Master's degree thesis

LOG950 Logistics

Benefits Realization with a cloud-based ERP system: A perspective for SME Manufacturers

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Preface

This master thesis represents the final requirement to the two-year Master of Science in Logistics program at Molde University College. This research was conducted between December of 2019 and June of 2020. As graduates, this experience has been valuable for us.

During the writing of this thesis we have had some difficulties with our data collection as a consequence of the Covid-19 pandemic. After the breakout some respondents had to cancel scheduled interviews, and therefore our research contains fewer cases than we originally intended.

First of all, we want to express our gratitude to our supervisor, Professor Bjørn Jæger of Molde University College, for sharing his academic expertise in the field of logistics, guidance and continuous encouragement throughout this thesis.

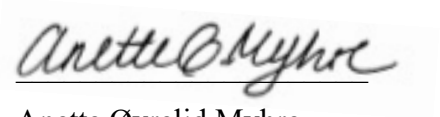
We sincerely want to thank the companies for participating in our data collection, and for providing us valuable insights despite your busy schedules, partly in view of the Covid-19 pandemic. We are also thankful for the cooperation from Jakob Hatteland Computer AS and our key contact Thorvald Gundersen for acting as a facilitator and our point of contact at the company. The information has been imperative to complete this thesis.

Additionally, we would like to give a special thanks to our family and friends who have supported us throughout our education.

Last, but not least we would like to thank our fellow students for good memories and Molde University College for five years of quality education.

Thank you.

Molde, June 2020



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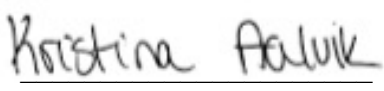

Kristina Aalvik

Abstract

Business value realized from EPR system usage continue to disappoint in terms of matching the IT investments. An emerging question is how to realize benefits from a cloud ERP system. Research has shown that cloud has offered SME manufacturers possibilities of ERP systems. Furthermore, research indicate a shift from emphasizing the technical artifacts to the realization of benefits. Thus, this master thesis aims to determine how SME manufacturers can manage the process of benefits realization with a cloud-based ERP system.

Based on a review of the literature on cloud ERP and benefits realization within SMEs, an online questionnaire was distributed as an exploratory phase. Respondents were manufacturing clients of a Norwegian cloud ERP vendor which had already implemented their system. Semi-structured interviews were further conducted with three case studies. Analysis of the responses demonstrated that SMEs face pre-adoption challenges which the benefits of a cloud ERP system somewhat solves. The results imply that formal benefits realization approaches are not essential for SMEs to achieve benefits from cloud ERP. Nevertheless, it is arguably that benefits realization may result in more effectively and efficiently realization of business benefits. Based upon frameworks from literature and discussion, a modified conceptualization to comprehend SMEs benefits realization with cloud ERP was proposed.

Keywords: Benefits realization, benefits management, cloud ERP, SaaS ERP, manufacturing SMEs.

Abbreviations

CC	Cloud Computing
ERP	Enterprise Resource Planning
ETO	Engineer-to-order
IaaS	Infrastructure as a Service
IS	Information System
IT	Information Technology
MTO	Make-to-order
MTS	Make-to-stock
PaaS	Platform as a Service
ROI	Return on Investment
SaaS	Software as a Service
TCO	Total Cost of Ownership

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1. Introduction

Almost two decades after Harvard Business Review published the widely debated *"IT doesn't matter"* by Nicholas Carr (2003), the article still matters as it confronts contemporary issues. Core IT functions have become available and affordable to all, and the potentially strategic resources of IT has transformed into commodity inputs. To gain a competitive edge, businesses must accomplish something their competitors cannot have or cannot do. Modern technologies have accelerated commoditization of IT (Carr 2003). Cloud computing (CC) represents a state-of-the-art technology that enable IT resources to be delivered via the Internet (Zhong and Rohde 2014). It created a paradigm shift from requiring all IT functionality to be internal in the organization, to the possibility of having IT functionalities off-site. Furthermore, not only did it allow for the IT infrastructure to be external, but also offered it as on-demand solutions with the capability of scaling up and down (Naplava 2016). The rise of CC services has changed how enterprise systems are delivered to businesses (Tang et al. 2010).

Today, enterprise resource planning (ERP) systems are widely adopted by businesses, and facilitate business transactions across inter- or cross-organizational boundaries (Zhong and Rohde 2014). Although IT creates business value, the performance of organizations is still uncorrelated with IT investments (Chae, Koh, and Park 2018). The same applies for ERP implementations, where only 30 to 80 percent of projected business benefits are realized (Panorama Consulting Solutions 2018). Earlier emphasis has been on the technical artifacts when delivering IT and little attention was paid to managing the benefits intended from the investments (Ward and Daniel 2006). Ward, Taylor and Bond (1996) introduced what has become known as the Cranfield Process Model of Benefits Management. Benefits realization for ERP systems in general has long been recognized as a part of benefits management, with a lot of research appearing especially in around the decade from 2004 to 2018 (Hawking, Stein, and Foster 2004, Ward and Daniel 2006, Ashurst, Doherty, and Peppard 2008, Esteves 2009, Doherty, Ashurst, and Peppard 2011, Flak 2012, Badewi et al. 2018). Current benefit realization literature for ERP systems mostly focus on the classical on-premises ERP solutions, while the current delivery model is cloud ERP. Cloud ERP has some unique features that are likely to affect the importance of benefits realization for ERP

systems. Thus, there is a gap in the understanding of benefits realization from the viewpoint of cloud ERP compared to on-premises ERP.

Organizations are currently moving towards cloud ERP due to significant cost reductions, less required IT resources and to obtain top-end IT capabilities (Gupta, Kumar, et al. 2018). Cloud ERP has opened the ERP-market to small and medium-sized enterprises (SMEs), which tend to act as "first adopters" (Grubisic 2014). Cloud-based ERP offers SMEs the benefits of ERP system which previous was more or less unachievable to this market segment (Seethamraju 2015). The research investigating realization of value related to cloud ERP solutions and SMEs are poor. Furthermore, much less research has been conducted on cloud ERP narrowed to one industry (Grubisic 2014). Company size is no longer a sufficient determinant of software functionality requirements as this is not how businesses view themselves. The ongoing convergence towards cloud-based ERP may change how ERP vendors positions themselves in the market. Service providers are expected to be more industry specific as customers value their implementation partners business process knowledge as well as their software knowledge (Bech 2020). Thus, we can await a change towards more business process consulting and less technical consulting in the coming years (Jæger, Bruckenberger, and Mishra 2020).

Most of the under-the-hood technology has become irrelevant to cloud ERP customers. Vendors who can translate the cloud ERP into practical improvements help businesses to achieve a competitive edge (Bech 2020). There is limited research concerning cloud ERP in small and medium manufacturing industries (Usman, Ahmad, and Zakaria 2019). Therefore, this thesis presents three case studies of SME manufacturers who have implemented a cloud ERP system. The adopted system is especially focusing towards manufacturing. A motivating factor for our thesis is our wish to research benefits realization related to cloud ERP in an industry-specific context. A clear contextual investigation may provide a more accurate picture of the real world as different industries exhibit different business needs. Furthermore, the successful implementation of ERP is critical for any company and the value of a successful implementation always exceeds the cost (Bech 2020). Thus, the goal of our thesis is to give an understanding of how benefits realization can be managed with a cloud-based system as the unsatisfactory situation of investments returns is an ongoing scientific endeavor (Lahmann, Probst, and Parlitz 2017).

1.1 Research Problem

Through a qualitative study of a Norwegian cloud-based ERP vendor and some of its customers, we want to investigate pre-adoption challenges, post implementation benefits and how benefits realization are embedded in their business value governance. The purpose of this thesis is to provide a better understanding of how manufacturers can include benefits realization when adopting cloud ERP systems. Thus, the research problem for our master thesis is:

How can SME manufacturers manage the process of benefits realization with a cloud-based ERP system?

1.1.1 Research Questions

To answer our research problem, we defined three specific research questions.

First, investigating the challenges SME manufacturers are facing prior to a cloud ERP system implementation are important to understand the possible benefits SME manufacturers would like to realize.

RQ1: What challenges make SME manufacturers adopt a cloud-based ERP system?

Defining the benefits arriving from cloud ERP systems contribute to benefits realization. Because of this, we want to identify all the benefits the SME manufacturers can obtain.

RQ2: What are the benefits for SME manufacturers in terms of using cloud-based ERP?

Finally, we want to outline how the SME manufacturers are realizing benefits from their cloud ERP implementation. This question will ultimately help us answer our research problem as the current approach provide an indication of how SME manufacturers should be able to realize benefits.

RQ3: How do SME manufacturers realize benefits from a cloud-based ERP system?

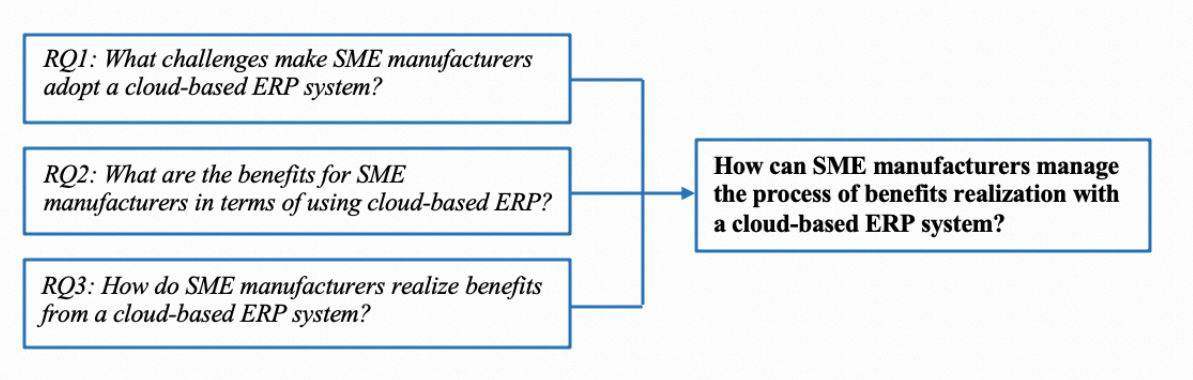

Figure 1 – The research problem and the three research questions

1.2 Statement of Purpose

This thesis is intended to be useful for cloud ERP vendors and customers, as well as for academics. This study provides an insight in benefits realization related to a cloud-based ERP system, and how SME manufacturers realize benefits from such an implementation. The fact that both cloud ERP vendor and cloud ERP customers were willing to participate in this study confirm the relevance and importance of the topic. The objective is to give an understanding of how the unique features of cloud ERP can affects companies from manufacturing industries when applying modern technologies and a benefits realization approach. Thus, assisting the vendor and customers interest in obtaining the full range of benefits.

In view of the limited research investigating benefits realization with cloud ERP in industry-specific context, this study contributes in the verification of existing research into a distinct environment. For academics, this helps extending past research and to bridge the existing gap.

1.3 Clarification of Concepts

In this section, central concept for this master thesis will be clarified and defined (Table 1). These words and concepts will be used throughout the thesis and will also be clarified in-text.

Table 1 – Clarification of concepts

Concept	Definition
Benefit	*An advantage on behalf of a particular stakeholder or group of stakeholders (Ward and Daniel 2006)*
Benefits management	*The process of organizing and managing such that the potential benefits arising from the use of IT are actually realized (Ward and Elvin 1999)*
Benefits realization	*Refers to the action of ensuring that potential benefits are realized (Flak 2012)*
Cloud Computing (CC)	*A model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (Mell and Grance 2011)*
Cloud ERP / on-demand ERP	*ERP systems delivered with the use of cloud computing technology (Zhong and Rohde 2014)*
Enterprise Resource Planning (ERP) system	*Software program that integrate and coordinate information in every area of the organization (Monk and Wagner 2013)*
On-premise ERP	*Traditional ERP software that are internally hosted. Data, software application and servers are maintained by the user organization (Peng and Gala 2014)*
Small and medium-sized enterprises (SMEs)	*Enterprises are categorized as "small" if they have having less than 50 persons employed, and categorized as "medium-sized" if they have 50 or more, but under 250 persons employed (European Commission 2015)*
Software as a Service (SaaS)	*Customers use vendors' applications running on a cloud infrastructure. The customer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities (Mell and Grance 2011)*

1.4 Structure of the thesis

The thesis is structured chronologically and consists of ten main chapters (including introduction, references and appendices). The overall structure of the thesis is illustrated in Figure 2 and a short description of each chapter is given below.

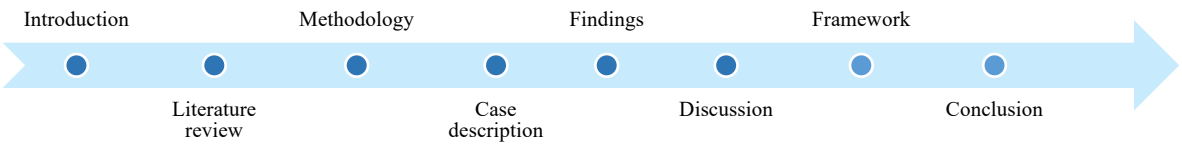

Figure 2 – Thesis structure

Chapter 2 presents a literature review with relevant concepts and prior and contemporary research on the selected topic. The literature review contains of five sections: Enterprise systems and logistics, loud computing, cloud ERP systems, benefits realization and cloud ERP systems and benefits realization management. The chapter explain ERP systems and its shift towards cloud-based ERP solutions. We identify challenges and benefits with cloud ERP systems found in existing research before presenting the much-used Cranfield Process Model of Benefits Management by Ward, Taylor and Bond, and further theory on benefits realization as a part of benefits management.

Chapter 3 describe the methodology with the chosen research design for the thesis and the methods of data collection. The methodology chapter further explains how the data analysis was carried out and ends with the judgement of the research quality.

Chapter 4 describes the case. It presents the cloud ERP vendor and the interview respondents.

Chapter 5 presents the findings of both our questionnaire and interviews. The chapter identifies the challenges manufacturers face which make them adopt cloud ERP systems. Further, we uncover the challenges and benefits of the system adoption and how the manufacturers realize benefits.

Chapter 6 discuss the findings and relate them to the literature in order to answer our research questions. Chapter 7 proposes a modified framework of benefits realization for SMEs and cloud ERP.

Chapter 8 concludes the thesis by answering the research problem. Further, this chapter provides a summary, limitations and recommendations for further research on cloud ERP and benefits realization.

2. Literature review

This chapter consist of the explanation of relevant concepts and a review of prior and contemporary research on relevant areas to underpin the thesis. The literature review aims at describing the theoretical foundation of our thesis and it is essential as it relates our research to the greater, ongoing discussion in the literature (Creswell 2014). The structure for this chapter is as follows:

2.1 Enterprise Systems and Logistics

Information Technology (IT) is a key component of successful businesses (Murthy 2008). Jessup and Valacich (2008, 12) explain the term IT as referring to "*machine technology that is controlled by or uses information*". It concists of all the hardware and software needed to achieve the business objectives (Laudon and Laudon 2018). The terms IT and Information Systems (IS) are often used interchangeably. IS can operate on IT, yet, IS existed within organizations prior to the occorence of IT. Accordingly, IS can function without the use of technology. As technologies evolves, the definition of IS evolves. With the advent of digital technologies, we use the current definition of IS by Magal and Word (2009, 15) as "*computer-based systems that capture, store, and retrieve data associated with process activities. In addition, they organize these data into meaningful information that organizations use to support and assess these activites*". IS are acquired to help organizations be more productive and profitable, gain competitive advantage, increase customers, or to improve services (Jessup and Valacich 2008, 20). The complexity of managing data across business processes made organizations move from functionally centered IS to integrated Enterprise Systems (ES). Rather than facilitating parts of the processes, ES support the entire process (Magal and Word 2009).

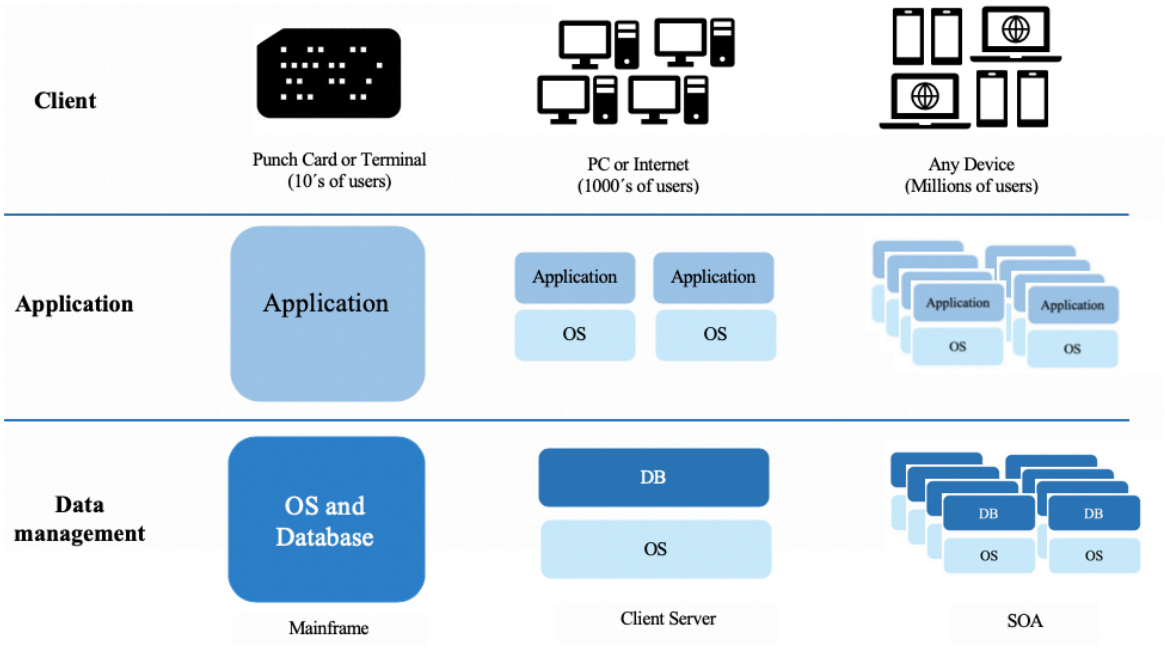

Figure 3 – The evolution of enterprise systems based on Magal and Word (2009)

The architecture of a typical ES includes hardware, software and a database. ES has evolved through a paradigm shift in computing architecture from expensive stand-alone mainframe systems to cost-effective and scalable three-tier client-server applications (Figure 3). In the early days of ES, only extremely large businesses acquired such systems. Later, ES as packaged applications combined with networking technologies increased the use of ES. Three-tier client-server architecture implies that earlier combined layers (the user client, application and database) are separated and maintained as independent components. Nowadays, systems based on service-oriented architecture (SOA) are enabling organizations to use web services to integrate several client-server applications (Magal and Word 2009). Moreover, the on-premise characteristics of SOA-based systems present new issues from enterprises. A new paradigm shift from SOA-based system to adding Cloud Computing (CC) expand it from on-premise to off-premise. Thus, reducing cost and complexity as well as increasing capacity, flexibility and agility (Tang et al. 2010).

> *"Businesses are made of processes. Enterprises strive for excellence in business processes … Business processes are supported by IT in today's enterprises, so if your target is to improve business processes of an enterprise you are usually immediately involved in IT issues"* (Draheim 2010, 11)

Within logistics and today's supply chains, technology play an ever-greater role (Mangan and Lalwani 2016, 208), and their operations demand the support of IT in one form or another (Christopher 2016, 293). From the early stage of IT adoption within organizations, most cases addressed the automation of business processes to improve efficiency. When IT adoption became more widespread, the rational for IT investment went from reduction of costs, to include improved quality of operations and product (Ward and Daniel 2006, 3). Modern supply chains are information intensive and adaptive IS are essential to cope with logistics complexities (Mangan and Lalwani 2016, 208). ES serves to manage the information flow (Christensen, Grønland, and Methlie 1999, Magal and Word 2009), and with contemporary technology, real-time supply chain management as "*information at your fingertips*", becomes an actuality (Skjøtt-Larsen et al. 2007, 106).

2.1.1 Enterprise Resource Planning systems

Enterprise Resource Planning (ERP) system is a software program used by companies to "*integrate and coordinate information in every area of the organization*" (Monk and Wagner 2013, 1). Further, ERP system are the software tools that handle all enterprise data and deliver information to those who need it, when they need it (Somers and Nelson 2001). The systems support the organization to deal with the supply chain, receiving, inventory management, customer order management, production planning, shipping, accounting, human resource management as well as other business functions (Ferran and Salim 2008). The adoption and use of ERP systems can change the structure and processes in the organization, as well as the distribution of power and obligations of people inside the organization (Peng and Gala 2014). However, implementing an ERP system may be both expensive and time consuming, as well as it is usual for ERP implementation to have adoption issues. Some of the problems are regarding delays, employee resistance, substantial budget over-run and high overall project failure rate (Li et al. 2017).

2.2 Cloud-computing

In order to gain competitive advantage, companies need to react to the customers demand and market conditions. In recent years, CC has been one of the most discussed topics within IT since its emergence in the late 2000s (Batista et al. 2015). It has evolved to be widely perceived as an important strategic technology, with potential to change the

traditional IT usage both global and in the organizations (Peng and Gala 2014). The primary advantage of CC is related to cost, flexibility and high scalability. For IT infrastructure, this implies the possibility to add or remove different types of hardware and software. For organizations with a complex supply chain, flexibility is seen as one of the greatest benefits of the CC model and considered as a key component of effective supply chain management (Cegielski et al. 2012). Meanwhile, security concerns are one of the biggest barriers related CC (Naplava 2016). According to Mell and Grace (2011, 2), CC can be referred to as,

> "*A model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*"

Further, CC provides a change in the way IT services are invented, developed, deployed, scaled, maintained and paid for (Marston et al. 2011, Hustad et al. 2019). Currently, CC is one of the most common methods in order to develop and utilize software (Safonov 2016).

2.2.1 Service models

There are three main cloud service models; Software as a Service, Platform as a Service and Infrastructure as a Service. As stated by Kavis (2014, 13) *"Understanding the three cloud service models, SaaS, PaaS and IaaS is crucial for enterprises to make the right investments in the cloud"*. Figure 4 compare traditional IT and the three different cloud service models.

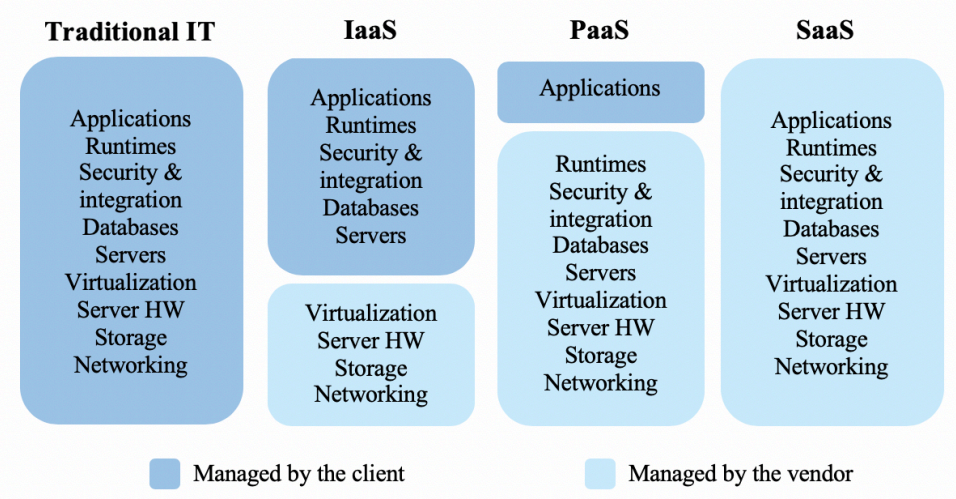

Figure 4 – Comparison of traditional IT and cloud service models adapted from (Mikovic et al. 2017)

Software as a Service

Software as a Service (SaaS) is defined as a model for maintaining software and data within the digital business. The service involves managing and performing all types of software through web-based services rather than traditional application on the processor at the local computer (Safonov 2016). The model is based on the use of license software service by the tenants who purchase the service, often on subscription basis (Kristoffersen 2016). In other words, it can be known as "on demand", hence it can be switched on and off according to usage and payment. Cost savings are one of the main benefits when using SaaS. It is economic for both server and clients as the server software are hosted externally and the service is often issued through a web browser or program that can be downloaded (Chaffey 2014).

Although there are several advantages connected to SaaS, there are also identified some challenges. Some of the challenges are the lack of customization during the implementation. Implementations are often standardized and therefore not able to be customized for each different business that applies the system. Further, the system is dependent on a third party when delivering service over the web and this could lead to some problems due to downtime and poor availability if the network or server fails. Also, reduced data security and protection can be a problem, since failures in the system is unavoidable (Chaffey 2014).

Platform as a Service

Platform as a Service (PaaS) are available entirely from the Internet. The vendors manage the application platform and provide the developers with a tool to expedite the development process from the Internet (Kavis 2014). The National Institute of Standards and Technology (NIST) define PaaS as:

> "*The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired application created using programming languages, services and tool supported by the provider. The consumer does not manage or control the underlying cloud infrastructure, including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment*"
>
> (Mell and Grance 2011, 2)

Many PaaS solutions provide capabilities as a service, so the developers can focus on business and not on updating of the IT system. However, the developers give up a degree of flexibility due to the constrictions from the tools and software by the vendors (Kavis 2014).

Infrastructure as a Service

In an Infrastructure as a Service (IaaS) CC resources are delivered as a service, usually in the form of virtual machines with attached virtual disks (Leitner and Cito 2016). IaaS allows the users have the entire control of the infrastructure, to control and manage the computing resources as storage, network and computing powers. IaaS is primarily targeted enterprises and integration with data and applications. These providers include Amazon, Google, Microsoft, Rackspace and IBM (Han 2013). NIST defines IaaS as:

> "*The capability provided to the consumer is to provision processing, storage, network, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications and possibly limited control of selected networking components"*
>
> (Mell and Grance 2011, 3)

2.2.2 Deployment solutions

In order to be considered as a true cloud solution, Rountree and Castrillo (2013) states that they should exhibit five key characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service. Each organization often have their own requirements on what service they want from the cloud, in order to match these, a cloud environment can be implemented using different models (Rountree and Castrillo 2013).

Schouten (2013) presents three main deployment methods: Private, public and hybrid. In a private cloud, a single-tenant cloud solution utilizes hardware and software that are owned by the client. The client is also responsible for the management and administration of the system (Schouten 2013, Rountree and Castrillo 2013). Secondly, a public, multi-tenant cloud solution is delivered using shared hardware and software owned by an external service provider. The client is only responsible for the software or application that installed, often connected through the Internet. Thirdly, we have the hybrid, whereas the client combines

two or more cloud models (Schouten 2013). As illustrated in Figure 5, there are different architecture for the deployment solutions.

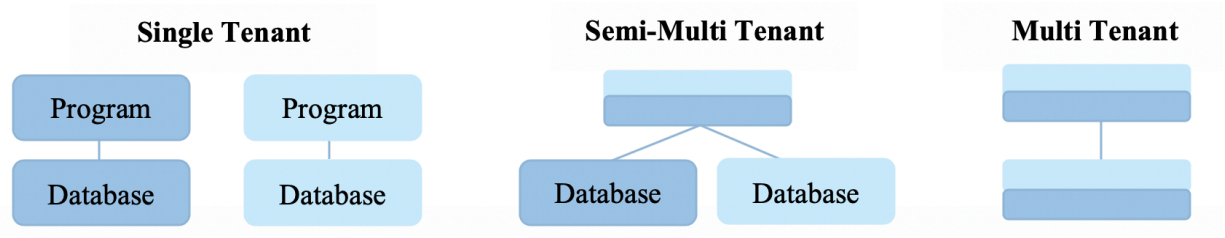

Figure 5 – Architecture for deployment solutions based on Christensen (2019)

In this research we will examine a cloud-based ERP system. The ERP system is a SaaS with a multi-tenant architecture deployed as a public cloud.

2.3 Cloud ERP systems

Cloud-based ERP systems, often referred to as *cloud ERP*, introduced a new method for the delivery of ERP systems by employing CC technology. The systems are standardized off-the-shelf packages (Seethamraju 2015). The balance between maintaining the competitiveness of an organization by utilizing an ERP system and minimizing the cost of ERP usage is a well-known challenge. However, the emergence of CC within ERP is viewed as a potential solution (Zhong and Rohde 2014) since cloud ERP offers the same functionality as an on-premise ERP system, but at lower costs. The lower costs are resulting from a cloud-based ERP system lack of on-site setup, maintenance and support (Gupta, Kumar, et al. 2018), as cloud ERP are ERP systems accessed via a web browser (Duan et al. 2012). The competitive advantage that made business adopt IS to begin with stand in need of migrating to cloud services in the interest of obtaining top-end IT capabilities and collect the benefits cloud ERP offers (Alharthi, Shehab, and Al-Ashaab 2019). Cloud ERP bring organizations a collection of business value and the following section will present the benefits identified in prior research and different systematic literature reviews (Duan et al. 2012, Peng and Gala 2014, Mohammed, Nasr, and Geith 2016, Hustad et al. 2019).

2.3.1 Benefits

There are several benefits identified in the literature on cloud ERP systems (Duan et al. 2012, Mohammed, Nasr, and Geith 2016, Ramasamy and Periasamy 2017, Hustad et al. 2019, Panorama Consulting Group 2020). The main cloud ERP benefits will be elaborated on in the following part.

Reduced Cost of Ownership

The total cost of ownership (TCO) for cloud solutions is significantly less than on-premise solutions. This is mainly a result of the shift from the company itself acquiring, running and maintaining the IT infrastructure, to ERP vendors offering this as a service (Panorama Consulting Group 2020). The users only pay for the access over the Internet. The service provider is responsible for the upfront and operating costs, this enables the companies to minimize the internal IT support (Mohammed, Nasr, and Geith 2016).

Availability – access from anywhere

Through mobile devices and a web browser, users can access the system from almost anywhere and at any time (Panorama Consulting Group 2020). The increased accessibility will increase the usability inside and outside the enterprise (Mohammed, Nasr, and Geith 2016).

Saving time and Focus on core competencies

Cloud ERP provides the possibility to get a standardized infrastructure system in only a few weeks or months (Gill 2011). According to Duan et al. (2012) rapid implementation is among the top benefits of cloud-based ERP, as well as it reduces the time of implementing new modules in different areas of the business. Implementing cloud ERP allows for the resources that would have maintained the IT, to be used on other areas of the business. The release of the IT department saves time on administrative tasks, in order to focus on other concerns as core activities inside the business (Duan et al. 2012, Mohammed, Nasr, and Geith 2016).

Standard system

Andersen (1994) defines a standard system as a software program or several interconnected systems which is developed for use in multiple organizations. The development of standard

systems assume that the system will not include customized changes from the user, or the users can adopt personal features in terms of customization. Customization involves other codes that enable new functionality that are not already present in the standard solution (Panorama Consulting Solutions 2018). The main benefits of standard systems are cost reduction, more accurate cost estimates, unnecessary with internal system developers, faster initiation, easier to know what you get and the system can offer higher quality (Andersen 1994). Cloud ERP providers present ERP systems based on a standardized workflow, best practices or the most common way of doing business (Mijač, Picek, and Stapić 2013).

Johnson (2009) and Hofmann (2010) referred to in Mijač, Picek and Stapić (2013) claimed that the reason why companies customize their business processes is in order to achieve better performance. Thus, conforming to standards may harm the competitive advantage if ERP turns into a commodity. On the other hand, research by Mijač, Picek, and Stapić (2013) view no indication that the customization issue with cloud ERP was significanly different from traditional ERP systems. Thus, there was no evidence of customization to be more promonent for cloud ERP.

Flexibility and Scalability

The cloud offers flexible solutions for companies as they can both scale up and down as necessary. Buying more storage, adding extra instances or changing the system environments does not interrupt the daily operations (Panorama Consulting Group 2020). Using ERP through cloud services prevent organizations to become technologically obsolete. The flexibility arises from a continuous redesign of contracts which allow organizations to meet their IS requirements at any given time (Gonzalez, Gasco, and Llopis 2008).

Security as a Service

Cloud providers consider security as a crucial element and invest substantially in cybersecurity (Panorama Consulting Group 2020). Reliable cloud ERP providers maintain data safe according to high standards (Ramasamy and Periasamy 2017). The cloud vendors have the responsibility to provide day-to-day maintenance service and support the client's companies, and thus also responsible for securing the customers data (Peng and Gala 2014). They are always upgrading and keeping up with the latest cybersecurity threats (Weng and Hung 2014, Panorama Consulting Group 2020).

On the other hand, the security factor is the most controversial in prior research on cloud-based ERP. A variety of research mentions security risks, and view security as s challenging and complex process (Duan et al. 2012, Mohammed, Nasr, and Geith 2016). Data concentrated in a pool of cloud infrastructure off-site create concerns about hackers, data breaches and application vulnerabilities (Subashini and Kavitha 2011). When considering vendors that are unfamiliar an option can be to use third-party security audit of that vendor (Ramasamy and Periasamy 2017).

Continuous innovation

Updates and upgrades are adapted faster in cloud solutions than traditional ERP application (Mohammed, Nasr, and Geith 2016). Upgrades are done on a regular basis from the cloud ERP vendor. Updates can involve fixing bugs or changes of further functionality, and thus "*help companies stay on the leading edge of innovation"* (Panorama Consulting Group 2020).

Visibility and Traceability

Modern ERP systems enhances visibility and control both internal and external to the organization as such systems have the abilities to integrate and collaborate with suppliers, partners, customers, incoming material and outgoing final products (Mohammed, Nasr, and Geith 2016). One of the greatest challenges related to inventory management is accuracy. Cloud ERP helps solve this by allowing to trace inventory at all stages. By tracking functionality based on lot and serial numbers, the companies are able to create a system and search through data at any time. Information can be compared against additional values, such as number in stock, manufacturing dates, allowing the business to review and keep track of inventory at any time (Purohit, Jaiswal, and Pandey 2012, Symonds 2012).

There has been little attention devoted to cloud ERP benefits to SMEs, and specially to SME manufacturers. On the other hand, Hustad et al. (2019) identified benefits in SMEs realized from cloud-based ERP system, such as simplifying and automatizing work processes, security, continuous updating, reduction of costs, timesaving and availability. Moreover, the technology was seen as future oriented as the systems developed over time. These benefits are supported in prior research. All seven benefits are summarized in Table 2 with explanations of each benefit.

Table 2 – Benefits of cloud-based ERP systems in SMEs (Hustad et al. 2019)

Themes of benefits identified	Explanations
Simplifying and automatizing work processes	*Work processes are standardized, automated, and simplified based on "best practice"*
Future-oriented technology	*The system develops over time through new solutions, technology, and modern digital designs*
Security	*ERP systems are offered by professional providers that take security seriously*
Cost reduction	*The system reduces the customers' costs, releases resources, shifts responsibility for the IT infrastructure to the provider, and reduces the need for internal IT competencies*
Continuous updating	*System updates happen automatically for all users*
Saving time	*The system supports fast implementation, automatized processes, and diversity of units (e.g., mobile units)*
Availability	*The system is available through a web browser and several mobile units*

2.3.2 Cloud ERP system Implementation in SMEs

As a result of the changes in the technologies and competition, SMEs achieve benefits as standardization, best practice processes, information visibility and real-time data through implementing cloud ERP systems (Seethamraju 2015). The implementation strategy for a successful cloud ERP implementation engage undertaking cost-benefit analysis in order to obtain goals and objectives that can be achieved within the time frame (Gupta, Misra Subhas, et al. 2018). Adopting new technology help SMEs gain competitive advantage, however it is often very costly. CC contribute to handle challenges as cost and risk management (Gupta 2016). ERP enables SMEs to purchase data storage, hosting service and applications as ERP packages and exploit the benefits and privileges without installing the IT infrastructure (Varian 2010, Gupta, Misra Subhas, et al. 2018). SaaS ERP are considered as the best option for SMEs to take advantage of the benefits of the ERP system, as it provides the opportunity to automate their business by reducing their investments in IT infrastructure (Popli and Sarin 2015, Seethamraju 2015).

In a paper by Gupta (2016) he introduced four main variables influencing SMEs decision to adopt cloud ERP; environmental, organizational, human and technological factors. For a

successful implementation, user training and selection of the right cloud vendor are some of the most important stages. The company has to carefully assess what is the "right fit" between their own processes and the processes included in the software. Schubert and Adisa (2011) stated in their research that SaaS models are more suitable for firms that do not need much customization or integration with other applications. SMEs therefore need to decide whether to follow the software offered by the vendor or develop alternative systems to meet the specific business need. As a result, it is important to find a good solution between the cloud ERP and the firm in the adoption process (Seethamraju 2015).

2.3.3 SME manufacturers

It is important to consider the distinct characteristics of CC across different industries as the manufacturing sector have different drivers of CC adoption than other sectors (Oliveira, Thomas, and Espadanal 2014).

The process of production implies manufacturing or generating goods or services and is considered a more complex process than other business processes such as procurement and fulfillment. The production process often varies from business to business, but often they can be classified as either assembling or manufacturing. Assembling means putting component materials together to produce finish goods, whereas manufacturing involves creating something from raw materials. There are different production strategies a company can undertake, for instance make-to-order (MTO) and make-to-stock (MTS). MTO involves producing in response to direct customer orders, while MTS involves creating inventory of products to later meet customer demands (Magal and Word 2009). Further, another strategy is engineer-to-order (ETO) which involves designing and producing a product based on very specific customer requirements (Kłos 2016). Nowadays, many companies have to select MTS and MTO modes as they must be able to deliver customer specific products with the leadtime of standard, off-the-shelf products (Shukla, Agarwal, and Shukla 2012).

ES facilitate production *"by helping the company to execute the process, capture and store data, and monitor its operations"* (Magal and Word 2009, 113). Aligning the supply and demand for goods as well as communicating all activities associated with their processes is a fundamental role of ERP systems for most manufacturers. SME manufacturing companies are facing challenges due to globalization and increased emphasis on speed, quality and

services (Shukla, Agarwal, and Shukla 2012). Enhancing the efficiency is done when real-time visibility and automation of activities are introduced (Waurzyniak 2015). ERP offered through the cloud has many benefits for the manufacturing industries whose core competencies is on manufacturing and not information management (Shukla, Agarwal, and Shukla 2012).

This research will more closely investigate SME manufacturing businesses.

2.4 Benefits Realization

The reason some IS and IT investments continue to fail is partly due to their increasingly more complex usage. IS and IT are implemented in larger areas of organizations and affecting people both internal and external (Ward and Daniel 2006). Further, it is also partly a result of how organizations manage their investments. The focus has shift from improvements in management being mostly 'supply-side' driven, to become more 'demand-side' driven. This implies that traditional approaches has been concentrated on the delivery of a technical artefact, while the current emphasis lies on the human and organizational changes required to identify and manage the investment benefits (Ashurst and Doherty 2003, Ward and Daniel 2006, Doherty, Ashurst, and Peppard 2011, Lahmann, Probst, and Parlitz 2017).

The term benefit has long been associated with financial savings, and for this reason constructed benefit realization as a new name for rationalization. However, benefit realization refers to realizing a broad range of potential benefits – including non-financial benefits (Flak 2012). A business benefit can be defined as *"an advantage on behalf of a particular stakeholder or group of stakeholders"*(Ward and Daniel 2006, 107). Moreover, benefits can be described as a positive effect that contributes to the strategic achievement of business objectives (Serra and Kunc 2014). Benefits emerging from IS/IT can be described as either tangible or intangible (Ward and Daniel 2006). The boundary between tangible and intangible is obscure (Hares and Royle 1994), and definitions of these terms vary in literature (Remenyi et al. 2000).

Remenyi, Money and Twite (1993) explained a tangible benefit as one which directly affects the organization's profitability. They can be measured by an objective and often imply

quantitative measures. An example of such benefits can be cost savings related to discontinuing software licenses, which can be measured without a problem. Tangible benefits, also referred to as "hard" benefits, are often cases where the unit of measurement are financial. Traditional investment appraisal approaches have frequently rested on a calculation on the return on investment (ROI) and a highly financial document. Thus, many organizations have considered IS/IT investments exclusively on hard benefits (Ward and Daniel 2006).

Intangible benefits, commonly known as "soft" benefits, can only be evaluated subjectively. These benefits are harder to measure, but for sure valuable for organizations. They tend to employ qualitative measures and can for instance include enhancements in satisfaction of both customers and employees, or improved decision-making (Ward and Daniel 2006). Many studies have indicated that solely financial measures fail to judge accurately the payoff of IT investments (Tallon, Kraemer, and Gurbaxani 2000). Many IT projects can deliver benefits that cannot easily be quantified. These can comprise better information access, improved workflow and interdepartmental coordination, which are all key benefits derived from ERP system usage (Murphy and Simon 2002).

In the mid-nineties a more holistic view concerning IT investments appeared. The fundamental idea was simple: an identified goal is not realized by itself. In addition to identifying the objectives, necessary measures should be identified in order to realize business value (Flak 2012). The methods to underpin this action were labelled *benefit realization* (Remenyi, White, and Sherwood-Smith 1997), *active benefit realization* (Remenyi and Sherwood-Smith 1998) and *benefit management* (Ward and Elvin 1999). For organizations to manage their IS/IT investment benefits, it is imperative to have a greater understanding of the nature of the benefits and actions needed to acquire them. Further, business managers must understand their role in the realization of the benefits (Ward and Daniel 2006).

2.4.1 The Principles of Realizing Benefits from IT

For organizations to manage the process of benefits realization it requires a comprehension of how IT deliver value. Without such a comprehension organization might not be in a position to realize potential benefits arising from their IT investments (Flak 2012). Peppard,

Ward and Daniel (2007) identified through their research five principles that underpin the process of realizing value from IT investments. These principles are as follows:

1. *"IT has no inherent value"*. The investment in technology alone does not create value. Little consideration around IT investments rarely generate beneficial effects. On the contrary, an approach like this can solidly cause increased costs in terms of acquisition costs. The value of IT is not in its possession as it is with other assets such as real estate. Spending money on IT incur costs, while benefits result from the effective organizational use of the acquired technology.

2. *"Benefits arise when IT enables people do things differently"*. Benefits emerge only when individuals, groups, customers or suppliers perform their roles more efficient or effective. The new course of actions requests an improvement in how information is used.

3. *"Only business managers and users can release business benefits"*. Benefits comes as a result of changes and innovation in the way things are done. It is business managers and users, and possibly customers and suppliers, that must account for these new working manners. For this reason, IT and project personnel cannot be made accountable for realization of the business benefits from IT investments; rather, business staff must take on this responsibility. For them to recognize this principle and take part in IT projects is a key means in benefits realization.

4. *"All IT projects have outcomes but not all outcomes are benefits"*. This principle convey that many IT projects do produce negative outcomes. At worst, IT projects can affect the very survival of the organization itself. The challenge for management is to steer clear of negative outcomes, as well as obtain the positive outcomes in order to deliver explicit business benefits.

5. *"Benefits must be actively managed for"*. Value from IT investments does not appear automatically. Naturally, there is often a time gap between initial investment and payoff. Therefore, the management of benefits continue even after the technical implementation is completed. It is crucial that organizations persist to work on

benefits realization until each of the expected benefits has been achieved, otherwise benefits are not realized sufficiently.

Aligning with these principles for benefits realization increase the conditions to realize benefits (Flak 2012).

2.4.2 Benefits Management

The inherent interdependency of benefits realization and change management resulted in the term ´benefits management´ (Ward and Daniel 2006). Benefits management was defined as *"the process of organizing and managing such that the potential benefits arising from the use of IT are actually realized"* (Ward and Elvin 1999). As the definition specify, benefits management is an approach involving steps with tools and techniques to manage the planning and implementation of IS projects in a manner such that realization of benefits from the project is achievable (Ward and Daniel 2006). The approach recognize and include ideas from total quality management (TQM) with a stronger focus on value, more process-orientation and emphasis on change management (Flak 2012). Table 3 demonstrate the attention shift from traditional IS project approaches to benefits management. Taking advantage of the benefits management approach facilitate the move from the left-hand side to the right-hand side of the table (Ward and Daniel 2006).

Table 3 – Comparison of benefits management with traditional IS project approaches (Ward and Daniel 2006, 37)

From →	**To**
Technology delivery	Benefits delivery
Value for MONEY – low level task monitoring	VALUE for money – benefits tracking
Expenditure proposal – loose linkage to business needs	Business case – integration with business drivers
IT implementation plan	Change management plan
Business manager as onlooker/victim	Business manager involved and in control
Large set of unfocused functionality	IT investment that is sufficient to do the job

Stakeholders 'subjected to'	Stakeholders 'involved in'
Trained in technology	Educated in exploitation of technology – talent harnessed
Carry out technology and project audits	Obtain business benefits then review with learning – leverage more benefits

When introducing a new technology, there are mainly two types of changes: business changes and enabling changes. Business changes are defined as *"the new ways of working that are required to ensure that the desired benefits are realized"*, while enabling changes are *"prerequisites for achieving the business changes or that are essential to bring the system into effective operation within the organization"* (Ward and Daniel 2006, 109). Normally the business changes cannot start until the new system is available, whereas enabling changes often have to be made ahead of the system introduction. The social element to IS deployment, often goes unrecognized by investing organizations. The tendency for IS/IT investment to be led by IS staff, rather than including the involvement of business staff, can encourage this issue. Determining the required changes is best done by shared knowledge among business managers and key stakeholders, which do include IT specialists (Ward and Daniel 2006). Whether the benefits realization is successful or not, is connected to the organization's benefits realization competences (Flak 2012). Ashurst, Doherty and Peppard (2008) presented a benefits realization capability model and pointed to four distinct competences which increase an organization's ability to realize business value from IT investments, specifically benefits planning, benefits delivery, benefits review and benefits exploitation.

The much-used Cranfield Process Model of Benefit Management by Ward, Taylor and Bond (1996) is regarded as a successful model for realizing benefits. Further, it has become a common methodology from a scientific and practical perspective (Divendal 2011, Lahmann, Probst, and Parlitz 2017). Benefits management or the creation of business value is illustrated as a circular and iterative process. The five stages in the benefits management process model are shown in Figure 6.

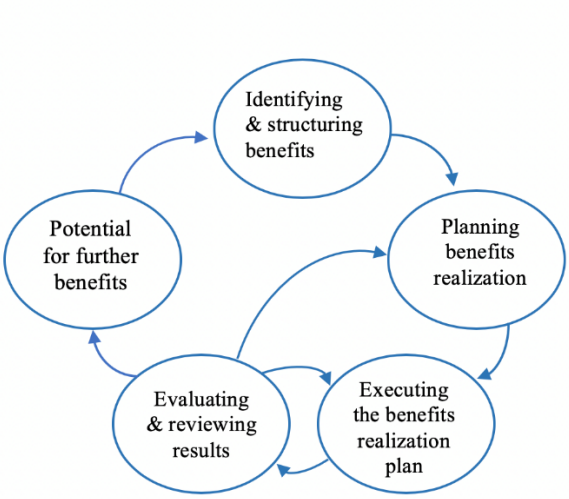

Figure 6 – A process model for benefits management based on Ward and Daniel (2006, 105)

"Identifying and Structuring the Benefits"

The purpose of the first stage in the benefits management process model is to establish the foundation of the investment. The investment requires clear agreed-on objectives that maintain the relation to one or more drivers for change in the organization. All the potential benefits by reaching these predefined objectives must be identified and furthermore, an understanding of how the combination of IS/IT and business changes can generate realization of these benefits is crucial. The identification of business benefits is inevitably iterative as objectives can change and additional benefits can appear. Defining the ownership of the benefits, their measurability and recognize organizational or stakeholder obstacles are structuring elements of this stage, all important for benefits to be realized. An outlined business case will show whether there are sufficient potential benefits to justify the investment, or if discontinuing the investment is best (Ward and Daniel 2006).

"Planning Benefits Realization"

The main focus for this stage is to prepare a comprehensive benefits proposal and a business case for the investment. Ward and Daniel (2006) argue that the plan must fully describe all benefits and changes, clarification of responsibility for delivery and the measures for every single benefit. Further, it should include the current measurements for each benefit in advance of the investment together with what values are expected from the

investment. Actions are defined and assigned to the responsible stakeholder and criteria used for the assessment of realized benefits are established. In the final analysis a benefits dependency network is formed to present the benefit and change relationships.

Ward and Daniel (2006) summarized stage 1 and 2 as a set of questions to be answered in order to come up with a benefits plan. These questions are illustrated in Figure 7.

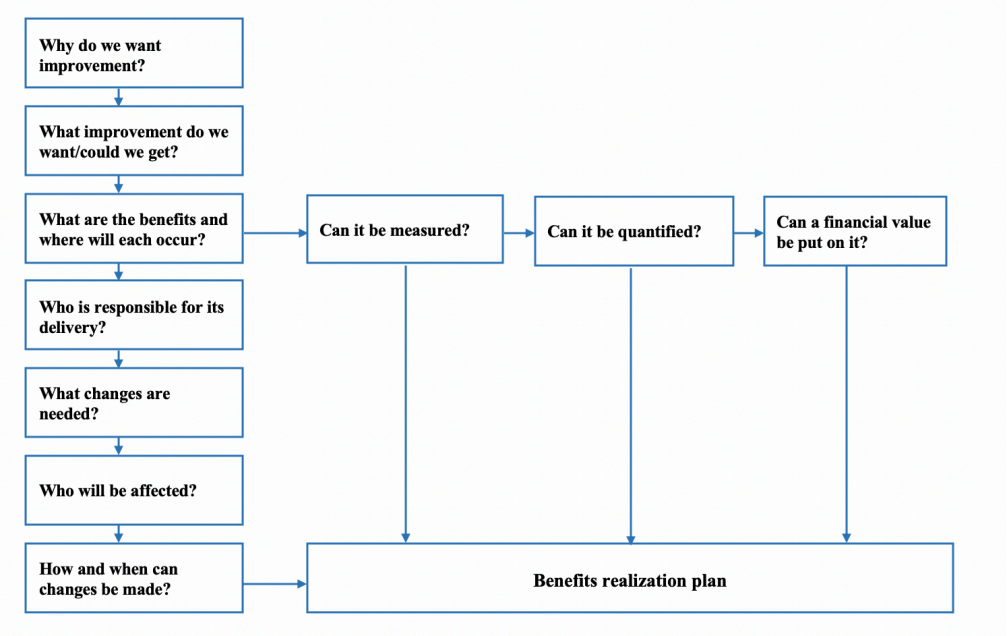

Figure 7– Key questions in building a benefits plan based on Ward and Daniel (2006, 112)

"Executing the Benefits Plan"

At this stage the pre-established plan should be conducted. Interim targets and milestones can be helpful to evaluate the benefits plan progress. The business project manager is often appointed the important role of making sure everything goes as planned and that each business stakeholder performs their assigned responsibilities. As the project evolves, it is imperative to review the scope and specifications of the system or the business as unanticipated changes will happen. In some cases, the investment justification may need a reappraisal to determine if the project should continue or stop. Either way, an important point to keep in mind is alteration of the plan. At all times during the execution, the benefits plan should be modified according to emerging changes (Ward and Daniel 2006).

"Reviewing and Evaluating the Results"

After system completion, there should be a formal review of how the project went about. The management resolution to the evaluation is among the factors that differentiate successful IS/IT deployment from less successful organizations. A benefit review involves evaluating the investment itself, confirming which planned benefits are realized or are not realized, which unanticipated benefits are realized and which disbenefits occurred. Moreover, a post-implementation review also implies why the plan unfolded as it did, how to improve the benefits management process and lessons learnt for the future (Ward and Daniel 2006).

"Establishing the Potential for Further Benefits"

Ward, Taylor and Bond (1996) referred to in Ward and Daniel (2006) found it difficult to predict all potential benefits prior to a system implementation. Some benefits first become apparent after the end of the system implementation, or after a time of system running. Therefore, after completion it is equally important to search for further improvements of the system and related business and enabling changes. This final stage avoids available benefits being neglected and thus, assists in maximizing the return from the IS/IT investment. Establishing the potential for further benefits should be a process similar to stage 1, in addition to applying the organizational learning to detect new opportunities (Ward and Daniel 2006).

Despite a variety of research fostering the belief of benefits realization as essential to realizing business value and success (Remenyi, White, and Sherwood-Smith 1997, Ward and Daniel 2006, Flak 2012), some academics oppose this view and assume some limitations of the approach (Haddara and Päivärinta 2011, Breese 2012). Haddara and Päivärinta (2011) criticize the approach due to the "self-evident" nature of expected ERP benefits and the process to be too costly and resource consuming. Breese (2012, 32) also argue that the approach embrace assumptions that *"do not hold in the real world"*. Hereby, the uncertainty around when to apply the approach, and moreover, that ignoring contextual complexities may be counterproductive as they inevitably impact on the efficacy of benefits management. However, the researcher concluded that benefits management approach is something less than a panacea, but do not represent a false dawn (Breese 2012).

2.5 Cloud ERP and Benefits realization management

Several frameworks have been developed to understand how approaches to benefits realization can be connected with ERP (Esteves 2009, Badewi et al. 2018, Hustad et al. 2019). As realization of ERP benefits are heterogeneous, frameworks for classification of benefits provide a method for assessing the benefits and a comprehensive base for further studies (Shang and Seddon 2000). Zuboff (1985) referred to in Badewi et al. (2018) proposed a framework that classified benefits into: *automation, planning and transformation*. This framework has been used in the literature that consider ERP effects (Uwizeyemungu and Raymond 2009, 2010, 2012). Shang and Seddon (2000) produced another framework of five benefit dimensions from ERP systems, namely the *operational*, *managerial*, *strategic*, *IT infrastructure* and *organizational benefits dimensions*. These dimensions can aid research on achieving the benefits of ERP systems.

2.5.1 ERP benefits realization roadmap

Roadmaps can support and enhance technology implementations (Phaal, Farrukh, and Probert 2004). Probert and Radner (2003) referred to in Esteves (2009) define a roadmap as views of a group of stakeholders displaying the vital steps to reach the desired objectives. Esteves (2009) developed a benefits realization roadmap for ERP usage in SMEs. The framework indicates a long-term vision and a continuous cycle is needed with an eye toward a successful realization of the potential benefits from ERP implementations. The roadmap includes four main stages as illustrated in Figure 8.

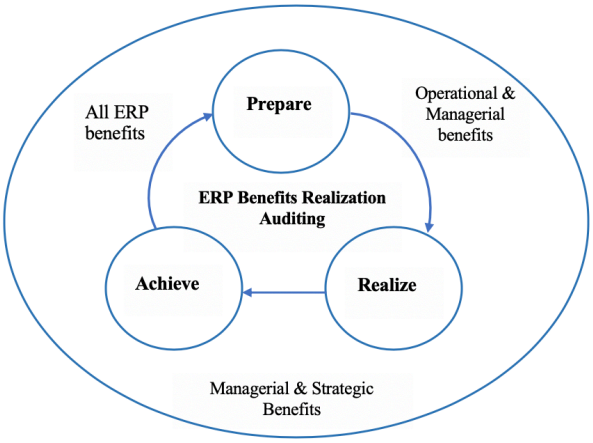

Figure 8 – An ERP benefits realization roadmap based on Esteves (2009)

1. The *prepare stage* is the first step and involves the activities to prepare the realization and achievement of benefits from the ERP system. Initiation and development of the activities influencing the next stages of the roadmap should be the focus as well as clarifications of users' expectations.
2. The *realize stage* is the second stage and cover realization of most of the ERP benefits. Especially benefits related with operational, organizational and managerial dimensions are realized at this stage, which help managers to demonstrate the potential of the ERP investment and its impact across the organization.
3. The *achieve stage* is the final stage and the point of full realization and achievement of the system benefits. Long-term benefits such as strategic benefits are mainly achieved at this stage.
4. The *auditing stage* concerns the continuous auditing analysis of the ERP benefits realization of each stage. Therefore, mangers should repeat the roadmap and monitoring the achieved benefits while seeking improvements.

2.5.2 ERP Benefits Capability Framework

Building upon the framework that classify benefits into three dimensions, Badewi et al. (2018) divided ERP benefits into *automation, planning* and *innovation benefits*. These benefit dimensions are defined in Table 4.

Table 4 – Definitions of three-dimensional benefit framework (Badewi 2016)

Benefit dimension	Definition
Automating benefits	*"advantages perceived by benefits owners, which are realized once an organization automates its value-engineered business processes. Examples: improving organizational efficiency, cost reduction through time reduction, customer responsiveness, elimination of double data entry, reduced human data entry errors and less time needed for the purchasing and selling cycle"*
Planning benefits	*"advantages perceived by the benefits owners (planners) from using ERP based reports. Examples: lowered inventory level, increased customer satisfaction, higher use of resources, and more reliable plans with fewer errors"*

Innovating benefits	*"positive advantages perceived by the benefits owners due to their ability to understand their environment. Examples: new improved ways of managing resources, of producing/delivering products and services, of developing new products and services using ERP, developing new strategies for managing the organization and capturing new customers"*

Their research contributed with an ERP benefits realization capability framework, which demonstrate that each group of benefits requires ERP resources and organizational complementary resources (OCRs) to be capable for realizing ERP benefits (Figure 9). ERP resources are *"features, attached technologies and IT department competences"* (Badewi et al. 2018, 1), while OCRs are non-IT organizational structure and culture such as *"practices, attitudes, culture, skills and organizational characteristics"* (Badewi et al. 2018, 1).

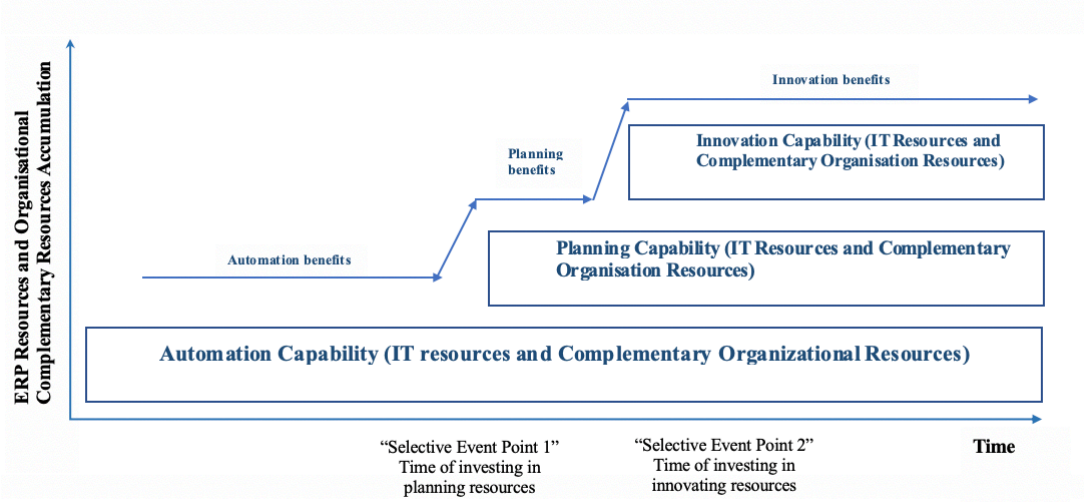

Figure 9 – A framework with the capabilities for realizing ERP benefits based on Badewi et al. (2018)

As illustrated in Figure 9, the research of Badewi et al. (2018) suggest that organizations are incapable to enjoy higher level of benefits before a significant number of lower-level benefits are achieved. Furthermore, it is imperative that ERP assets are orchestrated with the development of organizational capabilities in order to achieve the highest effectiveness and efficiency of the available resources.

2.5.3 A Framework of how SMEs create value from IT

To understand how SMEs realize benefits and create business value from cloud ERP systems, Hustad et al. (2019) integrated the benefits management process model by Ward and Daniel (2006) with an IS value model by Soh and Markus (1995). Figure 10 demonstrates the integrated framework.

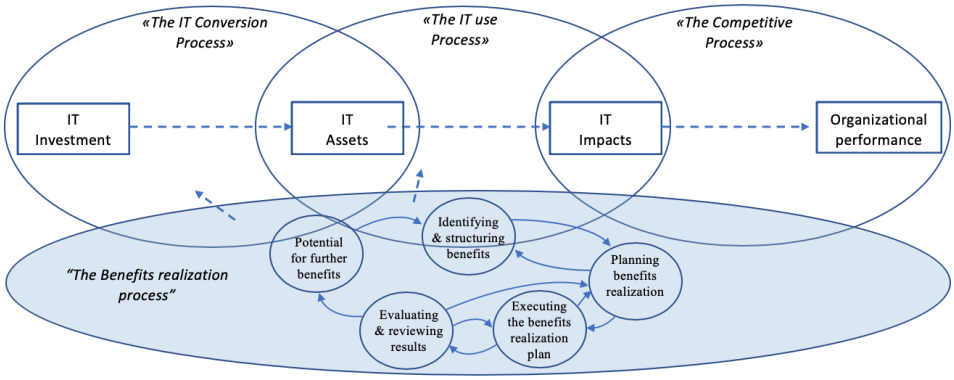

Figure 10 – A framework for understanding how SMEs realize benefits and create value from IT investments based on Hustad et al. (2019)

The process model by Soh and Markus (1995) present how, when and why IT investments are converted to favorable organizational performance. Organizations expenditures on IT results in IT assets, which are *applications portfolio, IT infrastructure* and *users' skills*. However, they argue that IT investment is a "*necessary, but not sufficient, condition for IT assets*" (Soh and Markus 1995, 38). The conversion of IT expenditures into assets are not inevitable equally efficient. Further, the process by which businesses transform the IT investment into IT assets can be referred to as IT management. Thus, inadequate management is a significant threat to the effectiveness of IT conversion. Their process model illustrates that *"while necessary, quality IT assets are not sufficient for IT impacts to occur"* (Soh and Markus 1995, 38). Ineffective or inappropriate usage of IT can inhibit positive impacts. Additionally, the researchers argue that an organizations size and the intensity of industry information also affect the capability of an organization to achieve business value.

The conceptualization of Hustad et al. (2019), as shown in Figure 9, suggest that the first three stages of the benefits management process support the IT conversion and the IT use processes and help the organization obtain proper IT assets and impacts.

2.6 Summary of literature review

Organizations stand in need to migrating to cloud-based solutions with the objective to achieve business value. ERP systems offered through CC technology provide various benefits to SMEs, such as reduced TCO, availability, timesaving, standardization, flexibility, scalability, security, continuous innovation, visibility and traceability. Cloud ERP is especially beneficial to SMEs and investigating the benefits for SME manufacturers in particular is of interest to fill a gap in academic.

The purpose of benefits realization approaches is to ensure that the potential benefits from IT is realized. Literature indicate this approach to be advantageous to apply when implementing ERP systems. Thus, it is interesting to investigate benefits realization within cloud ERP systems as well.

3. Research methodology

This chapter refers to the scientific research approach of our study including the research design, methods of data collection, data analysis and research quality. The methodology chapter cover all steps from broad assumptions to detailed methods (Creswell 2014).

3.1 Research Design

Research design is according to Churchill (1999) a framework or plan for a study that is often used as guidance when collecting and analyzing data. Yin (2014, 26) defines research design as *"a logical plan for getting from here to there, where here may be defined as the set of questions to be answered, and there is some set of conclusions about these questions".* Further, it helps for advanced planning of the methods that are being adapted in order to collect the relevant data, using the right techniques in the analysis as well as keeping a clear view of the objective of the research (Kothari 2004). The research design can be outlined in three different designs, exploratory, descriptive and casual design depending on the objective of the research (Churchill 1999).

3.1.1 Exploratory, Descriptive and Casual design

The exploratory, descriptive and causal design are three categories of which to design the research (Schell 1992).

The exploratory design is identified as the initial research of a phenomenon to seek new insights (Schell 1992). The study is useful when clarifying ones understanding of a problem (Saunders, Lewis, and Thornhill 2009). Exploratory design is also referred to as formulative research studies, due to the studies purpose of formulating more precise research problems for investigation. Reviewing existing work on the subject and the experience survey are methods used in the exploratory design (Kothari 2004). escriptive design describes, clarify and explain relationship and properties (Yin 1994). Descriptive research designs are more structured and rigid compared to exploratory designs. A descriptive approach presupposes prior knowledge regarding who will be a respondent, what issues have highest priority and why particular questions are relevant to the problem statement (Silver et al. 2013). The latter, the causal research design (also termed explanatory research design), focus on the cause-

effect relationship (Yin 1994). Descriptive case studies may lead to issues on "how" and "why", which is answered by causal case studies (Schell 1992).

We have conducted both exploratory and descriptive research. Initially, we conducted an extensive literature review to gain knowledge about the current state of research on the selected topic. Further, we developed an online questionnaire through *Nettskjema* to acquire a comprehension about pre- and post of cloud ERP implementation, the benefits of cloud ERP and explore the circumstances of benefits realization when implementing such systems. Based on the questionnaire results we detected case companies and conducted interviews with relevant respondents. In the discussion of our findings and analysis the research design is descriptive as we attempt to identify the manufacturers pre-implementation challenges, the benefits a cloud ERP system bring to the organization, as well as how they are realizing business value from the implementation.

3.2 Qualitative and quantitative methods

According to Jacobsen (2005) quantitative methodology is used when the researcher wants to find extent and frequency of a phenomenon, often with large number of data to survey. Quantitative methods have the advantage that it gives data in forms of measured and analysis of relationships between variables, not processes. The numbers give us the opportunity to perform arithmetic operations, typically represented in graphics and tables (Dalland 2012).

Qualitative researches seek to find the socially constructed nature of reality, the relationship between the researcher and what is researched, as well as the constrains that shape inquiry. Such researchers emphasize the value-laden nature of inquiry. They seek answers to questions that stress how social experience is created and given meaning (Lincoln and Denzin 2013). The qualitative method aims at apprehending the meaning and experience that may not be measured (Dalland 2012). In qualitative research, conversational communication as in-depth interviews, is collected in order to explain the studied behavior (Given 2008). The qualitative method can help perceive certain behavior among a specific group related to a specific topic.

Both quantitative and qualitative methods contribute in their own way to a better understanding of the society we live in, as well as how human, groups and institutions acts

and interacts. Our research is outlined as a mixed method approach, since the inquiry involve both quantitative and qualitative data collection (Creswell 2014). The questionnaire did have some quantitative elements to it, despite this, in our thesis we have primarily used a qualitative approach. This is due to the qualitative nature of most of the questions asked in the questionnaire and that interviews were applied as the primary data source.

3.3 Data Collection

This section describes our sources of data as well as elaborating on the approaches for collecting them. Research strategies are not mutually exclusive as it is possible to combine more than one strategy (Saunders, Lewis, and Thornhill 2009).

A great emphasis was on the ethical concerns of conducting research. Thus, the research project was reported and approved by Norwegian Centre for Research Data (NSD) as it processes personal data. Further, we made sure to follow their procedures.

3.3.1 Primary and Secondary data

Research data can be divided into two categories, primary and secondary data (Hox and Boeije 2005). Primary data is referred to as the information obtained firsthand by the researcher for the specific purpose of the study (Sekaran 2003, Bryman 2012). Some examples of sources to primary data are interviews, focus groups and questionnaires. Glaser (1963) defined secondary data as "*the further analysis of an existing dataset with the aim of addressing a research question distinct from that for which the dataset was originally collected and generation novel interpretations and conclusion*". The data is easily accessible and not at the same extent as time consuming as collecting primary data. The data has been previously created for different purposes, however if it is relevant it can also be used for our purpose. Collecting primary data might be costly and time-consuming. On the other hand, it is also beneficial. By gathering primary data, we can modify the research method in order to suit our research question (Hox and Boeije 2005).

Our initial plan was to collect both primary and secondary data through interviews and documents from their implementation project plan or benefit realization plan. However, none of the respondent's companies had acquired such documentation. For that reason, we

decided that primary data through questionnaire and interview were suitable to give valuable insight in how SME manufacturers are performing in terms of benefits realization.

3.3.2 Questionnaire

A questionnaire is a tool that is important for the researcher in order to understand, interpret and complete data collection (Adams and Cox 2008). Fowler (2008) referred to in Creswell, (2017, 12) stated that *"Survey research provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. It includes cross-sectional and longitudinal studies using questionnaires or structured interviews for data collection with the intent of generalizing from a sample to a population."* As an exploratory study, we created a questionnaire as a survey instrument for the companies that had previously or are currently implementing RamBase.

The questionnaire is a self-administered questionnaire, where the respondents answer the questions by completing the questionnaire by themselves (Bryman 2012). We used the website *Nettskjema* which is a tool for designing and conducting online surveys. This tool is GDPR-approved by Molde University College to collect data. The questionnaire consists of two parts (see Appendix 1), where the first section collects general information such as organization type, size, revenue and the respondents job position. Part two included question related to their benefit realization process. Our survey consisted of both closed and open-ended questions, with two types of fact questions and Likert scale.

Likert scale is a widely used format developed for asking attitude questions, the respondents are typically asked for their degree of agreement with a number of statements that together form a multiple-indicator or -item measure. (Bryman 2012) The format is a five-point scale going from "strongly agree" to "strongly disagree". The simple factual questions required answering yes or no answer, while the complex factual questions needed more interpretation.

The survey was e-mailed to 14 different manufacturers who had implemented RamBase. We received 5 responses and thus had a response rate of 35,71 percent.

3.3.3 Case study strategy

Studies within management and organizational theory rely heavily upon the case study to retrieve data (Schell 1992). According to Yin (2014), a case study can be defined as "*an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context.*" There is a misconception that case studies are restricted to qualitative research. However, they can be used to collect both qualitative and/or quantitative information (Schell 1992). Case studies are often used as a research strategy in order to provide knowledge of individual group, organization, political and related phenomena (Yin 2003). If the case study is correctly carried out, one can find valuable information about the study which can lead to new theory.

When performing a case study, there are two different designs that may be used, single-case or multiple-case design. This depends on whether we are looking at one or several cases. When performing a case study, there are two different designs that may be used, single-case or multiple-case design. This rely on whether we are looking at one or several cases (Yin 2014). According to Yin (1994), case selection is an important issue. In our study, the cases were selected on the basis of a number of criteria that makes them representative for our case. All cases are SMEs that have implemented RamBase cloud ERP-system.

A common misunderstanding or oversimplifications about the nature of case study methodology concerns generalization. Some would argue one cannot generalize on the basis of an individual case; thus, the case study does not adequately contribute to scientific development. However, this clearly depends on the case on is speaking of, as well as the case selection (Flyvbjerg 2004).

In our thesis, the cases were selected on the basis of number of criteria that makes them representative in our research. Sampling can be defined as the process where individuals are selected from the sample frame (Martínez-Mesa et al. 2016). The companies had to be a small or medium-sized manufacturing business who had implement a cloud ERP system.

3.3.4 Interviews

The use of interviews helps gather valid and reliable data that are relevant to our research questions and the tentative model of the phenomenon that underlies the research. (Saunders, Lewis, and Thornhill 2003, Given 2008). According to Given (2008) semi-structured interviews is a strategy for collecting qualitative data by asking the informants a series of open-ended questions. By asking open ended questions, it allows for the informant to answer from their "own frame" (Bryman 2012). The topics of the interview guide is based on the research object and the phenomenon that underpins the research. By developing a written interview guide in advanced with open-ended questions, you also have the ability to adopt and change the questions as the research proceed with the interviews (Saunders, Lewis, and Thornhill 2003).

An interview guide (see Appendix 2) was prepared for the data collection and a pilot interview was conducted with a PhD-student at Molde University College. The PhD-student had previous experience with ERP implementation, and thus could help us to test the content, its structure and the process of questioning (Yin 2009). In the interview we presented the informants with a list of seven benefits identified in the literature to have been realized by SMEs from cloud-based ERP. In order to avoid leading questions, we presented them the list after they had given their own experience towards the benefits. At the outset of our research we planned for face-to-face interviews, as it offers little chance of misinterpretation (Sekaran 2003). We performed a total of three interviews, with a duration from 30 minutes to one hour. Due to the situation around Covid-19 that occurred during the writing of the master thesis we were constrained to do virtual interviews (Given 2008). All three interviews were carried out over either Skype or Teams. Although it can be more difficult for the interviewer to see the respondent's expressions, the one-on-one virtual interviews provide focused and natural answers (Given 2008, Bryman 2012).

Before performing the interviews, the respondents were made aware of their rights in connection with the research projects such as voluntarism to participate, anonymity and information about the use of audio recording. With permission the interviews were recorded by using *Nettskjema diktafon* (GDPR-approved by Molde University College) and transcribed for further analysis. All interview informants either had a key role in the implementation project or a central role in the manufacturing company. The informants were

given the numbers 1, 2 and 3 to protect their identity (Creswell 2014). Table 5 shows the date and duration of each interview.

Table 5 – Overview of interviews

Case	Interview object	Date	Duration of interview
1	Chief financial officer	16.04.2020	56 minutes
2	Marketing manager	17.04.2020	41 minutes
3	Chief executive officer	06.04.2020	32 minutes

3.4 Qualitative content analysis

In general, content analysis is used to make sense of the collected data and derive meaning. Initially it was used as a quantitative method but has become a common qualitative method and is independent of theoretical perspective. We performed a content analysis which is a systematic examination of all forms of communication that has been recorded to objectively classify text into categories (Given 2008). Content analysis is an approach for making inferences by identifying certain characteristics of the data (Bryman 2012).

> *"Content analysis is the intellectual process of categorizing qualitative textual data into clusters of similar entities, or conceptual categories, to identify consistent patterns and relationships between variables or themes"* (Given 2008, 120)

A content analysis is interpretive as it involves close reading of text. We spent time revisiting the identified categories, combined or divided them and resolved contradictions. This was due to the iterative feature of the analysis process as the text was repeatedly analyzed.

The execution of the content analysis involved several steps. First, the interviews were transcribed for the analysis. Transcription is the process where the recording is turned into textual material, which becomes the primary data for the analysis (Given 2008). We applied verbatim transcriptions to capture a high level of details in the data (Creswell 2014). The interviews were performed in Norwegian to make the informants more comfortable and to ensure that the content was correctly captured as the native language of both interviewees and interviewers was Norwegian. When transcriptions were translated from Norwegian to English, we made sure to derive the same meaning. Further, by analyzing the whole dataset,

we collected relevant statements from the informants that referred to the same theme. Finally, we produced *first order* and *second order subthemes* which resulted in *general dimensions* that was subsequently discussed.

A key element to a robust qualitative content analysis is research quality. The aim of conducting such a data analysis is to achieve credibility of the research (Given 2008).

3.5 Research quality

In the field of research, the credibility of research findings is an issue of great importance (Saunders, Lewis, and Thornhill 2009). In order to ensure the scientific value of our research, we devoted attention to the research design criteria summarized by Yin (2018). There are four tests relevant when judging the quality of a research design: construct validity, internal validity, external validity and reliability.

> *"Qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher's approach is consistent across different researchers and different projects" (Creswell 2014)*

3.5.1 Validity

Validity refers to the integrity of the conclusions derived from the research (Bryman 2012). It concerns the "goodness" or "soundness" of research, and the degree to which the research actually measures "the truth" (Given 2008).

Construct validity is associated with the proper operational measures to the studied concepts (Yin 2018). To what extent the measurement questions of the study actually measure the constructs it intended (Saunders, Lewis, and Thornhill 2009). Case studies have often been criticized to reflect "subjective" judgements (Yin 2018). Thus, with the purpose of increasing construct validity we used to multiple sources of evidence in our research. In addition to semi-structured interviews, we referred to secondary data source in form of theory that make the same matches. This to help us make the connection between our research questions and our research findings. Further, we discussed the research results with

fellow student colleagues and the proposed modified framework was discussed with our supervisor.

Internal validity was not taken into consideration in our research as this is *"for explanatory or causal studies only and not for descriptive or exploratory studies"* (Yin 2018, 78).

External validity is related to the problem of the research's generalizability. This deals with *"the scope of applicability of the research findings in one organizational setting to other settings"* (Sekaran 2003, 25). As stated by Yin (2018), using replication logic in multiple-case studies, where each case serve as a distinct analytic unit, strengthen the external validity. Theory development in case studies play a significant role when generalizing the research results from our case study. An often mistake when doing case studies is to only consider *statistical generalization* as the way of generalizing the findings. This method of generalizing involves inferring findings from a sample and applying it to the larger population. The case research or the multiple cases are not "sampling units", and thus, case studies represent an inadequate sized sample. Nonetheless, instead of considering the case(s) as a sample, one should consider it an *"opportunity to shed empirical light on some theoretical concepts or principles"* (Yin 2018, 73). The *analytic generalization* goes beyond the context for the specific researched case and can either confirm, modify, advance or reject theoretical concepts, or establish new concepts.

3.5.2 Reliability

Reliability refers to whether the results of the research is repeatable, and it is closely related to the term replicability. Simply put, reliability is intended to measure if the research is consistent (Bryman 2012). The objective of this final test is to ensure that if other researchers follow the same research procedures as described, they will arrive at the same results. Thus, minimizing errors and biases of the research (Yin 2018).

The possibility of repeating a case study is rarely presented in reality. However, there are several case study tactics to enhance the reliability of the research (Yin 2018). A case study protocol was developed, which is more than a conventional instrument. It is a formal document capturing the procedures from the data collection, and a major way of increasing the reliability. Furthermore, our findings present sufficient extractions from the case study

database allowing a reader to second-guess the interpretations and conclusions from the case study. The research procedures were made as explicit as possible, and interview transcripts were stored.

3.6 Summary of methodology

We have primarily applied a qualitative research approach, with an exploratory and descriptive design. Furthermore, we used both a survey and interviews to collect research data. A web-based self-administered questionnaire was distributed to the survey sample through e-mail. After this, semi-structured interviews were used as the primary data source, which was transcribed and analyzed by using the content analysis method. The chosen method is our tool when studying our research problem (Dalland 2012).

4. Case description

This chapter describes the cloud ERP vendor in more detail, introduce the definition on SMEs, and give a brief introduction to the case companies contributing to this thesis.

4.1 Vendor description

Jakob Hatteland Group is a Norwegian company which provide innovations to make businesses more effective, reliable and secure. When they started selling electronic components in 1971, they developed an inhouse business system to manage the challenges subsequent to their success. In 2005 Rambase was launched as a commercial system and no longer just a system for internal business. Today, Jakob Hatteland Computer AS is the owner and maintainer of the system. Their business system, RamBase, is a cloud ERP platform technology. It is a fully integrated ERP solution, particular for mechanical industry and machining. RamBase is born SaaS, as it is not adjusted to the cloud, but built for it. Evolved in HTML5 and using open web standards, the system can integrate information from other systems. It connects the entire value chain and the information are managed in a reliable way to enhance performance quality and bottom-line outcome.

From 2017, RamBase has had active distributors and further growth is expected to come from a partner network. The vast majority of RamBase clients are provided by Hatteland. Their traditional delivery method has shifted from introducing new developments in the implementation project to delivering a complete standard system to customers within the defined market segments who fit into the system.

Their basic methods of implementation can be divided into two categories:

1. *Specified deliveries.* A thorough mapping is carried out and a gap/fit analysis is performed to compare the company's processes and requirements against the standard RamBase. If there is a gap, it will be assessed whether this will lead to the development of new functionality, or whether the customer can change their routines.
2. *RamBase FastTrack.* A brief overall mapping is carried out to see if the company fits the standard RamBase and that the conditions otherwise facilitate a quick and

efficient implementation. The goal is to get the system up and running quickly and expand its use and improve processes as they are entered into RamBase.

The emphasis has been more on the process level compared to how to work in RamBase. There has not been a focus on benefits realization in their implementation projects neither from Hatteland nor from their partners. The mapping does not emphasis on what key performance indicators (KPIs) a client has or how additional benefits can be extracted using a cloud ERP system.

4.2 Small and medium-sized enterprises

SMEs play a crucial part of the global economy since they account for the majority of enterprises worldwide (The World Bank Group 2020). The European Commission (2019) reported that there were slightly more than 25 million SMEs in EU-28, and that they account for 99,8 percent of the all enterprises in the EU-28 non-financial business sector. Per 1st of January 2020, SMEs account for 34,3 percent of the enterprises in Norway. The rest 65,1 percent are enterprises with one employee and 0,1 percent are large enterprises where there are 250 or more employees (Statistisk sentralbyrå 2020).The official European Commission definition on SMEs (2015):

> *"The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million"*

The definition considers three different factors, namely the level of employment, level of turnover, and the size of the balance sheet (Muller et al. 2019). The categorization of SMEs is summarized in Table 6.

Table 6 – Definition of SMEs (Muller et al. 2019)

Enterprise category	Employees	Turnover	Balance sheet total
Micro SME	0 to < 10	< €2 million	< €2 million
Small SME	10 to < 50	< €10 million	< €10 million
Medium-sized SME	50 to < 250	< €50 million	< €50 million

Enterprises are categorized as small if they have having less than 50 persons employed and categorized as medium-sized if they have 50 or more, but under 250 persons employed.

4.3 The case companies

The research cases of this study fall under the definition as SMEs. Our initial plan was to research SME manufacturers. However, our research can be narrowed down to small manufacturers as all three case companies fall under this classification. All three case companies are finished with their cloud ERP system implementation. The names of all companies have been changed in order for the companies and informants to remain anonymous.

The first case company is a manufacturer of customized certified components to the offshore industry, but also in the sector of renewable energy, process energy and aquaculture. Their production involves engineering, machining, welding and assembly. The company did not have a previous ERP system before implementing RamBase in 2016. The implementation duration was 12 months, including the pre-project and training. Further, the company had a neutral focus towards benefits realization in their implementation project.

The second case company are separated into three departments. The first department provides tailor-made solutions for environmental car interior to several professions as electricians, plumbers and contractors. Furthermore, they also offer to adjust cars to meet special customer needs. In addition, the last department involves decor of cars. The company did have another ERP system before implementing RamBase in 2018. The implementation lasted two months and also this company had neither much nor little focus towards benefits realization in their system implementation.

The third company is a manufacturer which produces heating, ventilation and air conditioning (HVAC) prefabrications. They prefabricate all types of solutions such as cabinets, switchboards, piping or other prefabricated products. RamBase was implemented in 2019 as their first ERP system and the implementation period was one and a half to two months. This company was selected due to their successful implementation.

5. Findings

In this chapter we present our research findings both from the exploratory questionnaire (section 5.1) and the conducted interviews with the three case companies (section 5.2).

5.1 Questionnaire

The self-administrated online questionnaire provided insight to cloud ERP implementation and the process of benefits realization from the viewpoint of the customers. The questionnaire was distributed in an exploratory phase to gain knowledge about the customers, their current situation and to explore if there were factors interesting to further investigate.

The results from the questionnaire stated that 80 percent of the respondents did not have a previous ERP system. Meanwhile, the other 20 percent had an ERP system that did not offer a production management module. Due to the cloud emphasis of this thesis, we wanted to explore if this was a critical factor for the customers. As Figure 11 shows, 50 percent of the respondents stated “cloud” to be an important factor when selecting an ERP, whereas 17 percent did not view it as an important factor. However, 33 percent answered that they did not know.

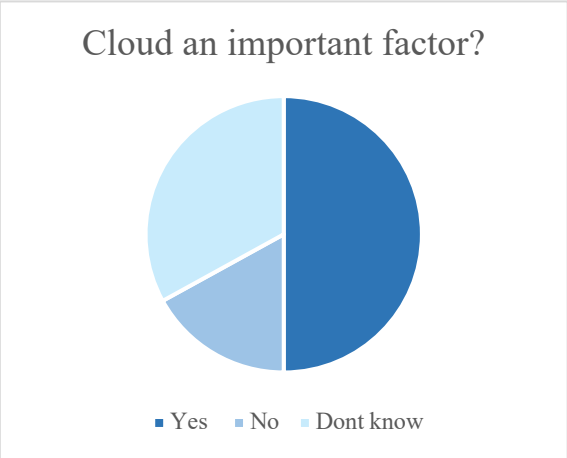

Figure 11 – Cloud an important factor?

We asked about the implementation timeframe from project start until "go live", as literature stated cloud ERP support more rapid implementation. Implementation time varied from 2 to 12 months between the respondents.

We received varied answers to if they pre-defined benefits to be realize from the cloud ERP system. One respondent had defined in advance both financial and non-financial benefits, while two respondents had predefined non-financial benefits and the rest of the respondents had none such predefined benefits.

We wanted to investigate what challenges the manufacturers had prior to the implementation, and almost all of the respondents mentioned control of processes and resources.

> *"Better control of production, both related to planning of resources and workflow, as well as being able to use historical data for production planning. Furthermore, warehouse and tracking of material was important"* – Questionnaire respondent

Most of the respondents had a neutral focus towards benefits realization. The questionnaire resulted in 16,7 percent who had focus, 66,7 percent who had neither much nor little focus, and 16,7 percent who had very little focus. Furthermore, when asked about to what degree the expected benefits corresponded to the actual benefits, only 33,3 percent agreed to this statement, while 66,7 percent neither agreed nor disagreed.

5.2 Interviews

We decided to further interview two of the respondents from the questionnaire, while the third case was not a part of our questionnaire sample responses. The presented sequence of the three case companies from section 4.3 does not correspond to the alphabetic presentation in this section. This is to protect the anonymity of the respondents.

Through the content analysis we used raw data to find themes in our data material as a means to reduce the material and to interpret the results. The basis of our analysis is the set of research questions presented in the introduction. Thus, the content analysis identified three general dimensions: challenges that make SME manufacturers adopt cloud ERP, benefits

for SME manufacturers from cloud ERP usage and benefits realization approaches seen in SME manufacturers.

5.2.1 Pre-adoption challenges

Table 7 – Content analysis on pre-adoption challenges

Case	Raw material	First order subthemes	Second order subthemes	General dimension
A	*It is the way it goes, having a system [cloud ERP system] which is future oriented … The system will not be outdated in a two years' time.*	Cloud computing possibilities and future-oriented technology	Finding suitable ERP system to company size and industry	**Challenges that makes SMEs manufacturers adopt cloud ERP**
C	*It [cloud] has some to do with the security, flexibility and availability anywhere. Also, we see ourselves as expanding to other countries.*			
C	*More possibilities than limitations were the idea with it [cloud]*			
B	*… wanted no hardware installed locally in the organization.*			
B	*It [cloud] is a crucial factor as vi are a small company.*	SMEs and system tailored for industry		
B	*Wanted an ERP system which was tailored for the industry.*			
A	*No modules for warehouse and production management*	No system that helped keep control	Lack of control and need for traceability	
B	*… It was to much, the volume through the business was too large for manual systems to handle*			
C	*In four years we double our sales, therefore we needed an ERP system to help control the production*			
B	*To complex to plan, as we received to many production orders.*	Lost control due to increase in volumes		
C	*… We want an increase in that department, which is the reason we look more at production, and how to achieve better control*			
B	*…The volume of everything that needed to be done, made it hard to plan and keep control*			
B	*…Tracking is really important in mechanical industry, and we started losing control*			

As seen in Table 7, our analysis specially identified two pre-adoption challenges among the SME manufacturers. First, one challenges had to do to with the ERP system selection, as the ERP system they selected had to be suitable for their company size and the manufacturing industry. All three informants believed CC to offer possibilities for them in terms of ERP systems.

For case A, the ERP system to be cloud-based was not viewed as a critical factor in the selection process. However, the informant did point to that this is the direction it goes, regarding future-oriented systems. They did consider other ERP system vendors, which also offered cloud-based systems, but as a hybrid solution. The informant stated that a cloud ERP system as a positive element as they *"did not need to worry about the system being outdated in a two years' time".* The informant from case B explained that the ERP-system was a cloud based was a central factor as they are a small production company. Furthermore, a cloud ERP system that was tailored to manufacturing businesses made it an even better choice for them. For case C, their wish to expand to other countries affected which system solution they wanted, as they needed a system that could be available from different locations.

Second, all the manufacturers had challenges with maintain control of their business processes and resources, as well as their business needed the ability to trace each process. None of the cases had an ERP system that could manage the production process, and moreover, with the increase in volume in their business, they lost control. Case A mentioned that they did not have any form for production management system or warehouse management system. They only had financial systems. Both case B and C had challenges as the planning became more complex as their production and purchase orders increased. Thus, the volume expanded for all processes. The informant from case B said, *"traceability is very important in mechanical industry and the volumes became too high for us continue with manual systems"*. Case C also stated that an outdated pen- and paper-system was no longer optimal, *"it [production planning] went smoothly up until 500-600 products, however, after this is started to get difficult to keep control and thus, we needed help"*. The statement below further supports this:

> *"Our customers extend from Kirkenes in the north to Lindesnes in the south. We want to expand and therefore we are looking more at our production and how to gain better control"* – Informant case C

5.2.2 Implementation

Two of the cases used around two months from implementation start to "go live", while case B used 12 months, including the pre-project and training of employees. The implementation

of the Cloud ERP system for both case A and B was directly from the vendor itself. However, case C had a third-party consultant company involved as well.

When implementing the Cloud ERP-system case A had five super-users inside the company trained within the different areas of the system. The different users then prepared the employees at the different departments.

> *"When implementing a new system, the problem is not the system, it is the users. Therefore, the key is to help and support the employees along the way and make them ready. It is all about communicating the effect of the new system, as well as explaining the reason for why we are implementing it. That is not easy for everyone to see"* – Informant case A

For case C, the response from the employees was very positive in the beginning, and everybody were very ready to start implementing. As the implementation started, and the cloud ERP were adopted, it developed some frustration when things did not work out as planned and did not work the way it was supposed to. The informant from case B explains that they should have prepared and learned the employees more about their new cloud ERP system before the implementation. The majority of the employees had no experience from such a system, which made the threshold for using it high. The vendor was present during the whole implementation with training.

The informant from case A viewed the implementation as a step by step process as they wanted to move from an ETO strategy to a more standard module strategy. Thus, they had recently started using most of the production module. Company A wanted their customers to perceive the product as customized, while they used more standard modules to build it.

5.2.3 Benefits

From our analysis we identified several benefits for SME manufacturers from cloud ERP usage (Table 8 and 9).

Table 8 – Content analysis on benefits from cloud ERP usage

Case	Raw material	First order subthemes	Second order subthemes	General dimension
A	*Businesses are not that unique …we should adapt the processes that does not fit the system.*	Businesses have similar business processes	A standard system for the businesses	**Benefits for SMEs manufacturers from cloud ERP usage**
C	*…I believe the business processes have become more standardized.*			
A	*Businesses should move to a standard solution, so that everyone with a concultant backround can help…Removing the ability to customize the system is the greatest evolvement in the world of ERP*	Removing the ability to customize		
B	*A tailored system for mechanical industry that don't offer possibilities for customization. Thus, the system is easy going instead of customizing the systems for each business.*			
A	*A cool thing, whenever a customer suggests a new update, every customer receives it*	All customers recieves the same updates	Continous updating of the software	
C	*We have no own business specific modules in the system, so we can enjoy others' inputs of improvements.*			
B	*Service level with superiror uptime of the system and few interuptions*	Updates are done on a regular basis		
B	*Sequential updates are more user friendly, instead of waiting for bigger updates which require new training and can cause interruptions in the*			
C	*… Flexibility and scalability are fundamental as we see ourselves expanding to other countries… We do not know how the production will be in the future*	Flexibility and Scalability	Scalability, accessibility and flexibility	
B	*…People have to work from home due to the corona situation. Concerning this, the system is very flexible*			
C	*Reduced risks of production errors as historical information are saved and easily accessible*	Accessibility		

Table 9 – Content analysis on benefits from cloud ERP usage (cont.)

Case	Raw material	First order subthemes	Second order subthemes	General dimension
B	*The production manager has been replaced by the system*	Release of resources		
B	*It [the system] require little IT, more or less none. All you need is internet connection*			
C	*It [cloud] has to do with security, flexibility and availability from anywhere*	Security		
B	*...we have concluded that this solution [cloud] is the most secure*			
A	*As everything is gathered in one place, security is very important. However, I believe every ERP system offers good security*			
A	*Traceability has high value for us, toghether with improving the documentation flow.*	Visibility and traceability		
B	*Tracing in general is important, especially material tracking... Everything is tied together: machinery to operators. Thus, we are able to go back and see who performed what and which instrument was used*			

One of the benefits identified in our analysis was that the system offered a standard system to the businesses. The informant from case A believed that removing the ability to customize the system is the greatest evolvement in the world of ERP. The informant reflected that businesses are not that unique and therefore considered standardization as key. If their business processes did not fit the system, they should rather adjust them. The informant also stated that the business processes had become more standardized. For case B, they felt the system was easy-going as it was tailored for the mechanical industry and did not offer any custom-made specifications to each business. The informant further explained that it was easier to get support from the vendors' helpdesk with a locked system as the system was the same for all their customers in manufacturing industries. Since all customers had the same version the informant implied that the detection of faults and assistance was made quicker.

Another identified benefit was the continuous updating of the software. The informant from case A pointed to the fact that they received all system upgrades and viewed this as a benefit. If other customers had suggestions for changes and updates, and a system configuration was

made, they could enjoy the benefits of it. This was also found with case C, where the informant stated that they could take advantage of other customers input. The informant also talked about the vendors great way of introducing the new update by offering relevant webinars. The informant from case B mentioned that with on-premise systems where updates often came each third year it was almost as implementing a total new system. Instead, the on-demand ERP solution provided updates pretty much each day. The informant viewed this as more user friendly than to wait for enormous changes. The systems had few interruptions and a superior service level regarding uptime.

Further, our analysis showed that the customers considered the system to offer flexibility and scalability. One of the manufacturers, case C, aimed at expanding in the future and thus, being flexible and scalable was beneficial. The informant from case B further linked this benefit to the Covid-19 situation, as many of them had to work from home. This is also connected to the accessibility of the system, as data is stored and retrieved from anywhere. Case C stated that since historical data was easily available in the system, they had less production errors.

The system required little internal IT competencies as no infrastructure were on-site. The System users only needed internet connection and a password to enter the software. The manufacturers were able to run larger volumes without necessarily applying more administrative tasks. The informant from case B had a statement which supported this:

> *"the production manager is replaced by the cloud ERP system. Today, most of the activities which previously was the production manager's job, are performed by the system and the engineers who enters the required information"* – Informant case B

The analysis showed that the manufacturers trusted the cloud ERP vendor to maintain the security. The informant from case A did consider security as a benefit, despite explaining security as an indifferent issue. The informant opinion was that all ERP systems have relatively good security. Further, for case B security was a crucial element which they perceived as a realized benefit. The company had suffered a lack of security with other IT systems, and today they had almost a full cloud-based system solution for all systems. Together with vendors they have concluded that a cloud-based solution was the most secure technique in terms of their company size. Case C agreed that security was a benefit received

from their cloud ERP system since the system is offered by professional providers that take security seriously.

With the cloud ERP system, everything was gathered in one place. This resulted in better document and information flow for the case companies. Further, this enhanced the overall business processes. Informant B said the system had helped them to go back and verify their operations as the system connected the machinery and the operators. The system made it possible to check planned scheduling against actual scheduling and thus see if the production proceeded as expected or not. All had better overview of their business processes and what had to be done and which material was required. This made their activities more effective and overall; the manufacturers gained the control back.

In literature, research by Hustad et al. (2019) identified seven benefits within SMEs arriving from cloud-based ERP implementation. As mentioned in the methodology chapter, we presented a list of the identified benefits to our informants. This was to confirm and/or reject the benefits in our case studies. The results are summarized in Table 10.

Table 10 – Summarizing results from presented list

Benefits of cloud-based ERP systems in SMEs	
Simplifying and automatizing work processes	All three cases agreed that a benefit identified from their cloud-based ERP system was that their work processes became standardized, automated, and simplified based on “best practice”.
Future-oriented technology	Both case A and B regarded a future-oriented technology as a necessity and perceived it as a benefit coming from their cloud ERP implementation.
Security	All three cases stated security as a benefit from their cloud ERP system. However, some of them believed this to be an indifferent issue since the system is offered by a professional cloud ERP vendor.
Cost reduction	All three cases viewed cost reduction as a benefit realized from their cloud ERP implementation, both in terms of less IT infrastructure and resources.

Continuous updating	The continuous updating was a benefit realized by all three cases.
Saving time	All three cases believed that the cloud ERP system supported fast implementation and automized their processes. Not all of them saved time by applying multiple units but considered this a benefit to be realized in the future.
Availability	It was clear for all cases that availability was a benefit arrived from their cloud ERP system. Since the system is available through a web browser and several mobile units it was easily accessible.

5.2.4 Challenges after system implementation

Through the interviews with the informant we also revealed some post-implementation challenges. These will be shortly presented in this section.

Two of the respondents said training of system users was a challenge. Some users needed more training in advance of "go live" as they had no previous experience with such systems. One of the informants stated that their production was more distinct and thus might needed a different approach when implementing it. Also, some of the respondents had modules they felt could be better.

5.3 Benefits realization

Table 11 – Content analysis on benefits realization

Case	Raw material	First order subthemes	Second order subthemes	General dimension
A	*We have formed a business culture that makes us look at new ways to do things...Ultimately, it is about getting better and more efficient, increasing the quality or effectiveness*	Varied degree of general practices towards benefits realization		**Benefits realization approaches seen in SMEs manufacturers**
A	*...The most important is to listen to the employee´s suggestions for change in the company for the better.*			
B	*It [benefits realization]is an ongoing processes. Where we together with the board on a monthly basis, goes through parameters and financial measures... We have a continuity in our improvement projects.*			
A	*We had a project group, however, we did not have that kind of focus. We did not allocate responsibilities for different activities. One could say the focus on what to realize where too little, but again we are a small company*	Responsibility of realizing benefits	Structure of benefits and pre-implementation planning	
B	*... We are not a big company. Thus, the CEO is the one who had most responsibility throughout the project. He is the one who makes sure we use the tools in the best possible way*			
C	*... We allocated responsibility of monitoring the benefits*			
A	*There was a plan, however it was not structured in a formal way*	Varied degree of benefits realization plan		
C	*We did develop a plan in advanced. On the other hand, we did not manage to stick to it... it is one thing to make up a plan, but another thing is to actually stick to it when reactions and challenges come across.*			
B	*... It [the evaluation] is always difficult to answer, as it depends who you are asking.*	Little formal measures to evaluate implementation	Varied degree of post-implementation evaluation	
A	*We do not evaluate that much, rather we use the try and fail method*			
B	*It has been successfull as we are fully using the system, and we are not operating on any other system on the side.*	Traditional evaluation of project outcome		
C	*We evaluated the problem in terms of looking back, we see that several elements could have been done differently*			
B	*...it has never been a wish to implement another system, generally it has been the right system for the company*	Informal evaluation of project		
A	*... Overall, we viewed the implementation as successful*			

Table 11 demonstrate that our analysis showed several elements of benefits realization. In our interviews we mostly focused on benefits realization, and what approaches were seen in SME manufacturers. The analysis identified: varied degree of general practices towards benefits realization, structure of benefits & pre-implementation planning and varied degree of post-implementation evaluation.

The informant from case A states that they have continuously worked with benefit realization and transformed it into a business culture. It was important to listen to the employees' suggestions of change. Thereafter, try out the idea and do an evaluation of the proposed idea. If the idea doesn't work as planned, it was at least something they could learn from. As a result, the company have listened to those who uses the system and shop floor workers as well as creating a culture where the employees within the company can express their opinions and look into how and where to make a change for the better. Several of the changes that has been processed, have been a suggestion from the employees and not the management, something the informant claims are their key to success.

> *"Ultimately, it is about getting better and more efficient, increasing the quality or effectiveness."* – Informant case A

Further, the case B informant believed their company was too small for a general practice regarding benefits realization. On the other hand, they had a monthly evaluation with the management, where they evaluated parameters as productivity, lead time and other financial measures. For case C their aim was to stay competitive and deliver products to a reasonable price.

The informant from case A said that they did not have a formal pre-implementation plan. If they were to use the phrase *benefits realization* the employees would probably fall of their chairs. This being said, the informant did have a plan in mind. The company created a project group, but because they are a small company, they did not put an emphasis on how to realize the benefits and who were responsible for realizing them. Case C did have a plan in advance of the implementation. However, they failed to comply with the original plan. One thing was to plan for the implementation, but another thing was to actually stick to it during the implementation when reactions and challenges happened. Due to their company size it was

the CEO who was in charge of the implementation project and has been the force behind the employment of the system tools.

During the post-implementation of the system, case A did not have a concrete evaluation of the project. Case A was not used to run a formal evaluation of projects, partly due to their company size. Instead they evaluated if something went wrong and learnt from it. Despite no formal end-evaluation or *"no list showing it had become better",* they knew their business had improved from the implementation. Thus, the informant from case A regarded the system implementation as successful.

After the first half year of using the system some people from case B were under the impression that the system could be customized. Also, the training of users during the implementation was good, but they noticed a need for more continuous training in the post-implementation stage since there is a lot of details in the system and in the beginning all instructions and information was overwhelming. Each process is easy, however for those working in more than one module, which many of the employees does, it is a lot of knowledge to acquire at once. The informant from case B said that for many it took about a year to fully learn how to use the system. The frustration after implementation concerned the knowledge and competencies towards the system, and not the system itself. A statement from informant B which highlight this is, *"we were never under the impression of having chosen the wrong system. Every step of the way, everybody has genuinely felt that this this was the right system for the company".* Today, case B are fully using the system and has no other system on the side that are still in use. Based on this, the informant would overall classify the implementation as successful. On the other hand, the informant further stated that this was a subjective matter of opinion as, "*it [the evaluation] is always difficult to answer as it depends on who you are asking".*

After evaluating the implementation, the informant from case C said they concluded that the implementation had failed on a number of points. Some of the problems was related to the fact that they did not have enough knowledge about the system before the implementation, and therefore did not have enough understanding of the system. In retrospect they could see that better understanding would have saved them from a lot of work, and at the same time identified some of the work that should have been done that was not conducted. In addition, the company had a different production process than the vendor had previous been

implementing system in. Hence, case C felt the implementation did not have enough focus on their specific company's production.

All the three manufacturers could see potential for improvements regarding their realization of benefits. The informant from case A said that they were still in their early days, and thus thought they would see more effects from the system in terms of traceability and effectiveness when properly using the system. Potential for further benefits from the system also applied for both case B and C. Informant B believed they did not use the system 100 percent yet.

> *"We clearly see potential of improvements in how to use the system. There are elements to improve before we use the system 100 percent and it [the system] offers good tools which we are not utilizing enough"* – Informant case B

6. Discussion

In the following chapter, we will discuss the results from the questionnaire and interviews together with the empirical material from our literature review in order to answer each of the three research questions. This will be a basis for responding to our general research problem: *"How can SME manufacturers manage the process of benefits realization with a cloud-based ERP system?"*. The three research questions were:

RQ1: What challenges make SME manufacturers adopt a cloud-based ERP system?
RQ2: What are the benefits for SME manufacturers in terms of using cloud-based ERP?
RQ3: How do SME manufactures realize benefits from a cloud ERP system?

The discussion section will be structured by discussing each research question in turn.

6.1 What challenges make SME manufacturers adopt a cloud-based ERP system?

The adoption of ERP systems through the SaaS model make advanced technologies accessible to SMEs (Varian 2010, Duan et al. 2012, Popli and Sarin 2015, Seethamraju 2015, Gupta, Misra Subhas, et al. 2018, Hustad et al. 2019). Our findings support this notion as cloud solution was a central factor when selecting ERP system for some of the SMEs. The case companies' sizes are arguably a challenge as on-premise ERP systems are both costly and require the system infrastructure to be installed and maintained for internally (Li et al. 2017). Further, our findings identified the following main challenges experienced by the case companies before they decided on the cloud ERP system implementation, namely lack of control and traceability.

Our findings and analysis revealed that lack of control was a main challenge for all three manufacturers. Their struggle to maintain control may be explained from their growth in terms of volume and complexity, and further with an out-of-date system they lost control. ERP systems handle all processes associated with the supply and demand, and thus assist manufacturers in enhancing their control over their processes (Waurzyniak 2015). Furthermore, the lack of control created problems with regard to measuring business

processes performance and efficiency. The real-time visibility and automation supported by ERP system are known to result in more efficient activities (Waurzyniak 2015).

Another challenge our research highlighted was traceability in manufacturing. Especially, for mechanical manufacturing being able to go back and verify material usage and the connected operations was of great importance. Functionality that make each activity traceable construct an business environment allowing users to search through data when necessary (Purohit, Jaiswal, and Pandey 2012, Symonds 2012).

An interesting statement from our interviews unveiled that operating in mechanical industry may presented industry-specific challenges, and thus choosing an ERP vendor with industry knowledge was valuable. Moreover, literature indicate cloud ERP to allow manufacturers to concentrate on their core competencies. It is therefore worth noting that manufacturing industries, whose core competencies lies within manufacturing, value the assistance in IT technology and information management (Shukla, Agarwal, and Shukla 2012).

6.2 What are the benefits for SME manufacturers in terms of using cloud-based ERP?

The literature has revealed common business values generated from the usage of ERP systems delivered as cloud solutions (Gill 2011, Duan et al. 2012, Peng and Gala 2014, Elmonem, Nasr, and Geith 2016, Hustad et al. 2019). All of the three manufacturers studied are today fully using their cloud ERP system and could recognize their implementation as beneficial. On one hand, they had overcome what they perceived as their major pre-implementation challenges by applying informal method to achieve benefits from the system. On the other hand, some of them implied that they were still waiting for other benefits to happen.

Existing research explain cloud ERP systems as a major advantage to SMEs. SaaS gives access to advanced technology because of less IT infrastructure and thus reduced investment costs (Seethamraju 2015). Among the three case companies only one of them expressed their company size as a factor for choosing a cloud-based solution. One of them described their cloud ERP selection as partly based on cloud technology as future oriented. An explanation

to why not all SMEs in our case study expressed that cloud ERP best suited their size may be due to their lack of knowledge about the opportunities cloud solutions actually offer to SMEs.

Hustad et al. (2019) identified seven benefits SMEs experienced from cloud-based ERP systems. Our study supports their results as our sample of manufacturers confirmed identical benefits arriving from their cloud ERP. Our findings and analysis indicated four additional prime benefits originating from the manufacturers cloud ERP system: standardization, visibility and control, traceability and flexibility. Our case sample raised uncertainty about these benefits arriving as a consequence of choosing a cloud solution or not. Nevertheless, it is conceivable that some benefits are enhanced and become more apparent by the use of cloud technology. The integration and coordination associated with traditional ERP systems (Monk and Wagner 2013), may be managed more effective when it is accessible in real-time from anywhere. The identified benefits are to some extent interrelated and the further discussion will engage around the business benefits that was most prominent to our three business cases.

Standardization

The research findings confirm to a considerable degree that not allowing for customization is regarded a benefit to the small manufacturing companies. The allowance for customization in IS is a prolonged debate, where some research consider standardization as a drawback (Hofmann and Woods 2010), whereas others outline different benefits from standard systems (Andersen 1994, Mijač, Picek, and Stapić 2013). Our research suggest that the small manufacturers view a standard system based on “best practice” as really beneficial to them. Schubert and Adisa (2011) claimed SaaS model solutions to be more suitable for organizations which need less customization. Previous research emphasis that limitations of customization is an issue of less importance to SMEs (Duan et al. 2012). Since the system was custom-made to manufacturing businesses, our findings propose that from the user perspectives’ the standard solution tailored for their industry were not perceived as a limitation nor a directly challenge.

Research indicate that cloud ERP systems offers simplified and automatized work processes (Seethamraju 2015, Waurzyniak 2015, Hustad et al. 2019). In our study, the business cases expressed this to be closely related to the standardization aspect. The small manufacturing

businesses was not view as that unique by one of the informants. At the same time, the cloud ERP provider was considered professional in ensuring customer adjustments in form of system updates. Therefore, a standard system was helpful in facilitating their business processes, making them simpler and automized.

Continuous updating

Our research supports existing research notion of continuous updating as valuable for cloud ERP customers (Mohammed, Nasr, and Geith 2016, Hustad et al. 2019). Instead of larger system updates, they obtained updates on a regular basis, which the business cases viewed as more user friendly than to wait for more heavy system updates. This benefit has also appeared in previous research as cloud technology contribute to faster updating and upgrading (Mohammed, Nasr, and Geith 2016). The continuous upgrading assured the informants that the system would not become outdated in the short run, and thus it could be regarded as supporting continuous innovation (Panorama Consulting Group 2020).

Release of resources and focus on core competencies

Cloud ERP allows businesses to concentrate on their core internal activities (Duan et al. 2012, Mohammed, Nasr, and Geith 2016). Based on our research, the companies saved resources as the vendor is responsible for installation and maintenance. An interesting finding was that one of the cases did no longer employ someone in the production manager position. Today, the system assisted them and performed the production planning, which have resulted in a more reliable way of working. Without requiring more administrative tasks, they were today able to run larger volumes.

Security

In the literature, security within cloud ERP is controversial (Duan et al. 2012, Mohammed, Nasr, and Geith 2016). Due to the high availability through the cloud the security risks increase, and studies present concerns about locality, data access, data privacy and data breaches (Subashini and Kavitha 2011, Mohammed, Nasr, and Geith 2016). One of the case companies had experienced security breach in previous systems, and thus after an internal discussion about solution options, they concluded a cloud-based solution was the most secure technique for them. Further, the security aspect from the deployment of cloud ERP were viewed as an important benefit from our research. One informant even held the opinion of security as nothing to concern about, as all ERP providers acquired top security. Our

research did not find any special concerns around the security factor, however, all of the manufacturers viewed it as crucial and that is was clear it should be present.

A reason to why the case companies did not express any particular concerns about safety issues may be due to their company size, and thus their constrain of in-house IT competences. Cloud solution providers have high security standards and invest heavily in cybersecurity as this is an integrated part of their offered service (Weng and Hung 2014, Panorama Consulting Group 2020, Ramasamy and Periasamy 2017). It is therefore conceivable that the SMEs trust their cloud ERP vendor to be responsible for managing the security as a service.

Visibility and Traceability

All the respondents explicit mentioned better control realized through the cloud ERP system. The system provided the companies with an overview of the processes, which in turn made them more effective. The system supports both front-end and back-end activities, and with all information in one place, decision-making was done faster. The manufacturers achieved more control over business processes that was integrated in the system. The integration and collaboration ability of modern ERP systems over the internet, extend the visibility and control both internal and external to the organization (Mohammed, Nasr, and Geith 2016).

Based on the analysis, traceability was one of the major benefits achieved from the cloud ERP implementation. Two out of three stated traceability to be a matter of great importance in manufacturing. A system connected with the machinery and the operators made them able to go back and review the production process. Thus, it was possible to confirm what material was included, which instruments was used and who operated on a specific task. Historical information was saved in the system and was provided easy access to. They achieved better control of material and component requirements for their production. Planned production scheduling was quickly checked against actual production to verify if the production process went without problems. Overall, better control over the production reduced the risks of production errors.

From our research, we got the impression that these improvements were of high relevance because they operate in the manufacturing industry. Even though the literature does not

thorough cover this benefit, we conclude visibility and traceability as important and notable benefits to our manufacturing business cases.

Scalability, availability and flexibility

Previous research has found cloud solutions flexible for organizations due to their scalable nature (Duan et al. 2012, Mohammed, Nasr, and Geith 2016, Panorama Consulting Group 2020). One of the case companies explained their strategy of expanding to other countries, and therefore a cloud solution offered possibilities instead of limitations. Another informant linked this benefit to the current Covid-19 situation. After the pandemic outbreak and government restrictions, many of their employees had to work from home. Allowing entrance to the system without software installations on computers at home made the system flexible to them in an unexpected circumstance. With cloud ERP the system is accessed from almost any device as long as the user has a login and an internet connection (Panorama Consulting Group 2020).

Furthermore, we could argue that scalability and the corresponding flexibility, are significant benefits to SMEs, in view of their company size. The likelihood for SMEs to expand their businesses may be a reason for selecting cloud service solutions.

The benefits discussed above was realized by all or some of the manufacturers. It is worth mentioning that not all benefits occurred at an early stage, but some were achieved in the long term. Most of the benefits have to some extent been uncovered in previous research, however, literature points to dissimilar sample of benefits. An explanation to why the above-mentioned benefit was realized in our research may be due to the industry-specific feature of the chosen cloud ERP vendor. Furthermore, our specific case sample can also explain our identified benefits.

6.3 How do SME manufacturers realize benefits from a cloud ERP system?

Benefits realization refers to methods for ensuring business value are received from IT-investments as benefits does not realize themselves (Flak 2012). The findings and analysis of our research discover no formal strategy towards benefits realization when it comes to their cloud ERP implementation. As identified in the literature, modern approaches for obtaining value from IT-investments recognize the significance of structuring the management of potential business benefits in order to realize them (Ward and Elvin 1999; Ward and Daniel 2006; Flak 2012). Different processes and frameworks have been established to highlight important measures for organizations to undertake (Ward and Daniel 2006, Esteves 2009, Badewi et al. 2018, Hustad et al. 2019).

The manufacturers differed in terms of their general usage of benefits realization in their organization. The case which was nearest what could be considered a practice for benefits realization, worked with continuously improvements and changes, and described it as embedded in their business culture. However, ideas for improvement did not seemed to be handled in a stepwise manner, instead suggestions were carried out as they came along. The other case companies believed their business were too small to embody a general practice and did not have any general practice that could be related to benefits management approaches. Peppard, Ward and Daniel (2007) points to several principles organizations shall harmonize with to realize benefits arising from IT investments. The deployment of IT does not create business value alone and benefits does not appear all by themselves, rather they must be actively managed for. It could be argued that the manufacturers lack of practice for benefits realization suggest they do not fully comprehend how IT can deliver value. Another explanation may be that the SMEs do not have sufficient knowledge about what benefits realization or benefits management involve.

On the other hand, even though none of the cases planned for a holistic and iterative approach, our findings indicate some informal actions that are included in the stages of prior theoretical frameworks. The benefits management process model by Ward and Daniel (2006), cover five stages: *identify and structure benefits, plan benefits realization, execute benefits plan, review and evaluate results and establish potential for further benefits*. Further, Esteves (2009) proposed a roadmap specifically for ERP benefits

realization with the following four stages: *prepare, realize, achieve and audit*. The stages from both models incorporates similar measures for benefits to be realized, thus, the further discussion comprises both processes, and the frameworks of Badewi et al. (2018) and Hustad et al. (2019) will be part of the discussion at the end.

Business benefits expectations

The challenges that made the manufacturers adopt a cloud ERP system reflects their expectations on ROI. Through interviews all of the respondents mentioned either control or traceability as identified benefits in advance of the implementation, namely the prepare stage. At the same time, in two out of three cases, the companies' reflection on expected benefits were not put into structure and further prepared for. Ward and Daniel (2006) underpinned in their study that potential benefits that can be reached must be identified and maintained in relation to one or more drivers for a change in the organization. Further, Esteves (2009) state that the first stage must include activities preparing for the achievement and realization of the expected benefits. The work on this stage will influence the further stages, which involve investment value returns. One of our case companies stated that they did develop a pre-implementation plan for how to realize their expected benefits, however, they did not manage to fulfil it.

Allocated roles and responsibilities

Existing literature express the importance of allocating roles and responsibilities to the potential benefits both when structuring the benefits and when planning the benefits realization (Ward and Daniel 2006; Peppard, Ward and Daniel 2007). When asked the question regarding who were responsible for the implementation, all answers ultimately concluded that the companies were no larger than that the main responsibility fell on the CEO. In spite of this, some of the respondents referred to formation of project groups. However, their focus was not on what benefits, how to realize, and who were responsible for these tasks.

It is conceivable that allocating roles and responsibilities might be more expedient to larger enterprises. A reason for this can be that in larger companies it is easier to disclaim responsibility or assigning blame if nobody performs the necessary tasks. Therefore, we could argue that this element is less required by SMEs.

Execution of implementation plan

Both Ward and Daniel (2006) and Esteves (2009) claim the management of benefit realization to be a continuous process, where managers should constantly *prepare*, *realize* and *achieve*. The company which stated to have developed a plan in advance, did not follow it when reactions and challenges entered the picture. According to literature auditing and revising the execution plan is an extremely important element as business environments are dynamic and unanticipated challenges may occur (Ward and Daniel 2006, Esteves 2009). Returning to the initial preparation stage, the revised plan must be accompanied with new estimation of ERP benefits for the next stages (Esteves 2009).

Post-implementation evaluation

All three case companies evaluated their implementation project. Nevertheless, the formal degree of the evaluation greatly differed. The case with the most informal method described their implementation as successful, however, they did not specify any special elements in their evaluation. In Ward and Daniel's (2006) benefits management process, the final stage before seeking for further potential benefits, contain a formal review of the implementation outcome. There were several project elements that should be reviewed, for instance which planned benefits was realized or not realized and what negative impacts occurred from the system implementation. When the other two business cases reviewed the results, we got the impression that they used a more traditional approach where they focused on the technical solution and if the implementation project was within the time and cost estimate. They explained it as relatively successful as they were fully using the system and did not have any additional systems. On the other hand, the evaluation was a subjective matter and the answer thus depended on who you asked. Our findings supported the belief of Ward and Daniel (2006) of the evaluation to be a helpful stage for business to learn. Some of them stated that if they had the same knowledge as they had today, the project might have been more successful.

In the integrated framework proposed by Hustad et al. (2019), it is suggested that the first three stages of the benefits management process, namely, *identifying and structuring benefits*, *planning benefits realization* and *executing the benefits realization plan*, support the IT conversion and IT use processes of Soh and Markus'(1995) model. The research of Badewi et al. (2018) developed a ERP benefits realization capability framework which claimed that benefits require IT resources and OCRs to be realized. In a cloud ERP

environment, it is arguable that the organizational capabilities are dependent on the cloud vendors capabilities as well, as IT help is from the provider becomes an imperative asset. As our research findings indicated, the case companies valued the IT competencies from their cloud ERP provider.

In total, our research results deviate from what the literature suggest as an approach in realizing business value from IT investments. The SME manufacturers applied informal approach not strictly following the methods described in literature. Nevertheless, all respondents reported several benefits as realized by the cloud ERP system.

7. Modified framework suggestion of benefits realization for SMEs and cloud ERP

Based on frameworks identified in the literature together with our discussion in chapter 6 above, we propose a modified framework from Hustad et al. (2019) to illustrate how SMEs comprehend benefit realization from cloud ERP systems. Building on the integrated framework, we incorporated IT resources and organizational complementary resources from the research by Badewi et al. (2018). Moreover, we suggest changes to the model to emphasis how the role of cloud ERP comes into play. Figure 12 illustrate the modified framework.

In the revised model IT assets is replaced with Cloud ERP as the organizations do not manage IT infrastructure in terms of the hardware and operating systems. Both the cloud provider and the client need to have soft infrastructure such as expertise and experience to ensure the results in beneficial cloud ERP usage. Furthermore, we could argue that a cloud provider offering industry specific system solutions can hold valuable organizational complementary resources as well. For this reason, IT management becomes a collaboration between the cloud vendor and its clients.

Hustad et al. (2019) suggested that the first three stages of Ward and Daniel's (2006) benefits management process to support processes of IT conversion and IT use. We agree that the benefits management process is a valuable addition to Soh and Markus' (1995) IT value creation model, although using "IT" with a strong technology component is less relevant today. To emphasis the contemporary drive towards cloud IT solutions we suggest using "The Cloud IT use Process" instead of "The IT use process". With cloud IT and cloud ERP in particular, the services are available through the cloud from any device and at any time. Appropriate benefits realization of Cloud ERP will lead to IT Impacts that improve Organizational performance.

In relation to the five steps from Ward and Daniel's (Ward and Daniel 2006) benefits management process, the following subset of the stages seems to be adequate for SMEs to realize benefits; the benefits realization plan, the execution of the plan and a final evaluation of the implementation. Also, since our research demonstrated that the SMEs did realize several benefits by applying *informal* measures within the stages, we indicate "The Benefits

realization process" as one element in the model leaving out the details of each stage in the benefits management model.

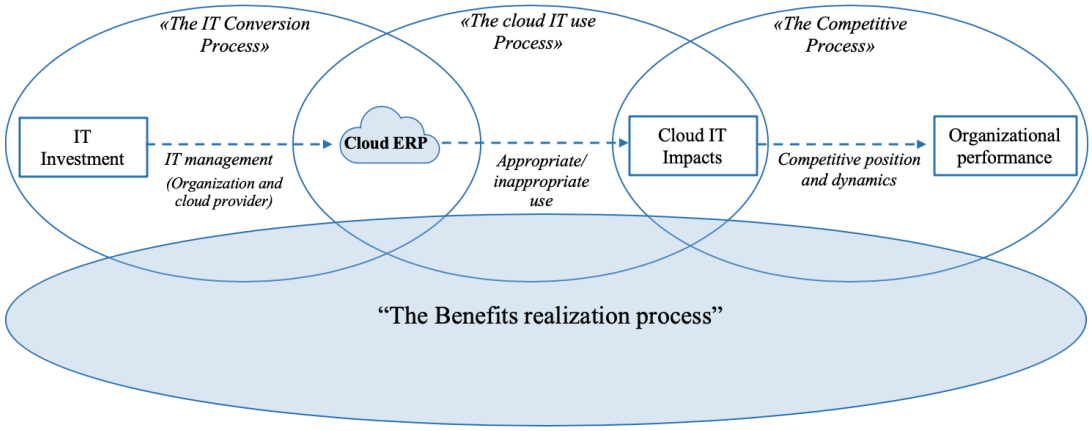

Figure 12 – Modified framework to comprehend SMEs benefits realization with cloud ERP

8. Conclusions

Considering the unsatisfactory situation of realized benefits from ERP systems, a benefits realization approach has been proposed in literature as a potential solution to increase the realized benefits and implementation success rate. Thus, this approach will help mitigating failed IT investments. This master thesis seeks to fill the gap in academic regarding benefits realization with cloud ERP in SME manufacturers. There is limited research on benefits realization in the context of cloud ERP and much less in an industry-specific context. In addition, this study has investigated SME manufacturers pre-adoption challenges and what benefits they have realized through the use of a cloud-based ERP system.

To gain a better understanding of cloud ERP and the benefits realization concept and to answer our research questions a literature review was conducted. CC has accelerated the commoditization of IT as many SMEs are moving to cloud-based ERP systems. The migration to the cloud has generated a problem related to how SMEs, and manufacturers in this particular case, can manage the benefits realization process with advanced technologies. The shift in responsibility of IT infrastructure from the organization itself to cloud ERP vendors transform the management of IT. Several frameworks have linked ERP with benefits realization and literature suggest that a holistic entrance yields great business value.

We performed semi-structured interviews with key personnel within SME manufacturing industries which had implemented cloud ERP. Through multiple case studies, we discovered the main challenges that make SME manufactures adopt a cloud-based ERP system to be lack of control and need for traceability in the manufacturing industry. Moreover, they struggle to find suitable ERP systems that fits their company size and specific industry. The benefits identified through our research were standardization, continuous updating, focus on core competencies, security, visibility, traceability, scalability, availability and flexibility.

The results from the analysis showed that the SME manufacturers used more informal approaches towards benefits realization. Yet, all three manufacturers had realized several benefits. The discussion in chapter 6 served as a basis to our conclusion in an attempt to answer the research problem. Our findings may indicate that formal approaches towards benefits realization in SMEs is not essential in order for them to achieve benefits from the cloud ERP system. Having said that, one could argue based on research that applying more

formal benefits realization approaches may result in more effectively and efficiently realization of business benefits. Moreover, the cloud environment changes how IT assets are distributed. Therefore, with less emphasis on the technical solution internally in the organization, more emphasis could be paid to organizational changes to manage and realize the benefits from investments such as cloud ERP systems. Our modified conceptualization is based on reality and illustrate the way SMEs approach benefits realization with their cloud ERP systems. It can help better understanding the subject matter as cloud alter the implementation of ERP systems.

8.1 Limitations of the study

Although the research conducted in this thesis *managed to answer the problem* it was set out to test, there were several limitations that could have affected the results. The major limitation in this study are related to the Covid-19 pandemic that occurred during the writing of this thesis. As a result, this study has a smaller number of informants than originally intended.

A multiple case study gives a stronger basis for generalization and increase reliability through a larger number of replications (Yin 2003). Despite that, this study is limited to investigating the subject matter with only one cloud ERP vendor in one country. If several vendors had been considered the results could have been different and it would be possible to compare results between cloud ERP systems.

Furthermore, the sample size of this research was selected from clients who had implemented a specific cloud ERP system. If the analysis had been based on a larger sample size, the results could be considered more accurate. Including a larger sample size, both in terms of more case studies as well as more than one vendor could also help make the results more generalizable.

This study is limited to concern SME manufacturers. One limiting factor regarding this is the informants lack of knowledge about the subject. On account of the manufacturers company size, one employee is often working within many areas of the business, and finding the right informant is not easy. Moreover, several of the employees which was part of the

system implementation did not longer work there. Thus, the degree to which the informants had participated in the implementation project varied.

8.2 Suggestions for further research

In order to provide other researchers and readers the chance to evaluate the quality and future use of this thesis, this section present the areas that provides opportunities for further research.

On the basis of the limitations of this study, we would suggest exploring other SMEs cases which have a high focus on applying benefits realization approaches. Comparing these cases against those who apply more informal methods can confirm whether SMEs require formal approaches to fully realize the benefits cloud-based ERP offers. In order to provide generalizable results, quantitative studies can be subsequently organized.

Further, we suggest research to include several industry-specific cloud ERP vendors and their clients to check for differences within manufacturing businesses, but also to give more accurate results. Even though we have sought to investigate this pertinent issue in a specific context, it would be interesting to further investigate this including other types of manufacturing companies, as these varies greatly.

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10. Appendices

10.1 Questionnaire

RamBase og Gevinstrealisering

Side 1

Denne undersøkelsen er en del av et masterprosjekt hvor vi ønsker å studere et ERP-system og prosessen med gevinstrealisering. Vi ønsker at forskningen skal kunne bidra med hvordan gevinstrealisering kan inkluderes og håndteres av ERP-kunder.

Undersøkelsen består av to deler, hvor de fleste av spørsmålene er obligatoriske. Vi håper likevel at dere besvarer alle spørsmålene etter beste evne.

All data vil behandles konfidensielt. Du har sammen med denne undersøkelsen mottatt et eget skriv som informerer om håndteringen og bruken av innsamlet data.

Jeg samtykker til å delta i spørreundersøkelse *

Jeg har mottatt og forstått informasjon om prosjektet "Skybasert ERP og prosessen med gevinstrealisering: En case studie av RamBase", og har fått anledning til å stille spørsmål.

(Se vedlagt informasjonsskriv i e-post)

- ○ Ja
- ○ Nei

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Jeg samtykker til å delta i spørreundersøkelse»

Del 1: Kontaktdata / Generelle spørsmål

Dette er generell informasjon om deg og din bedrift. Kom gjerne med kommentar til spørsmålene eller svarene ved behov.

Hva heter du (fornavn og etternavn)? *

Hva er din e-postadresse? *

Stillingstittel

Velg ...

Hva er din stillingstittel? *

Dette elementet vises kun dersom alternativet «Annet» er valgt i spørsmålet «Stillingstittel»

Navn på bedrift *

Type bedrift *

Med dette mener vi om din bedrift er å anse som eksempelvis en produksjonsbedrift, en grossist, osv.

Antall ansatte *

- 1-49
- 50-249
- 250 eller mer

Årlig omsetning *

(i mill. NOK)

Når startet dere implementeringsprosjektet av RamBase (Måned og år)? *

Er implementeringsprosjektet av RamBase avsluttet? *

- Ja
- Nei

Dersom ja, hvor lang tid tok det fra implementeringsstart til GoLive? *

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Er implementeringsprosjektet av RamBase avsluttet?»

Hadde dere ett annet ERP-system før RamBase? *

- Ja
- Nei

Dersom ja, hvilket (og hvilken versjon)? *

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Hadde dere ett annet ERP-system før RamBase?»

Opplevde dere noen operasjonelle utfordringer med det gamle ERP-systemet? *

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Hadde dere ett annet ERP-system før RamBase?»

- Ja
- Nei

Dersom ja, hvilke utfordringer? *

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Opplevde dere noen operasjonelle utfordringer med det gamle ERP-systemet?»

Opplever dere noen operasjonelle utfordringer med RamBase? *

- Ja
- Nei

Dersom ja, hvilke utfordringer? *

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Opplever dere noen operasjonelle utfordringer med RamBase?»

Har du noen kommentarer til noen av spørsmålene i del 1 eller svarene du har avgitt?

Sideskift

Side 2

Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Jeg samtykker til å delta i spørreundersøkelse»

Del 2: Spørsmål til masteroppgaven

Spørsmålene i del 2 er de som utgjør selve problemstillingen for masteroppgaven. Kom gjerne med kommentar til spørsmålene eller svarene ved behov.

Gevinstrealisering er prosessen med å fastsette forventede gevinster for så å hente ut disse fra forberdingsprosjekter i en organsiasjon. De positive resultatene fra en endring er gevinster, mens negative resultater er ulemper.

Denne undersøkelsen handler om reslutater knyttet til imlementeringen og bruk av ERP-systemet RamBase.

Hva var de viktigste grunnene til at dere valgte å implementere RamBase? *

Var det en avgjørende faktor at RamBase er en skybasert systemtjeneste? *

- Ja
- Nei
- Vet ikke

Hvordan var deres opplevelse omkring implementeringen av RamBase? *

I hvilken grad er du enig i følgende utsagn?

	Svært fornøyd	Fornøyd	Hverken for-nøyd eller misfornøyd (nøytral)	Misfornøyd	Svært misfornøyd	Ønsker ikke å svare
Hvor fornøyd er du med implementeringen av RamBase? *	○	○	○	○	○	○

Har dere opplevd ulemper knyttet til Rambase? *

Her menes både ulemper før og etter implementering, avhengig av hvor dere er i prosessen.

- ○ Ja
- ○ Nei

Dersom ja, hvilke ulemper? *

ⓘ Dette elementet vises kun dersom alternativet «Ja» er valgt i spørsmålet «Har dere opplevd ulemper knyttet til Rambase?»

I hvilken grad er du enig i følgende utsagn?

	Stort fokus	Fokus	Hverken mye eller lite fokus (nøytral)	Lite fokus	Svært lite fokus	Ønsker ikke å svare
I hvor stor grad har dere hatt fokus på gevinstrealisering? *	○	○	○	○	○	○

Har dere forhåndsdefinert hva gevinster dere tenker å realisere gjennom RamBase? *

Med gevinster menes både finansielle og operasjonelle gevinster som kan komme fra investeringen.

- ○ Ja, både finansielle og operasjonelle
- ○ Ja, men bare finansielle
- ○ Ja, men bare operasjonelle
- ○ Nei, ingen av delene

Dersom ja, hvilke gevinster? *

Dette elementet vises kun dersom alternativet «Ja, men bare finansielle», «Ja, både finansielle og operasjonelle» eller «Ja, men bare operasjonelle» er valgt i spørsmålet «Har dere forhåndsdefinert hva gevinster dere tenker å realisere gjennom RamBase?»

Her ønsker vi at du går mer spesifikt inn på hvilke gevinster.

Videre, hvilke tiltak blir iverksatt for å realisere disse gevinstene? *

Dette elementet vises kun dersom alternativet «Ja, men bare finansielle», «Ja, både finansielle og operasjonelle» eller «Ja, men bare operasjonelle» er valgt i spørsmålet «Har dere forhåndsdefinert hva gevinster dere tenker å realisere gjennom RamBase?»

I hvilken grad er du enig i følgende påstand?

	Svært enig	Enig	Hverken enig eller uenig (nøytral)	Uenig	Svært uenig	Ønsker ikke å svare
I hvilken grad opplever du at forventet gevinster tilsvarer faktiske gevinster? *	○	○	○	○	○	○

Har du noen kommentarer til noen av spørsmålene i del 2 eller svarene du har avgitt?

Se nylige endringer i Nettskjema (v10

10.2 Interview guide

Skype Intervjuguide og forberedelser til intervjuprotokoll

Dato og tidspunkt for intervjuet:
Intervjulengde: 40-60 minutter
Type intervju: Individuelle intervjuer (Teams pga. hindre korona-smittespredning)
Lokasjon: Teams
Digitalt opptak: Lydopptak med Nettskjema – Diktafon
(dersom informanten godkjenner dette)
Form for transkripsjon: Verbatim transkribering av lydopptak

Informasjon om oppgaven
Med Hatteland som oppdragsgiver er følgende formål med prosjektet/masteroppgaven: Oppnå kunnskap om gevinstrealisering i forbindelse med implementering av et skybasert ERP-system i norske produksjonsbedrifter. Formålet er å utforske hvilke utfordringer bedriftene har og mulige gevinster som kan hentes fra systemet RamBase. Utover dette vil det bli undersøkt hvordan de inkluderer gevinstrealisering som en del av før- og etter-implementeringen, og hvordan de kan håndtere realisering av fordelene ved systemet.

Forskningsspørsmålene vi vil undersøke er følgende:

- *Hvilke operasjonelle utfordringer finnes i produksjonsprosessen?*
- *Hvilke operasjonelle gevinster kan identifiseres i produksjonsprosessen ved å bruke et skybasert ERP-system?*
- *Hvordan kan skybasert ERP kunder inkludere og håndtere prosessen med gevinstrealisering?*

Informere om rammesetting for intervjuet (varighet, presentere intervjuer og prosjektet). Forklare hva innsamlet data kan bidra med.

Spørsmål

1) *Introduksjonsspørsmål (ca. 10 minutter)*

Etiske retningslinjer
Informere om etiske faktorer og konfidensialitet; datainnsamling gjennom GDPR-godkjent opptaker; digitale opptak og transkripsjoner oppbevares på en forsvarlig måte og distribueres ikke til andre uten informantens samtykke. Innsamlet data anonymiseres, opptak slettes etter endt forskning og funn som nevnes i oppgaven kan ikke knyttes til informant. Kan trekke deg når som helst.

Bakgrunnsinformasjon – Informant/deltager

- Navn:
- Utdanning**:**
- Nåværende posisjon i bedriften:
- Antall år i nåværende posisjon**:**

Informasjon om bedriften

- Bedrift:
- Type bedrift (bransje/industri):
- Antall ansatte:
- Årlig omsetning:
- Når RamBase ble implementert:

2) Bakgrunnsopplysninger

Etterspør fakta om informanten og bedriften. Dette er generell informasjon fra ovenfor punkter "Bakgrunnsinformasjon", både om informant og bedrift. Noe av bakgrunnsinformasjonen er allerede hentet inn på bakgrunn av tidligere utført spørreundersøkelse.

- Kan du fortelle litt om din rolle og hva den går ut på?
- Hadde dere et tidligere ERP system før RamBase?
- Når startet og sluttet implementeringen av RamBase? Hvor lang tid tok det?
- I hvilken grad har du vært delaktig i implementeringsprosjektet?
- I hvilken grad har Hatteland evt. andre vært delaktig i implementeringsprosjektet?

3) Overgangsspørsmål

Før-implementering av RamBase

- Kan du fortelle litt om hvorfor dere bestemte dere for å skulle anskaffe et ERP-system?
- Kan du fortelle mer om de utfordringene dere opplevde i forkant av deres nye ERP-system?
- Var det noen operasjonelle utfordringer dere opplevde i forkant av deres nye ERP-system? (for eks.: tid, ledetid, feil)

4) Hoveddel (ca. 40 minutter)

Spørsmål relatert til problemstillingen. Inndelt etter tema:

Skybasert ERP

- Kan du fortelle litt om hvorfor dere valgte RamBase?
- Kan du utdype om det var avgjørende at ERP-systemet er skybasert?
- Kan du fortelle litt om hvordan implementeringen av RamBase ble utført?
- Hvordan opplevde du at systemet ble mottatt av de ansatte i bedriften?
- Hvordan forberedte dere de ansatte angående det nye systemet?

- Kan du fortelle litt om hvilke moduler dere bruker i systemet?
  (for eks.: produksjon (MRP), kvalitet, salg osv.)
- Har dere opplevd ulemper knyttet til RamBase?
- Opplever dere noen operasjonelle utfordringer med RamBase?
- Sett ut ifra at dere er en produksjonsbedrift, hvordan mener du systemet har hjulpet selve produksjonsprosessen?
  (*Er alle steg inkludert i ERP-systemet?)*
- Opplever du at tidligere utfordringer har endret seg/forbedret seg etter implementeringen av RamBase?

Gevinstrealisering (Ward and Daniel 2006, Doherty, Ashurst, and Peppard 2011, Flak 2012, Lahmann, Probst, and Parlitz 2017)

- Kan du fortelle litt om hvordan praksisen for prosjektledelse og gevinstrealisering er i bedriften deres? (generelt)
- Arbeider dere kontinuerlig med å realisere gevinster?
- Hvordan er/var ansvarsfordelingen med tanke på å realisere gevinstene?
- Har dere en plan for å realisere gevinstene fra systemet?
  - Dersom nei: hvorfor ikke?
  - Dersom ja: Kan du fortelle litt om denne planen?
    Forhåndsdefinerte gevinster – både finansielle og operasjonelle
    Følge opp kunde, mindre feilleveranse, produksjonsplanlegging og rapporter.
  - Identifisert endringer som må gjøres for å oppnå gevinstene?
  - Hvordan måle gevinstene?
  - Følger plan?
  - Har gevinstene blitt målt (følget opp) under eller etter implementeringen?
  - Jobber kontinuerlig med å se etter flere potensielle gevinster?
- Hvilke fordeler har dere opplevd ved implementeringen av RamBase?
  (*videre, noen operasjonelle fordeler?)*
- Har dere oppnådd de gevinstene dere forventet fra systemet?
- Har dere opplevd noen spesielt viktige gevinster fra systemet?
- Er det noen gevinster som ikke ble innfridd etter forventningene?

- For en bruker-organisasjon er gevinstene på høyre side av tabellen nevnt i litteraturen for et skybasert ERP system (Hustad et al. 2019): Er du enig med listen presentert nedenfor og kan du relatere til gevinstene for bruker-organisasjonen?

Gevinster identifisert	Forklaring	Enig J/N	Kommentar
Forenkler og automatiserer arbeidsprosesser	*Arbeidsprosesser er standardisert, automatisert og forenklet basert på "beste praksis"*		
Fremtidsorientert teknologi	*Systemet utvikler seg over tid gjennom nye løsninger, teknologi og moderne digitalt design*		

Sikkerhet	*ERP systemer tilbys av profesjonelle leverandører som tar sikkerhet seriøst*
Redusere kostnader	*Systemet reduserer kunders kostnader, frigjør ressurser, flytter ansvaret for IT infrastrukturen over til leverandøren og reduserer behovet for intern IT kompetanse*
Kontinuerlig oppdatering	*Systemet oppdateres automatisk for alle kunder*
Sparer tid	*Systemet støtter rask implementering, automatiserte prosesser og et mangfold av enheter (f.eks. mobile enheter)*
Tilgjengelighet	*Systemet er tilgjengelig gjennom en nettleser og flere mobile enheter*

- Er der noen andre gevinster som du ønsker å legge til i listen?
  har han sagt noen
- Kan du fortelle litt om hvordan dere følger med på hvilke gevinster som realiseres etter implementeringen?
- (Dersom implementeringen er fullført) Hvordan ble implementeringsprosjektet vurdert?
- Hvordan vil du vurdere implementeringen av RamBase? (vellykket/mislykket)

5) Avslutningsspørsmål (ca. 5 minutter)

- Hvis vi ikke rekker over alle spørsmålene, kanskje sende på mail eller kort intervju senere?
- Sekundære materiell: Eventuelle dokumenter og gevinstrealiseringsplaner fra implementeringen om mulig.
- Har du noen avsluttende kommentarer til intervjuet og det vi har snakket om?

Takk for deltagelsen og informasjonen. Oppfølgningsintervju og tilgang til intern informasjon avklares. Kan når som helst kontakte oss dersom spørsmål.

10.3 Information letter to informants

Vil du delta i forskningsprosjektet
" Gevinstrealisering hos ett skybasert ERP system: Et perspektiv for små og mellomstore produksjonsbedrifter "?

Høgskolen i Molde
Vitenskapelig høgskole i logistikk

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å studere gevinstrealisering hos skybaserte ERP-implementeringskunder. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Dette er en masteroppgave som en del av et 2-åring-masterprogram i Logistikk ved Høgskolen i Molde.

Vi ønsker å oppnå kunnskap om gevinstrealisering i forbindelse med implementering av ett skybasert ERP-system i norske produksjonsbedrifter. Formålet er å utforske hvilke operasjonelle utfordringer bedriftene har og mulige operasjonelle gevinster som kan hentes fra skybasert ERP system. Utover dette vil det bli undersøkt hvordan de inkluderer gevinstrealisering som en del av før- og etter-implementeringen, og hvordan de kan håndtere realisering av fordelene.

Forskningsspørsmålene vi vil undersøke i oppgaven er følgende:

- Hvilke operasjonelle utfordringer finnes i produksjonsprosessen?
- Hvilke operasjonelle gevinster og utfordringer kan identifiseres i produksjonsprosessen ved å bruke et skybasert ERP-system?
- Hvordan kan brukere inkludere og håndtere prosessen med gevinstrealisering?

Hvem er ansvarlig for forskningsprosjektet?
Høgskolen i Molde er ansvarlig for prosjektet.

Ekstern oppdragsgiver er Hatteland AS. Hatteland AS vil derimot ikke behandle eller ha tilgang til innhentet informasjon, med unntak av den endelige rapporten hvor respondentene er anonymisert.

Hvorfor får du spørsmål om å delta?
Utvalget er trukket på bakgrunn av disse kriteriene:

- Produksjonsbedrifter som har implementert eller er i prosessen med å implementere RamBase

Videre ble utvalget trukket i samarbeid mellom Anette Øvrelid Myhre og Kristina Aalvik og Hatteland AS.

Anette Øvrelid Myhre og Kristina Aalvik vil sende ut en e-post til aktuelle informanter om ønsket deltagelse, hvor all nødvendig informasjon er vedlagt.

Hva innebærer det for deg å delta?
Hvis du velger å delta i prosjektet, innebærer det at du enten

- fyller ut et elektronisk spørreskjema. Spørreundersøkelsen består av 27 spørsmål, og det vil ta deg ca. 10 minutter å gjennomføre den. Spørreskjemaet inneholder spørsmål om din bedrift, deres ERP-implementering og prosessen med gevinstrealisering. Dine svar fra spørreskjemaet blir registrert elektronisk.

- eller stiller til ett intervju. Intervjuet vil omhandle spørsmål knyttet til forskningens formål og vil ta maksimum opptil en time å gjennomføre.

Eventuelle muligheter for oppfølgingsspørsmål vil avklares i intervjuet.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

- Studentene Anette Øvrelid Myhre og Kristina Aalvik vil ha tilgang til innsamlet data.
- Veileder Bjørn Jæger ved Høgskolen i Molde vil ha tilgang til innsamlet data.
- Innsamlet personopplysninger vil anonymiseres i selve oppgaven.

Vi benytter Nettskjema til spørreundersøkelse, samt Nettskjema diktafon til opptak dersom informanten samtykker til dette. Opptakene lagres forsvarlig, transkriberes og slettes etter endt forskning.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes innen 02.06.2020. Etter prosjektslutt vil opptakene bli slettet, og svarene anonymiseres ved bruk i prosjektet.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Høgskolen i Molde har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
Høgskolen i Molde ved

Anette Øvrelid Myhre
anette.oe.myhre@gmail.com

Kristina Aalvik
aalvik96@gmail.com

Bjørn Jæger
bjorn.Jager@himolde.no

Høgskolen i Molde personvernombud: personvernombud@himolde.no

NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17

Med vennlig hilsen

Bjørn Jæger
Prosjektansvarlig
(Veileder)

Anette Øvrelid Myhre & Kristina Aalvik
Studenter

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Gevinstrealisering hos ett skybasert ERP system: Et perspektiv for små og mellomstore produksjonsbedrifter», og har fått anledning til å stille spørsmål. Jeg samtykker til:

- ☐ å delta til intervju
- ☐ å delta på spørreundersøkelse

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. 02.06.2020.

(Signert av prosjektdeltaker, dato)