the decision that has been made on the digital systems. The goal is to find out why this particular change has been chosen and why it was performed the way it has been done. This last set is called “Kysymyksiä henkilölle, joka ollut tekemässä päätöstä pilvi-ERPistä / Questions for a person who has been deciding on the new cloud-based ERP system” (Questionnaire 3). Also, one of the most interesting aspects in all of three sets is to find out whether the change has been seen as a success and if it has been positive change on different organizational levels. All three sets can be seen in the attachments at the end of this thesis and the language of these questions is Finnish as the organization that is being researched is a Finnish organization and all of the interviewees are native Finnish speakers.

The research questions were presented beforehand to interviewees and they had time to get themselves familiar with the questions. This part was optional but having a closer look of the questions before the interview will help the interview situation to flow easier as the topic of the questions is already familiar to the interviewees. This tactic also helps the interviewees to think about the occurred change and potentially remember things that would not be able to come up on the spot during the interview session. The interviews were conducted through video call and recorded with the permission of the interviewees.

All in all, eight interviews were conducted with the dividence of five interviewees having only questions from questionnaire 1, one person having only questions from questionnaire 2 and one person having questions from only questionnaire 3. One of the interviewees gave answers to all the three question sets. People were divided into three sets due to their expertise and experience with organization’s digital systems and on the ongoing change.

This divergence can be seen in the table 2. More information on different demographics on the interviewees cannot be presented due to protecting their anonymity and therefore they will be referred with the name interviewee and a number.

Interviewee	Questionnaire number	Expertise
Interviewee 1	Questionnaire 1	Procurement
Interviewee 2	Questionnaire 1	Tendering
Interviewee 3	Questionnaire 1	Tendering
Interviewee 4	Questionnaire 1	Procurement/Category
Interviewee 5	Questionnaire 1	Procurement
Interviewee 6	Questionnaire 2	Logistics
Interviewee 7	Questionnaire 3	ICT
Interviewee 8	Questionnaire 1 + 2 + 3	Purchasing

Table 2. Interviewees

All interviewees have been in the organizations long enough to have been used the older version of the enterprise resource planning system, which was an on-premise version of a similar system. The goal for each questionnaire is to mirror the change to the older version of the digital system and through that find the effects that the change has had on the organization. All three questionnaires will be presented in the end of this thesis in the attachments.

3.2.1. Data Analysis Method

According to Eskola and Suoranta, qualitative data can be analysed in multiple ways such as keeping the analysis and interpretation as one and the other main way is to divide these two as their own separate parts. This thesis will be done as the latter version and therefore the relevant information will first be divided from the so-called raw material and after that interpretations can be made from the data. Interpretation will be made easier to understand by using some sort of “coding” in interpretation such as topic words. (Eskola & Suoranta 1998, 109).

The collected data has been analysed by transcribing the audio files into written form. Transcriptions will not include every single filler word nor tone in interviewees voices is not the purpose of this thesis and will not be taken into account. Transcriptions will be analysed in NVivo -programme where it is easier to divide the data into different categories to find

patterns and themes from each interview. The analysis will be done with relevant topic words that support the theoretical framework of the thesis, such as positive and negative emotions towards the new digital system and towards the change as a whole, positive and negative financial effects and different changes in working habits, use of time and efficiency. The analysis will also include aspects on how the change has affected the logistics system of the organization and why this particular digital system was chosen as the next step for the organization's procurement.



Figure 2. Data analysis process. (Based on Eskola & Suoranta 1998, 109)

Data analysis process has been presented in figure 1. The process starts with data collection and moves into transcribing the interviews. After this the process proceeds to analysing the interviews with topic words into clusters that derive from this research's theoretical framework. After this, the topic clusters will be presented, and findings will be conducted on the data. As the framework for this thesis has been constructed on different theories, the findings of empirical data will be reflected on the theoretical framework.

3.3. Reliability and Validation

Qualitative and quantitative research have been pitted against each other in the discussion on reliability and validation. (Eskola & Suoranta 1998, 151). For this reason, it is foremost important to provide theoretical reasoning to ensure the creditability of qualitative and case-study based research. This way researchers can assure the validity and credibility of their work. (Baxter & Jack 2008, 556)

In qualitative research context validity refers to the level of trustworthiness that the conducted research has. This can be defined with how much of colleagues, interviewees and so-called big audience believe in the analysis and results that have been ruled from the collected data and conducted research. On the other hand, reliability refers to the level of professionalism that the researcher has while conducting a study. This has conventionally been proven with the selection of sufficient research methods and conducting the research with them. With the chosen methods, the research questions can be answered while following previously made research plan. (Puusa & Juuti 2020,167)

To ensure that a research that has been conducted with a case method is considered to be reliable and valid, some aspects need to be taken into consideration while constructing the research. Validity can be divided into three categories that explain how to ensure that the conducted research reaches the needed level of validity: construct, internal and external validity. To ensure construct validity, description of data collection is needed with sources, as well as having an explained data collection summary on how someone else could conduct a similar study with the same methods. Internal validity can be ensured with having evidence that the same patterns found in the research can be matched with similar study. Lastly, external validity is identified as the idea that causal relationships found in the research can be generalized. (Stuart, McCutcheon, Handfield, McLachlin, Samson 2002, 430; Yin 1989, 45-48)

The findings of this research will be presented while following the chosen research method and assuring the validity and reliability of this thesis. The reliability is being assured with sufficient interviews that have been recorded and transcriptions that have been saved for possible use in the future. The research methods have been chosen to support the nature of studying a phenomenon and a case setup.

4. EMPIRICAL FINDINGS: CASE HUS LOGISTICS

The findings for this thesis will be presented in this chapter. The chapter will proceed with presenting every topic word used in the data analysis and these topics will circle around the presented conceptual framework (Picture 1). The first topic is how the organizational efficiency has been affected by the digital change. This will be followed by looking into the financial measurements in the organization and what kind of change can be seen in them before, during and after the change. The third topic is personnel's emotions and attitudes in the midst of the change. As this research has been conducted after the studied change, the perspective is more in the longer-term effects that digital change has on the organization's procurement department and its processes. If this thesis had been conducted in the midst of the change, the results could have been different as the change would have been in fresh memory for all of the participants and therefore their feelings and attitudes might have been different.

Each topic will be presented in a subchapter and concluded with a summary on the findings. At the very end of this chapter, all of the effects will be summarized for the purpose to get a better overall view on the change and its effects. As this research has been conducted as a case for HUS Logistics procurement organization, the findings are applicable for this particular type of change that has been occurred in this particular organization. HUS Logistics' procurement and logistics departments are both inside HUS Logistics organization. They will be referred in this chapter as HUS Logistics when both are addressed or as their own individual departments, HUS procurement department and HUS logistics department. The change has affected both parts of the organization and both parts have been researched through the interviews.

The findings presented in this chapter will be reflected to the previously presented literature and theory of different topics that touch upon the theme of this thesis, digital change in supply management. The findings will therefore be divided into positive and negative effects with the support of these theories. This means that the rational dividence to different categories will be made with the idea that certain effects are commonly seen as positive and therefore some effects have a more negative connotation in literature.

4.1. Why HUS Logistics' ERP system needed to be updated

As this thesis uses case method approach to study a phenomenon, a case organization was chosen for this research. As previously stated, the case organization is HUS and more specifically the case that has been researched is HUS Logistics' procurement departments change from on premise Enterprise Resource Management system to a cloud base system. The change to a new and updated version of the organization's ERP system was executed in the early 2020 and after that the employees have slowly changed from the old on-premise system to the new one. The ERP system that HUS Logistics uses is called Harppi and for that reason the name Harppi comes up in the interviews and in the answers from time to time. The on-premise version is addressed as "old Harppi" and the newer version is either "new Harppi", "cloud Harppi" or "pilvi-Harppi". The system operates in Oracle cloud's platform and is very similar to the previously used on-premise version.

During the interviews, interviewee 7 pointed out that there were multiple reasons for the updating of the organization's ERP system. The first reason was that updating the system now fits well with Finland's health and social services reformation (SOTE-uudistus). One of the initiatives for this digital change is to later take the updated version to other healthcare organizations and areas outside of HUS and its areas in southern parts of Finland. HUS Logistics works as a test organization for this type of ERP platform in this particular use. After the Finnish government's health and social services reformation failed, the main focus was in updating the system to a newer version and acquiring a new webstore for internal use in the HUS area.

The ERP system that was in use before the change had come to the end of its lifecycle and for that reason needed to be updated as the system provider barely provided any technical support for the system. On top of this, capacity controlling needed to be more flexible and cloud-based systems provide this better than on-premise systems do. For this reason, the decision for leaping to a cloud-based system, did not come directly from HUS Logistics or its procurement department, but rather from other parts of the organization and from the system provider. One of the reasons was purely financial as financial benefits were tried to be achieved through the change.

This type of initiatives for change have been described to be conventional in digital transformation as researchers Mergel, Edelman and Haug (2019) described the need to stay competitive in the internet age causes organization's to look for new solutions within the newest technology which then leads to digital transformation. Even though in this case

the initiative did not fully come from the need to re-invent the systems that were already in use, HUS Logistics did approach the development of the procurement system on an organizational level.

During the planning for a new system solution, the project team also came across very negative feedback from internal clients that had been using the system in ordering supplier needed in healthcare and social work in the HUS area and its additional specific catchment areas. The feedback was needed to determine the areas that needed most development. The old system was also heavily tailored and some of the complex solutions wanted to be eliminated.

Type of Force	Type of Reason
External	<ul style="list-style-type: none"> • Compatibility with Finland’s health and social services reformation (SOTE-uudistus) • The old system did not have technical support from the system provider anymore • Testing the usage of cloud-based ERP system in healthcare procurement for future initiatives • Trends
Internal	<ul style="list-style-type: none"> • The old system’s complex tailored features needed to be eliminated • Capacity controlling needed more flexibility • Financial benefits through the new system

Table 3. Why HUS Logistics decided to change from on-premise system to a cloud-based system

On a different note, the reason why this particular system was chosen for the update had some reasoning behind it too. One of the main reasons that came up on multiple interviews was that the new cloud version was built on top of the old system. This created a base for the new ERP version which did help the process, but it also restricted it as it created a frame for it. In the interview number 3, it was pointed out that if the system would have been built as a new system from the beginning, it could have been very different and less stiff. One

other reason that was pointed out in the interviews for this decision could've been that in order to minimize risks in healthcare processes in different HUS areas departments such as in hospitals, the system could not have been stripped all the way.

“Historical reasons did weight in the decision on how the new ERP system was built”

It was also pointed out that as it is the 21st century, it is very prominent for this time that organization's move their operations and support systems to cloud-based platforms. This has been a trend for a while now and some organizations have even started to bring their operation systems back to on-premise versions as it can allow them to have more flexibility and more decision-making power on their operations. These trends control the fluctuation on what organizations decide to do with their decisions from time to time and some decisions are fully affected by what the service-provider wants at that moment as they have full control on updating and continuing or discontinuing their service packets.

4.2. Issues While Implementing the New System

Some of the interview questions touched upon the implementation process of the new cloud-based ERP system. In these questions the main objective was to find what kind of problems or setbacks the organization faced during the change. Most problems were about the change in how employees work, but even these weren't considered as problems as they were more about changing the way one works or the way employees perceive the system and how it affects their way of working.

Interviewees who work directly with the ERP system, revealed that during the implementation, there were some smaller problems that the interviewees faced but they did not remember them that well anymore as it has been around a year since the implementation. They explained that when they occurred a problem with the system, their task was to direct the problems to the IT management and let them fix the issues.

One of the things mentioned in the interviews was that during the implementation of the new process, new information was given on the new system, but the interviewees pointed out that there was not enough briefing on how this information affects their work or how new

features are being used. Interviewee number 1 mentioned that new information is given continuously, but the introduction is not the best that it could be.

Interviewee number 1 also described that in the beginning their daily work was a lot slower with the new system as everything was new and every move needed to be checked again even though the system itself did not change that much. Interviewee number 5 pointed out that in the beginning they had to work more than usual on the contract management side of the ERP system, and this took a toll on the procurement employees' normal daily schedule. Even though they had to do additional work because of the system change, they interviewed did not feel that it affected the efficiency too much and that the implementation of the new system went quite smoothly.

Interviewee number 7 explained that one of the issues in this type of bigger projects is that they tend to swell too big when everyone wants to include everything to the same system and the focus shifts to small non-important details instead of bigger and more important parts of the new system. Trying to fit all aspects from human resources to logistics into the same system makes it too complex and creates a problem with not enough people knowing enough of the system that is being built. This creates a need for more people that know about these aspects and suddenly the project has swollen into a much bigger entity that was intended in the beginning of it.

“All eggs in the same basket is a real problem with this type of projects”

In the logistics point of view, the new system has a customized screen to help the logistics employees' work for example in collecting products at the warehouse. According to interviewee number 6, this customized screen worked perfectly during testing, but when it was implemented during the system change, it did not work the way it was intended to. This did affect the logistics department's efficiency and did cause a bit of a dip in the level of production efficiency, but this has been fixed since.

The change in ERP system meant that the data centre that HUS uses needed to be changed as the system is now used in cloud and will operate in the service providers data centre and not from HUS Logistics' own data centre. Interviewee number 8 pointed out that even though the system itself did not have many serious issues during the implementation, they think that it is beyond comprehension that the change in data centre caused the production in the system to halt for some time. This problem is bound to what the service provider

decides and can be witnessed during the system updates as well. They noted that this is not how it should be in cloud-based systems.

Issue	Effect
Issue in the new system	The issue was directed to the IT management department for further solving
New information is given constantly	New information is given constantly, but the introduction to how to use the information and different features in the system are lacking and therefore employees cannot fully use the system's potential.
Working was slower in the beginning	Working with the new system affected the pace of procurement employees working pace on those employees who work directly with the ERP system daily.
All eggs in the same basket	As too much focus is weighted onto every little aspect of the project, the need for more people is created and this swells the project immensely and makes it difficult to control.
Logistics' departments custom screen did not work as it was intended in the beginning	The custom screen intended for the logistics employees did not work as it was intended in the beginning despite numerous testing and caused a dip in logistics efficiency.
Change of data centres	The change of data centres was needed, but it caused the production to halt as the ERP system is used as the main tool in product management at HUS Logistics.

Table 4. Issues during the implementation of the new ERP system

4.3. Organizational Efficiency in Digital Change

This chapter will cover the effects on organizational efficiency and how digital change in ERP has affected HUS Logistics' procurement department. This chapter will be divided into two categories: positive effects on efficiency and the negative effects on efficiency. Both

parts will be summarized with tables to get a better idea on the overall effects that have occurred. At the end of this chapter, there will be a notice on why HUS procurement did not have any sufficient KPIs in use during this digital change and therefore it has been more difficult to measure the efficiency and effects that the change has had on it.

4.3.1. Positive Efficiency

During the interviews, all five interviewees who daily work with the ERP system called Harppi, pointed out that the new cloud-based system has in fact made their normal everyday work faster. This is due to the fact that the new system operates faster and as most interviewees noted that they use a good amount of reports from the ERP system. The use of these Excel-based reports has become more efficient as it reportedly takes a lot less time to get them from the new system compared to the old on-premise version. Compared to the old version, this new ERP system prints out the data reports immediately as the old one took multiple minutes which is a long time as these reports are needed daily with up-to-date information. This has a big difference on the everyday work's efficiency, which then contributes on the overall efficiency on the entire procurement processes.

Interviewee 1 pointed out that in the old system, if you wanted to “throw” a bigger set of data into the system with an Excel that was designed for that purpose, you needed to have exactly the right information in the Excel sheet that was needs and if one little part was incorrect, the whole set would not be processed. In the new system you still need to have the correct information in the sheet, but the improvement is that the system will give you a list of all the mistakes that occurred during the process. For example, if one column the wrong ending of a file type, the system will give you a list that explains that the file was not found and therefore you know that that is where the problem lies and that is where you need to look for mistakes. This was not possible in the old system as it reportedly only gave an error notice, but not any implications on where this problem occurs and what is the reason for it. Interviewee 1 said that due to this problem it sometimes took the whole day to work on a data set that was needed to be delivered to the system and it might have been for example one little comma that caused the problem an it took a long time to find the problem as the data sets are sometimes quite large.

One aspect that rose during the interviews was that in the new cloud-based system has improved visual side. The interviewee number 3 noted that “graphic improvements had happened” and that as the new system change had also changed the way the internal

webstore Valtti worked, it has also affected that side as well. This improvement makes it easier for different HUS areas such as hospitals and social work offices to order supplies and the materials they need.

Regarding the logistics operations in HUS Logistics, interviewee number 6 noted that the changes also affected the internal Valtti-webstore due to the new cloud-based ERP system had and a positive effect on the logistics operations. Reportedly the system change affected the way how logistics employees worked in the field while collecting the orders and the incoming cargo. The change has made the logistics employees work easier and smoother. The interviewee said that the changes can be seen directly in the field, but not remarkably in other areas in the logistics work.

During the interview number 7 that was conducted with an interviewee with knowledge and experience on the ICT systems in the HUS Logistics organization, multiple differences regarding the new and old system were pointed out that could potentially have an effect on the organization's efficiency in the long run. The first one was that the new version is much more stable, and it has less bugs. With this improvement, it is easier and faster to find the more serious problems in the system and to fix them with faster schedule than before. The new system also has wider range of features that can be used in the future to achieve more efficiency and smoother processes for the procurement and logistics employees. These same topics were also brought up with the interviewee number 6 in the logistics point of view and in the interview, it was said that with the new cloud-based system there has been less disturbance in the system and its usage.

Type of Change	Effect
Faster system	Affects the everyday life of procurement workers and accumulates to the whole procurement processes in the department
Error notice	The new system gives an error notice that helps the employees to locate the error on the system or data set and fix it faster
Graphical improvements	Makes working with the system more enjoyable and therefore easier to use
Improved internal Valtti-webstore	Smoother ordering as well as in logistics employees field work, such as collecting orders.
More stable system	System is more stable and less prone to bugs
Wider range of features	Can be used in the future to assemble more supportive features for the procurement and logistics employees to achieve efficiency in their work

Table 5. Summary of Positive Effects on Efficiency

4.3.2. Negative Efficiency

The change to a cloud-based ERP system did not majorly affect HUS Logistics' efficiency negatively, as it was pointed out that the change was not that drastic. One of the few noted negative effects were in the beginning of setting up the new system for the organization. Multiple interviewees said that when the new version was acquired, it did affect the time they had to use to get used to the new version of the system and learn new things regarding it. This wasn't really noted to be a negative effect as it was seen more of a learning opportunity and it did not take much time learn to new way of navigating the new version. This also affected only a portion of employees in the procurement department as not all employees use the ERP system in their daily work and therefore did not have much of a routine with the system that would have needed some adjusting.

One aspect that could be considered having a negative effect on efficiency, is that due to the change to a new version of the ERP system, HUS Logistics changed to service providers quartal update schedule. This means that the updates that were previously done when HUS

or the service provider needed them for the system, and now they come quarterly for all the clients that are using the cloud-based system from the same service provider. This means that HUS needs to prepare for the update in advance and they might be in difficult times for the procurement logistics organization. According to interviewee number 6, this does take a toll on the resources and it affects the production for 24 hours, which is not ideal for the organization. After the quartal update, the system needs to be checked that everything is still intact and the data in the system is still fine and accurate. They pointed out that sometimes smaller units of data have disappeared from the system after an update.

When the new cloud-based system was first launched for use in HUS Logistics, it caused a small dip in the production and logistics department. This happened because the customized screens that were aimed for the logistics employees did not work the way they were supposed to. In the end this did not have a huge impact on the efficiency of the logistics department as the problem was fixed quite fast. Interviewee number 6 also pointed out that the system did work moderately well even from the beginning.

When interviewees were asked if they have changed their way of working or thinking due to the change, most of them replied that they mostly tried to adjust to the change and to the new tools that they were given through the system change. It was pointed out in multiple interviews that the new system has features that some employees do not know how to use and therefore the potential that the system has, has not been fully acquired.

Type of Change	Effect
Beginning took time from daily work tasks	In the beginning setting up the system and getting used to new working patterns took time away from the daily tasks that employees had
Quartal updates	Due to the change, the ERP system changed to quartal update schedule that is the same for all the clients operating in the cloud-base. This put strain on the available resources that HUS has to be used before every update four times a year
Customized screens did not work in the beginning	This caused a dip in the logistics department and affected the organization's efficiency, but as the problem was fixed moderately fast, it did not have a huge impact in the long run.
Lack of knowledge	Some employees do not have sufficient knowledge on the features in the ERP system and therefor they do not reach their full potential with the usage of the cloud-based system

Table 6. Summary of Negative Effects on Efficiency

4.3.3. Notice on the usage of KPIs in Measuring Efficiency

During the interviews, it was noted that HUS Logistics did not in fact have any forms of measurements in use during the change that would measure the efficiency effectively. This means that as the change was not measured with any sort of scalable system, it is in fact difficult to determine the real effect that the change of ERP system had on the procurement and logistics department. During the interview number 6 regarding the change in logistics point of view, it was noted that the logistics department did not have any means to measure the change or its effects and that the way they determined the effects was that they followed the production's passing and it's line amounts, but other than that they did not use any measurements that could be considered as KPIs for the logistics department. They did admit that it was quite lucky that everything went well and there were no major problems

during or after the change process. If the change process would have failed for some reason, the interviewee number 6 did say that in that case the measurements would have been needed to see what actions are effective.

Interviewee number 8 also pointed out that it would have been crucial to have at least some sort of means of measurements in order to gain a good view of the process. They reasoned the lack of measurements with the notion that KPIs and other less official means of measurements are still in its infancy and due to that HUS did not have sufficient measurements to be used in this change process. They also pointed out that this change did in fact bring out the need to look into the effect of change in the organization and the need of having different types of measurements in a larger scale in the organization.

4.4. Financial Effects of Digital Change

This chapter introduces the parts of the interviews where interviewees were asked to measure and weight the effect that the change in HUS procurement's ERP system has had on financial measures. The chapter will be divided into two categories; first will be the potential positive effects and after that the negative effects will be presented. Both parts will be summarized with tables on the findings.

Questions regarding the financial effects of the ERP system change were directed to the interviewees number 6, 7 and 8. During the interviews, there were not many positive effects that could be presented directly to be caused by the digital change in the procurement department. This is due to the reasons that HUS procurement did not in fact have any sufficient KPIs in use that could be used to determine the financial impact that the system change has had on the procurement and logistics departments.

One of the reasons for not having information on the financial impact, is that the time since the change occurred has only been around one year. This means that the bigger picture on the financial effects has not been fully accumulated and therefore cannot be measured as well as it should be in order to determine the full financial impact that the system change has had on the HUS procurement and logistics departments.

4.4.1. Positive Financial

After conducting the interviews, it can be concluded that the interviewees did not have any direct positive remarks on how the digital change in the ERP system has affected the HUS Logistics organization financially. Positive effects were observed through the change, but they were more about the performance of the system rather than the financial impact of the change. The financial difference in HUS Logistics was more on how the charges were accumulated. This means that the charges did not decrease, but what is now being charged has changed. Interviewee number 8 said that the differences in cash flow before and after the change have changed from charges concerning the system itself to concerning the service that is now being bought from the service provider.

“After the change, charges are going from different causes, but have not decreased”

4.4.2. Negative Financial

The first negative effect that the ERP system change has had on the HUS Logistics' financial performance was noted to be that the charges that HUS IT Management department has charged from HUS Logistics have increased. Interviewee number 7 pointed out that one of the goals that was set for the change was “HUS Logistics departments IT management charges due to Harppi ERP system will decrease with the change”. This goal was not achieved and therefore it causes financial strain to the organization as the charges are increasing.

The new system is also not very cost efficient. According to interviewee number 7, the new ERP system's expenses are immense and the reason for this is that almost all, even the smallest and most simple technical parts in the system and its management have been outsourced. As the change has not yet fully stabilized, it is difficult for the interviewees to determine their take on how this affects the financial side of HUS Logistics in the long run.

Interviewee number 8 pointed out that at least for momentarily the new system and the change process did take a financial toll on the organization as the change required consult work and organization's own employees work hours to manage and monitor change process. It is important to have monitoring, developers and other people testing the system in order to achieve what has been set for goals and to understand what is needed from the

change process. In the same interview, interviewee number 8 concluded that while transferring from a system to another, it is always more expensive in the beginning. After that the expenses are built up from user and data centre charges. At the end of the day, someone has to pay for the expenses, but the difference after certain changes is that from which moment is responsible for the charges.

“Even the cloud-based ERP system is used through a server, the difference just is that the servers do not operate in our own data centre anymore”

Type of Change	Effect
IT Management charges	IT management charges were supposed to decrease through the change, but this goal was not achieved, and it causes financial strain to the organization.
Outsourcing	Because even the smaller technical parts of the system and its management have been outsourced, the amount of money that is the service provider requires is immense.
Transferring to a new system	Transferring to a new system always brings new expenses due to consult and employee work hours.

Table 7. Summary of Negative Financial Effects

4.5. Communication During Change

The interviewees were asked about what and how their superiors and management communicated on the change and new changes. If this research would have been conducted during the change and not a year after, the results might have been different as some interviewees replied to questions about communications that as time has gone by, they do not remember what was told as well anymore. In this chapter, first the positive things said about the change communication will be presented and after that the negative parts. This chapter is shorter and differently arranged than some of the other parts of the empirical analysis due to the fact that the amount of questions asked on the change communication was a lot smaller compared to other aspects.

Interviewees number 3, 4 and 5 described the communication from management to employees to be sufficient and they felt that they got enough information on the system and on the change process. Interviewees number 3 and 4 said that they were given a schedule on how the change process will proceed and how it will affect the organization. The procurement department was also given dates and times on when different things and changes can be made to the system and when they can continue orders through the system.

“There is not really anything bad to say about the change communication”

Interviewee number 5 explained that they were in a test group for the new system and that through that they got sufficient information on the new system and did not feel the need for more communications from the managements side. In the test group, the participants tested different features in the system and tried to test the daily tasks that they normally do with the system in the procurement department.

Positive	Effect
Management gave a good schedule on the change	A proper schedule on the change process helped the interviewees to get a good idea of the change process and therefore felt like they were taken into account in the change process.
Management gave enough information on the change	Many interviewees described the given information to be enough and they felt that they got everything that they needed to know about the change and the new ERP system.
Usage of a test group	Some interviewees mentioned that they were in a test group, where the new system was tested and developed. This gave a good idea of the new system for people who were part of it and helped them to understand how the change affects their daily work.

Table 8. Positive aspects of change communication at HUS Logistics

On the other hand, interviewees number 1 and 2 felt that the information that was given during the change process was not enough and they cannot remember much good about it. Some information was given to them, but they felt like they would have needed more. One problem that was pointed out was that information does not travel all the way from management to employees and this creates a gap in the communication process. Interviewee number 2 said in their interview that they have felt that they have been in darkness and when they have asked about some feature or information about the new system, they were told that it does already exist, but no one has told them about it. Till this day, interviewee number 2 says that they think about if the system has some reports that could be useful in their work, but that they just do not know about. They continued that at least to their team in procurement tendering, no one from management has come forward to tell them on the different features and different possibilities on reports that could be used to support their work.

Negative	Effect
Not enough information was given	As the interviewees felt that they did not get enough information on the new system, its features or on the change process, they felt left out.
Management does not know what kind of information the employees needed	The interviewees felt that management did not have an idea of all the information that should be given to the employees and therefore they did not have the needed tools to work with the new system with all of its features and possibilities.

Table 9. Negative aspects of change communication at HUS Logistics

4.6. Personnel's emotions and attitudes in Digital Change

The aim on this chapter is to present the things that were discussed in the interviews regarding personnel's feelings and attitudes towards the change and the change process. First, the positive aspects will be presented and after that the perspective will swift to the negative parts. Both aspects will have a summarizing table at the end of each sub-chapter. While asking the interviewees about their feelings regarding the change the did not have direct yes or no answers but the way their feelings and attitudes were divided into positive and negative was through the series of different questions and the overall feeling that the interviewees had on the new system and the change process. Due to this, it was difficult to get a clear dividence to either positive or negative feelings. These remarks that did came up on the interviews are nevertheless divided into two categories and presented in the next to sub-chapters.

4.6.1. Positive Emotions and Attitudes in Digital Change

Most interviewees had a positive attitude towards the ERP system change while looking at the bigger picture of the whole change. They think that the change has made the system faster and therefore has been a step forward in their work. Interviewees number 1,3 and 5 felt that the new system is better and that it has changed their daily work for better for example through how new inventory is logged to the system. On top of this the graphical

changes have made the internal webstore side of the system more enjoyable to use and therefore has affected the employee's emotions and attitudes in a positive way.

One aspect that affected the interviewees views positively was that the new system was seen to be more logical to use and clearer to use. Interviewee number 6 expressed this to be prominent in the use of reports. They explained that the new reports are better now compared to the old system. They also expressed that the new system is more stable, and it has had less disturbances while using it. This has made using it more enjoyable for the procurement and logistics employees.

One aspect that did positively affect the way the interviewees viewed the change was the change communication. Half of the interviewees who were asked about the communication during the change process, did feel that it was sufficient and that they were heard and seen in the organization. They did not feel the need to have more information on the change or on the new system.

In the interview about the reasons on why this particular ERP system was chosen to be used in HUS Logistics, the interviewee number 7 said that after the change the customer satisfaction has got better compared to the old system. They said that the improved customer satisfaction can be seen in the customer feedback regarding the new internal webstore which is part of this digital change as it is part of the ERP system that is used in HUS Logistics.

One aspect that the interviews tried to look into was whether the change caused any resistance in the organization. There was not much resistance even though some of the interviewees did have complaints on certain aspects for example on the communications or how the new system operates and was built. It can be concluded on the interviews that the change did not cause any resistance from the interviewees and therefore they mostly had a positive attitude towards the change, and they felt that the change will help their daily work and is a step forward in the use of ERP system in HUS Logistics.

Reason	Effect
The new cloud-based ERP system	The new system has been reported to be faster, more enjoyable to use and it has better features which have been noted to make employees daily work more straightforward.
Better graphics	Using the new system that has better graphics makes the employees daily work more enjoyable and better graphics also help them to navigate easier in the new internal webstore.
Reports are more logical and clearer	Some interviewees use mostly reports from the ERP system and after the system change, they pointed out that the reports are clearer and more logical and therefore makes their work more enjoyable and contributes to positive attitudes towards the change.
Change communication	Many interviewees felt that the communication during the change was enough and they felt being heard and seen in the change process through it.
New internal webstore	Through the change in the ERP system, HUS's internal webstore has got better customer feedback and people have had more positive experiences while using the new system.
No change resistance	HUS Logistics organization did not experience any direct change resistance according to the interviews and the interviewees had mostly positive over all attitude towards the occurring change.

Table 10. Positive emotions and attitudes towards the change

4.6.2. Negative Emotions and Attitudes in Digital Change

Even though it has been previously stated that the interviewees mostly experienced positive emotions and attitudes towards the change process and the final result, some complaints did arise in the interviews as well. The interviews did therefore reveal that the interviewees felt the change differently even though they work very closely in the same organization. Due to this the change process has not directly been similar to all participants.

Interviewee number 1 pointed out that introduction that they got during the implementation of the new system was in their words “so and so” and for them it was not enough as they were given an Excel spreadsheet and told that follow this. They also explained that as a system, Harppi is not very good compared to the ones they have used previously in their work.

“The system was a shock when I first started at this job”

One other concern that interviewee number 1 had was that they did not feel heard unlike some of the other interviewees had felt. In the interview they explained that they had suggested wishes for the new system and for its features, but none of these had taken into account while building the new cloud-based system. Their suggestions would have made the daily work easier for the people who use the system in their work directly. As the interviewee number 1 uses the system in their work daily, they have a good idea of how it operates and what parts of it would have needed to be changed. Disregarding their ideas did not lead to change resistance.

Additionally, even though interviewee number 5 had over all very positive attitude and feelings towards the change and the new system, they did point out that they have heard different opinions on the new system and the change process. They did not elaborate this but concluded it with saying “there are different opinions, and you can hear them”. These different opinions could have potentially been heard if the research had been conducted with a larger sampling than eight interviewees. Having different opinions in the organization is not inherently a negative thing, but if they are not heard then it may lead to unsatisfactory employees which can lead to change resistance or to turnover rate in employees.

One aspect that did raise negative emotions towards the change process was that during building the new system, it was felt that not enough people knew enough on the needs and realistically on the system that being built for the organization. In the interview with interviewee number 7, they explained that as the project had swell in the process and

controlling it became more difficult, it clearly did raise annoyance towards the project. Interviewee number 8 had similar thoughts towards the project and according to them the financial aspect of the project is “absurd”. During the interview it was clear that even though their overall attitude towards the change that has occurred was positive, there were multiple parts of it that were clearly not good in their opinion.

Reason	Effect
Introduction to the new system	Introduction was not profoundly done as it did raise different opinions in the interviewees.
Not being heard during the building of the system	Some interviewees felt that their voice was not heard during the change process and this made them feel that the process was “so and so”. This reportedly also has raised different opinions in the organization towards the change.
Swelling the system while building it	This raised annoyance in the interviewees who were part of building the new system as they felt that people in the organization did not have enough knowledge on the system or on the needs for the system.

Table 11. Negative emotions and attitudes towards the change

4.7. Other Options for the Change

While discussing about the system that was chosen through this digital change process, some other options did come up too. Interviewee number 7 suggested that one option for this type of system change would be to recruit personnel with enough knowledge and expertise to maintain a more fragmented unit. In this option HUS would have obtained smaller parts from this selected system and its management from the service provider and therefore had personnel who could maintain the system entity better and with more authority. This way HUS would have an entity that would endure malfunction better and would be more cost-efficient as well. In the same interview, interviewee number 7 pointed out that this option would require that HUS would hire more personnel with this type of knowledge and then be able to keep this type of knowledge in the organization.

In the interview with interviewee number 8 similar thoughts rose, as they concluded that the change should have been done with the idea of being able to fix smaller problems that are more on the surface of the system and having more knowledge on the functionalities and requirements for the system. This way HUS would have a better understanding of the problems and on what is needed when something malfunctions. Right now, the power on how things are done is more on the service provider and HUS gets what the service provider decides to give each given time. The interviewees do not think that this is an ideal situation.

4.8. Other effects

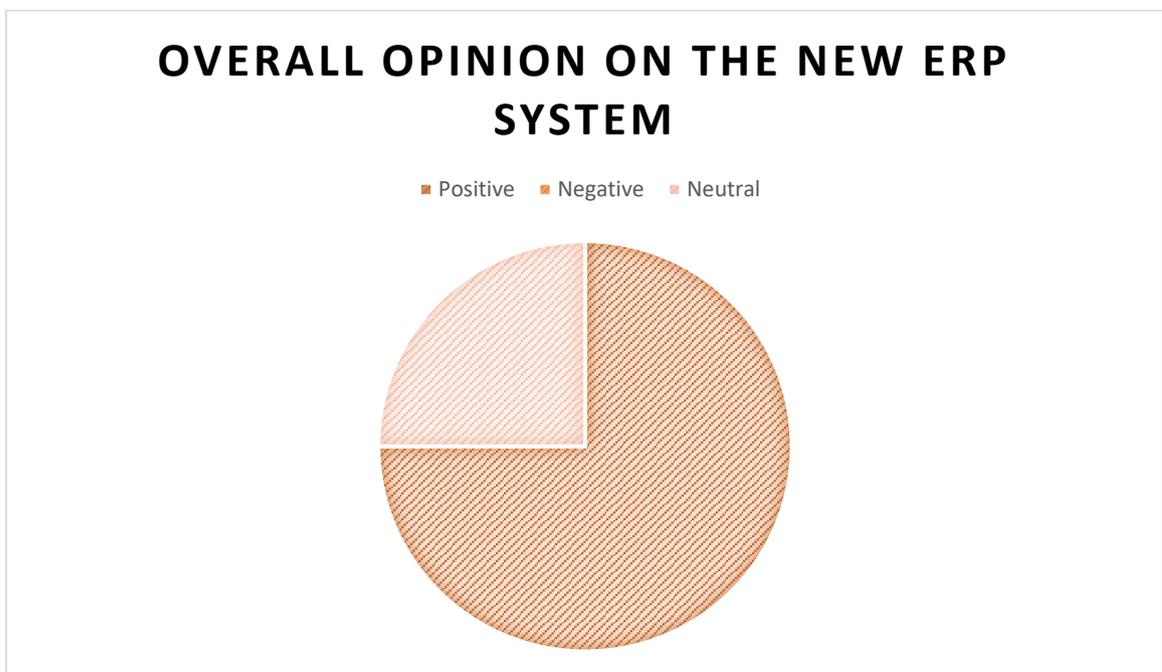
The system change did also bring some other changes and effects to the HUS Logistics organization. The purpose of this chapter is to introduce those effects that came up in the interviews but were not presented in the other topics.

Interviewee number 7 listed some differences between the old and the new system. One of these was that the new cloud-based system is more secure regarding information and data security. They did explain all the reasons for this, but one reason is that the service provider runs updates on the system collectively all the time. Other positive effect through the change is that the new system is more stable and in case of a system failure, everything gets fixed a lot faster than before. These are effects that the system provider makes possible, but as the system provider is still the same as it was before the system change, the effects are partially due to changing to a cloud-based system.

Interviewee number 8 pointed out that the way HUS Logistics does not have control over the new cloud-based system, resources needed for development or updating the system and still manages to use an immense amount of money annually. The service provider has all the control in this new established system and the power dynamics between the service provider and HUS Logistics. This was also discussed in the interview with interviewee number 7 and they mentioned that as HUS's IT management has outsourced the technical knowledge and management to external consult organizations. This has made the digital change project concerning the ERP system much more difficult.

4.8.1. Overall Thoughts on the New ERP System

Overall, the interviewees had a positive attitude towards the new system and the change process as well. The interviewees do identify more positive features from the new system and the problems in the system have more to do with the management of it rather than the system itself. During the interviews, the participants were asked whether they think that the change has been more positive, negative or neutral for the organization. Six of the interviewees said that the change has been positive, and three interviewees have felt that it has not affected the organization much and therefore have a neutral feeling towards it. None of the interviewees had an overall negative perception towards the change. This can be seen in the picture 2 below.



Picture 4. Overall opinion on the new ERP system

Interviewee number 8 included that even if HUS Logistics would not have changed from the on-premise version to the cloud based one, the organization would have still managed to continue their operations quite similarly. "It is more about the adaption on how development work is done and how different features and parameters are deployed and how they are used". This referred to the idea that as the change was mostly driven by external forces from the service provider and from the trends that direct the adaption of different digital advancements, the HUS Logistics organization would not have necessarily needed this change right now and they could have still managed to operate successfully.

5. DISCUSSION AND CONCLUSION

The adaption of new digital solutions and updating the older ones has been a popular trend amongst different organizations for a long time. In supply chain management, the impact reaches out across different activities and therefore creates a more complex set of effects to be studied and seen in the field. The digital transformation in supply chain management has historically created a demand especially for ERP systems and for their development. This has affected multiple dimensions in supply chain management and therefore has been one of the most influential developments regarding supply chain management and procurement in the digital perspective in the past few decades. This has also contributed to the strain that organizations have financially and in performance wise that the constant development and adaption of new and more suitable enterprise resource management solutions require on the present day.

The effects that can be seen in the use and adaption of ERP solutions in supply chain management have usually been categorized in different dimensions, but it has not conventionally taken into account the effects that the change and adaption of a new system has on the personnel and the weight they feel in the process. This has been taken into consideration in this thesis as it plays a big role in the way the whole procurement department operates, and it can affect the organization's performance in the long run if the personnel's emotions are being ignored.

The goal of this thesis was to look into the impact that digital transformation from an on-premise ERP system to a cloud-based one brings to a HUS Logistics procurement department and how these different effects can affect the organization's performance and its personnel's attitudes and emotions during and after the change process. The topic itself can be studied in many ways and it is not a new phenomenon in different organizations, but in this particular case the study was conducted a year after the change process and therefore there was possibilities to look into the longer-term effects that cannot be studied right after the change and the adaption of the new system.

In this chapter the goal is to summarize the research, give answers to research questions, give implications and go through the reliability of the research and give suggestions for future ventures of this topic. The conceptual framework will be presented in this chapter once more to conclude the findings with a reflection to the framework.

5.1. Summary

Digital transformation has many ways to affect organizational procurement and supply chain management processes. The effects that occur during this type of change can usually be concluded to positive effect and to negative effects or in other words to effects that accelerate the change or hinder it. These both types of effects were found during this research on HUS Logistics ERP system's change. The founded effects are listed in table number 12 beneath.

	Positive Impact	Negative Impact
Efficiency	<ul style="list-style-type: none"> • Faster system • Error notices help to locate malfunctions • Graphical improvements • Improved internal Valtti-webstore • More stable system • Wider range of features 	<ul style="list-style-type: none"> • Change is time consuming • Customization had problems • Employees lack knowledge in regard to the system
Financial Impact	No direct positive financial remarks were found.	<ul style="list-style-type: none"> • IT management charges • Outsourcing • Transferring to a new system brings new expenses
Personnel's emotions	<ul style="list-style-type: none"> • The new system being faster made daily working more enjoyable • Better graphics create a better user experience • Positive attitude towards the new system also due to 	<ul style="list-style-type: none"> • Introduction was not profoundly done • Some personnel felt that they were not heard in the building process • The system swell while building it and this raised annoyance

	<p>more logical and clearer reports</p> <ul style="list-style-type: none"> • Many personnel felt heard and seen during the change due to good communication • Positive feedback from the new internal webstore as users a better user experience 	
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Table 12. Summary of positive and negative impacts

The research was conducted by interviewing 8 people from the HUS Logistics organization who work in different parts of the logistics and procurement departments. The goal was to get an in-depth and broad view of the change and conclude the impact and different effects the change has had on the organization. The impacts that were being researched were divided first into negative and positive characteristics and in those two under three categories: efficiency, financial impact and personnel's emotions.

The increased efficiency that was reported in the organization through the interviews focused on the daily work and different tasks circulating that area. The changes that influenced the increase were very similar to previous findings on digital transformation in supply chains. As researchers Büyüközkan & Göçer (2018) concluded, digital supply chains support interactions between different departments inside the organization and therefore create agile and effective outcomes (Büyüközkan & Göçer 2018, 634). In this case as the new system became faster and had multiple improvements, the interviewees concluded that it had a positive outcome to their daily work. The negative aspects that can be noticed in the organization's efficiency are mostly linked to change management and in the fact that change always takes time from the so called normal working pace that employees have. This type of change driven by external factors such as technological changes has been identified by Weick and Quinn (1999) in their research that divided change on episodic and continuous characteristics. In this case, the main driver for change and digital transformation was from the ongoing trends that circulate around digital solutions nowadays and the pressure from the ERP service provider to update the system.

The findings on financial impacts that the change has had on the organization were quite small. There were no direct positive effects that could be concluded from the interviews and therefore the focus was only on the negative impacts. This was due to the fact that HUS Logistics did not measure the impact during the change and therefore there is not data that could be used to compare if the change had any final impact in a positive way on the organization. The negative financial effects that were found were mostly about the costs that the change had caused as implementing new solutions require consultant and personnel's work hours and these accumulate new costs. Also, the fact that HUS has to outsource a lot of knowledge-based skills that are not found in the organization regarding this type of solutions adds to the financial strain that the change caused. This did lead to a conclusion in the interviews that HUS Logistics would have benefited from the use of some sort of measurements for example from the use of KPIs. As Toor and Ogunlana (2010) concluded, KPIs and different projects can be used as learning projects and this applies to this particular case as well (Toor & Ogunlana 2010, 229).

The emotional aspect during and after the change in the procurement department had mostly positive aspects regarding the management of the change. In previous research it has been noticed that the environment of change increases personnel's feelings of anxiousness and stress (Fox & Amichai-Hamburger 2001, 85). During the interviews, personnel had divided opinions on whether the change had been managed properly or if it lacked more support. Due to this the findings had positive and negative remarks on the communication process and how the personnel felt seen or heard. The system itself did bring positive feelings and had a good response from the procurement and logistics personnel that was interviewed. The new improved internal webstore that was part of the new system also had a good response from the HUS personnel and therefore people in general welcomed the change with minimal negative emotions. The possibility of change resistance was quite small in this case as the change did not affect the organization structure that much and the change was not about the people or their position in the department, but rather on a tool they use in their work. Even though change resistance is natural phenomenon when people feel uncertainty, mistrust towards the process of change or feel that they have no control over the change (Fox & Amichai-Hamburger 2001, 85), it was not prominent in this case. Even if the personnel had some negative remarks on the change or any aspect regarding it, they did not feel threatened during it. Liu and Perrewé (2005) suggested that one of the most important ways to tackle potential change resistance or negative emotions regarding change was to establish good proactive communication.

(Liu & Perrewe 2005, 264) Many interviewees reported that they were happy with the way the change was communicated and that some of them were part of the testing stages.

Regarding the dynamics of this digital change, in order to understand why individuals in HUS Logistics organization behaved and had certain outlook on this change, the research process needed to identify the forces that have affected the change. Lewin's force field analysis helped in this as the purpose of Lewin's theory is to identify the forces that cause conflict in the presence of change and with this it is possible to change the dynamics and the direction that the organization is heading to. (Burnes 2004, 986) In this research the forces that mostly affected the group dynamics was the pressure from the service provider as that mainly brought the change to the organization as well as the management that controlled the communication and how personnel was included in the change process. In order to benefit from the change as much as possible, the organization needed to create a way to enforce these drivers and try to diminish potential conflicts that might cause disturbance in the dynamics of the procurement and logistics personnel. This was successful in regards of the change process in HUS Logistics as the management was able to diminish the potential factors for change resistance and any major negative impacts that could have potentially rise up during or after the adaption of the new ERP system.

5.2. Answers to the Research Questions

In this chapter the goal is to answer the three research questions that were set for this thesis and reflect the previously presented literature to the findings of this research. The research findings will also be reflected to the conceptual framework that was formed in the beginning of this thesis and that has worked as the basis for the research topic and the research question. The main research question was:

RQ1: What kind of impact does cloud-based ERP system have on the procurement processes and the organization?

On contrary to previously done research, the change that happened in HUS Logistics organization can be described as episodic change in Weick and Quinn's (1999) change categories. This categorization can be made from the fact that the change came mostly from external drivers and the organization tried to adapt to them.

The impact of the digital transformation can be divided into three categories: organizational efficiency, financial effects and the effects on personnel's emotions and attitudes. The first category, organizational efficiency, can mostly be seen in the use of time and in the way

the personnel adapts to the use of the new updated ERP system at HUS Logistics. The impact had more negative appearances in the beginning of the implementation process of the new system, such as that the change took time from the daily work tasks and that the customized screens made specifically for this update did not work in the beginning in the way they should have. These had a negative impact on the efficiency of the digital transformation in the procurement department. The change also had positive impact on the procurement processes in the longer run as when the personnel got familiar with the new updated system, their work became more efficient as the new system is faster and not so prone to malfunctions compared to the older version. This is due to the error notices, better graphics, the system being more stable and having a wider range of features. All of these improvements have had a positive impact from the ERP system change. Researchers Shang and Seddon (2000, 1005-1007) concluded similar benefits from the implementation of ERP system in their research. They concluded that the benefits would include productivity improvement, support for organizational changes, facilitation for business learning and better resource management. These findings are supported through this thesis research as well.

The second category, financial impact, can be seen in HUS Logistics as the increased IT management charges, the increased outsourcing of smaller technical parts of the system and its management. This with transferring of the new system, brings immense amounts of new and unexpected expenses for the organization. If HUS Logistics would have used directly usable KPIs before, during and after the implementation of this digital transformation, this research could have had more numerical data for the findings that could have been compared with each other to gain a deeper understanding of the financial impact. The interviews did not bring up any direct positive effects from the change. These findings did not align well with the findings of researchers Shang and Seddon (2000, 1005-1007), as in this research the digital transformation of the ERP system did not bring any cost reduction for the organization. The costs for IT management increased at HUS Logistics, which is in contrary to the findings of Shang and Seddon (2000).

The impact of the change affected HUS Logistics' personnel in both, positive and negative ways. Most of the interviewees had positive feelings towards the change, but some negative and dissenting opinions did rise in the interviews. These were not elaborated further in the interviews and therefore they were not deemed as too harmful for the organization's change management as most of the interviews had positive remarks. The change in the ERP system affected the personnel in a minimal way. After the personnel got the hang of the new system and in the way it operated, they did not have any stark feelings towards the

change or the digital transformation process. This is elaborated more in the second sub-question.

The main research question is supported by two sub-questions. These questions are constructed with the idea to deepen the understanding and give reasoning to the main research question. The first sub-question is:

S-Q1: How can this impact be measured in the organization?

Before conducting the interviews, there was an idea of what type of measurements were to be looked into during the interviews. The idea was to look into efficiency and financial impact through already existing key performance indicators that would have been in use in the HUS Logistics organization before, during and after the change. The impact on personnel's feelings, emotions and attitudes was meant to be researched solely based on the interviews. However, during the interviews it was revealed that HUS Logistics did not use any KPIs that could be used in this research. Therefore, the measuring of financial impact on the procurement department was done through interviewees' views on what had happened during the change and how it had affected the organization, without any sufficient data that could be compared to previously collected data.

Efficiency was measured with different questions presented in the questionnaire that touched upon the felt change in efficiency in daily work in the procurement department. Before conducting the interviews, it would have been beneficial to have some sort of data on actual measured changes in the organization's efficiency. As this type of collected data was not available from the HUS Logistics organization, the changes that happened in the organization were based on the interviewees' views and on the way, they had felt about the change. In this case, HUS would have benefited greatly on the use of sufficient KPIs as the use of them is linked to success in organizations and in performance management (Atkinson 2012, 48).

As it is also noted that choosing the correct means of measure and the correct KPIs for each organization and situation is a difficult task (Toor & Ogunlana 2010, 229), it can be concluded based on this research that in the future HUS Logistics should use and develop some sufficient measurements in their change management as it would be beneficial for their development as an organization.

The change in emotions and attitudes in the organization's personnel was measured through interviews. Interviewees' answers to the questionnaires were analysed and through them conclusions were made on how the change had affected them and their emotions.

Barnett and Carroll (1995) concluded in their research that change management's success can be measured by comparing the before and present scenarios. In this research that was possible only through analysing the collected data from the interviews and therefore that was the measurement method used in this case research. The impact can be divided into actions and effects that help the change and to ones that hinder the change and development.

The second sub-question will answer to the personnel's adaption and how the change reflected to their feelings and attitudes. The second sub-question is:

S-Q2: How has the procurement department's personnel adapted and felt towards the change?

During the interviews it became clear that most of the interviewees had positive attitudes and feelings towards the change and the change process as whole. However, some negative and hindering effects did come up during the interviews. All the impacts and how the personnel tried to adapt to the change will be concluded next.

Most of the positive feelings circulated around the technical advancements that were done during the change in the ERP system. These included better graphics, faster system, more logical and clearer reports, and better new internal webstore. These were concluded as bringing positive feelings in the personnel and therefore advancing the change process collectively. These positive feelings were also advanced by having mostly good and sufficient change communication from the management to the employees. This made them feel seen and heard during the change. One aspect that helped to support these positive feelings and attitudes was that during the designing of the new system and the change process, some personnel were asked to be part of the testing and were asked to give feedback on the system through these test sessions. As the personnel's attitudes and emotions were not affecting the change in a negative or hindering way, there was not much need for interference that was suggested in Lewin's force field analysis. Burnes (2004) concluded that in the case of an upcoming conflict, some forces need to be diminished or strengthened in order to create the needed change. (Burnes 2004, 982)

The negative effects that the change had on the procurement department and its personnel included not feeling that the introduction to the change and to the new version of the ERP system was enough for some of the interviewees. Another negative effect was that some of the interviewees did not feel heard during the change process and this made the change process "so and so" for some of the interviewees. These two negative aspects did raise dissenting opinions amongst the interviewees and did not reflect the feelings of all the eight

interviewees. The last recorded direct negative aspect was the swelling of the of the system while building it. This was an issue amongst the interviewees who were part of the team that was responsible for the building and the requirement specification process for the new system version. The main negative feelings during and after the change were annoyance and the feeling of not being heard. This should be addressed in the organization in order for the change to be successful and the according to Fox & Amichai-Hamburger (2001) the organization needs to focus on addressing the negative messages and emotions that have risen up. (Fox & Amichai-Hamburger 2001, 88)

As it was revealed in Lewin's force field analysis theory, it is important for the organization to identify the forces that are affecting the change situation. (Burnes 2004, 982) During the establishment of the new cloud-based ERP system, HUS Logistics management made sure to have sufficient communication with the personnel and while designing the new system, they tested it with the personnel to get a better overall view of the systems functions. With actions like this, the management made sure that the personnel did not face a crisis during the change. This helped the personnel to adapt to the change without conflicts.

Due to the management's efforts, the organization did not experience much change resistance from its personnel. The only recorded form of change resistance was that some of the interviewees said during the interviews that they had heard dissenting opinions from other members of the procurement department and had heard other people discussing, but that was the extend of the dissatisfaction of the change management and the change itself. The personnel adapted to the change very well and therefore did not have much negative to rebel against. The low level of change resistance may stem from good proactive communication that was recorded to be used in HUS Logistics during the change process and the adaption of the new system. This has been noted to be crucial in change management by Liu and Perrewe (2005) as it lowers the change of speculation in the organization. (Liu & Perrewe 2005, 264)

5.3. Managerial Implications

The goal for this thesis was to provide information and give a case example on the topic of digital transformation from on-premise ERP system to a cloud-based one and how that affects the personnel and the performance in a public healthcare procurement organization. There is previously conducted research and data on this type of change, but it is not

exclusive for the effects that can be seen in a procurement organization, especially on the scale that HUS Logistics operates in Finland.

Research on this topic has previously focused solely on one side of the topic, for example on procurement in a public organization or to a digital transformation on organizations in general. With this thesis these topics are combined, and the findings support digital transformation in procurement of public organizations. This thesis with its findings supports the decision-making in different organizations, specifically in procurement department when the organization is facing a change or are in the midst of it.

In order to achieve a successful change in an organization's procurement department and with its personnel, the organization needs to listen and see the change from the personnel's viewpoint. This way the organization is able to manage the change in a way that it has minimal negative impact on the organization's procurement processes and on the personnel that work closest to the key processes in the organization. This helps the organization to have a change that in the long run has the best possible outcome. One aspect that organizations need to pay attention during digital change is the design process of the new digital system that they are deploying. The new system, whether it is an update on the old system or a completely new system, needs to be kept as a compact package that will not cause excessive costs for the organization during the design, implementation or in the maintenance of the system.

5.4. Reliability and Limitations

The reliability of this research can be argued to be relevantly good. The chosen research method supports the study well and the research process was explained step by step through the whole process. The data was collected from various sources from interviewees with different background. This ensured the data to be versatile in the research. Even though the collected data and conducted research provide a good background for this research, the generalization of the study is difficult. This is due to the fact that the data was collected from only one case company, HUS Logistics. If the study would be conducted on other case companies, the results could vary from the results that were concluded in this particular research.

One of the limitations in this research is that as it is a case study, the results can vary from other organizations. For this reason, the results might not be directly reflected to every organization and to every change in digital transformation in procurement department.

Other limitation in this research was that the time scope is only for a bit over a year since the change had occurred and the research was conducted. If the time scope would have been different for example longer, the results could have had more in-depth and longer-term effects. On the contrary if the research would have been conducted during the change process, the interviewees might have had more detailed memories from the change and on the change management and communication from the management.

5.5. Suggestions for Future Research

The topic research in this thesis is a combination of multiple phenomena occurring at the same time, such as digital transformation in procurement and more specifically in a public organization. These topics have been researched individually, but together the research material has been quite narrow. For this reason, for the future it would be advised to research the topic and the effects that digital transformation has on the different aspects in procurement processes and in the organization. With more research and with a bigger research pool, it would be possible to gain more in-depth research on the topic.

Another suggestion for future research would be to have a longer time scope for the research. In this thesis the change had happened a year from the interviews. If a similar research would be conducted for example after 3 or 5 years, different type of data and opinions could be collected from the interviewees. This would give the change more time to affect the organization and different types of effects could rise up from the organization.

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APPENDICES

Appendix 1: Questionnaire 1

Kysymyksiä hankinnan työntekijöille / Questions for procurement employees

1. Oletko käyttänyt vanhaa Harppia työssäsi? / Have you used Harppi in your work?
2. Miten muutos vanhasta Harpista uuteen Pilvi-Harppiin on vaikuttanut työhösi? / How has the change from the old Harppi system to the new cloud-based Harppi affected your work?
3. Käytätkö edelleen jotain vanhan Harpin raportteja työssäsi, joita ei ole päivitetty enää tämän vuoden aikana? / In your work, do you still use some of the old Harppi-system's reports that have not been updated during this past year?
4. Pystytkö luottamaan uuden Harpin dataan, jota käytät työssäsi? / Can you trust the data in the new system, that you use in your work?
5. Mitä oleellisia tietoja puuttuu edelleen Harpin datasta? / What relevant information is still missing from Harppi's data?
6. Käytätkö suurimmaksi osaksi itse Harppi -sovellusta, vai sen raportteja vai sekä että työssäsi? Onko tähän tullut muutosta verrattuna vanhaan Harppiin? / Do you mostly use the Harppi-system or its reports or both in your work? Has there been a change regarding this?
7. Aiheuttiko siirtymävaihe vanhasta Harpista uuteen ongelmia? Did the change process from the old system to the new one cause any problems?
 - a. Millaisia? / What kind of?
8. Veikö uuden järjestelmän käyttö aikaa pois normaalista työskentelystä? Oliko työskentelysi hitaampaa alussa? / Did the adaption of the new system take time away from your normal daily work? Was your working slower in the beginning?
9. Onko työvaiheita vähentynyt? / Is there less steps in your work now?
10. Minkälaisia ongelmia olet huomannut uudessa järjestelmässä? / What kind of problems have you noticed in the new system?
11. Jos sinun pitäisi arvioida työskentelyäsi uuden Pilvi-Harpin kanssa, miten vertaisit sitä työskentelyyn vanhan Harpin kanssa? Onko se tehokkaampaa, hitaampaa, työläämpää, mielekkäämpää, jotain muuta? / If you would evaluate your working with the new cloud-based Harppi-system, how would you describe it compared to the old system? Is it more efficient, slower, more difficult, nicer or something else?

12. Toimitko uuden Harpin kanssa prosessimielessä kuten vanhankin kanssa, vai oletko yrittänyt muuttaa työskentelytapaa, jotta se tukisi paremmin uuden Harpin ominaisuuksia? / Do you work similarly with the new Harppi-system as you did with the old one, or have you tried to change your working habits to suit the new system better?
13. Mitä johto ja esimiehet viestivät uudesta Harpista ennen sen käyttöönottoa? / What did the management communicate about the new system before its adaption?
14. Onko muutosprosessin aikana kysytty työntekijöiltä mielipidettä uudesta järjestelmästä? / Were employers' opinions on the new system asked during the change process?
15. Minkälaisia vaikutuksia uudella Pilvi-Harpilla mielestäsi on ollut HUSin hankintaorganisaatioon kokonaisuudessaan? / How has the new system affected HUS' procurement organization in your opinion?
16. Jos huomaat, että Harpin raporteilta tai tiedoista puuttuu jotain oleellista, niin keneen olet yhteydessä HUS Logistiikassa, jotta asia saataisiin korjattua tai kehityslistalle? / If you notice that some relevant information is missing from the reports, who do you contact in HUS Logistics, so that the problem can be fixed?

Appendix 2: Questionnaire 2

Kysymyksiä liittyen suorituskyykyyn ja sen mittaamiseen / Questions about performance and its measurement

1. Onko HUSin hankinnan suorituskyykyssä havaittu muutosta Pilvi-Harpin käyttöönoton suhteen? / Has there been changes in HUS's procurement's performance after the adaption of the new Harppi-system?
2. Käytätkö edelleen jotain vanhan Harpin raportteja työssäsi, joita ei ole päivitetty enää tämän vuoden aikana? / In your work, do you still use some of the old Harppi-system's reports that have not been updated during this past year?
3. Pystytkö luottamaan uuden Harpin dataan, jota käytät työssäsi? / Can you trust the data in the new system, that you use in your work?
4. Haetko täydennystä jostain muusta tietolähteestä aina Harpin datan päälle? / Do you look for complimentary information from other sources to support your work with Harppi-system's data?
5. Mitä oleellisia tietoja puuttuu edelleen Harpin datasta? / What relevant information is still missing from Harppi's data?
6. Toimitko uuden Harpin kanssa prosessimielessä kuten vanhankin kanssa, vai oletko yrittänyt muuttaa työskentelytapaa, jotta se tukisi paremmin uuden Harpin ominaisuuksia? / Do you work similarly with the new Harppi-system as you did with the old one, or have you tried to change your working habits to suit the new system better?
7. Käytätkö suurimmaksi osaksi itse Harppi -sovellusta, vai sen raportteja vai sekä että työssäsi? Onko tähän tullut muutosta verrattuna vanhaan Harppiin? / Do you mostly use the Harppi-system or it its reports or both in your work? Has there been a change regarding this?
8. Uskotko Pilvi-Harpin käyttöön olevan vaikutusta HUSin suorituskyykyyn?
 - a. Jos ei suora vaikutusta, niin uskotko olevan epäsuora vaikutusta?
9. Minkälainen taloudellinen vaikutus Pilvi-Harppiin investoimisella on ollut? / What kind of financial impact has the investment on a cloud-based Harppi-system had?
10. Minkälaisia vaikutuksia uudella Pilvi-Harpilla mielestäsi on ollut HUSin hankintaorganisaatioon kokonaisuudessaan? / How has the new system affected HUS' procurement organization in your opinion?
11. Oliko HUSilla käytössä minkäänlaisia tapoja mitata muutoksen vaikutusta hankintaorganisaatioon muutoksen aikana tai sen jälkeen? / Did HUS have any type

means to measure the impact of the change in the procurement department during or after the change?

a. Jos ei ole ollut suoranaisia tapoja, niin tuntuuko näin muutoksen jälkeen, että olisi pitänyt olla? / If not, do you fee that there should have been?

12. Jos huomaat, että Harpin raporteilta tai tiedoista puuttuu jotain oleellista, niin keneen olet yhteydessä HUS Logistiikassa, jotta asia saataisiin korjattua tai kehityslistalle?
/ If you notice that some relevant information is missing from the reports, who do you contact in HUS Logistics, so that the problem can be fixed?

13. Mikä taho mielestäsi omistaa Harppi -sovelluksen ja sen datan HUS Logistiikassa?
/ How do you think owns the Harppi-system and who owns its data in HUS Logistics?

Appendix 3: Questionnaire 3

Kysymyksiä henkilölle, joka ollut tekemässä päätöstä pilvi-ERPistä / Questions for a person who has been deciding on the new cloud-based ERP system

1. Mistä päätös siirtyä pilvipohjaiseen ERP-järjestelmään tuli? / Where did the decision to change to a cloud-based ERP system come from?
2. Minkälaista muutosta sekä vaikutusta uudella järjestelmällä haettiin? / What type of change and impact was HUS Logistics looking for with the new system?
3. Miten paljon uusi Harppi eroaa vanhasta Harpista? / How does the new system differ from the old Harppi-system?
4. Mitä muutos on käytännössä tarkoittanut HUSin hankintaorganisaatiolle? / In practice, what has the change meant for HUS's procurement department?
5. Oliko uuteen ERP-ympäristöön siirtyminen suuri muutos? / Was the change to a new ERP environment a big change?
 - a. Mitä muutos piti sisällään? / What did the change include?
6. Onko muutoksella ollut vaikutusta HUSin hankinnan organisaation rakenteeseen? / Has the change had any impact on HUS's procurement department's structure?
 - a. Jos on, niin millä tavalla? / If it yes, then in what way?
7. Onko uuden järjestelmän käyttöönotossa ollut ongelmia? / Has there been any problems in the adaption of the new system?
8. Asetettiin päätöstä tehtäessä muutokselle tavoitteita ja mittareita, joilla niiden toteutumista mitattiin? / Was the change given any goals and any KPIs that could be used to measure the success of said goals?
9. Koetko päätöksen onnistuneeksi ja saavutettiin muutokselle asetetut tavoitteet? / Do you feel that the decision to change the ERP system has been a successful one and were the goals achieved?