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# **Understanding the factors that contribute to ERP project success**

A qualitative case study of TietoEVERY, Trondheim

Master's thesis in Project Management

Supervisor: Ola Edvin Vie

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## Abstract

Enterprise Resource Planning (ERP) systems are highly functional integrated solutions for modern organizations. Along with popularity, these systems have also gained some obscurity and some bad reputation. To mitigate this, academic researchers have focused on identifying various success factors for ERP implementation projects. Although these theories tend to apply these factors equally in all ERP projects, this research shows that success factors might not be generalizable in all cases. Hence this research aims to identify the success factors that are applicable to all ERP projects and understand their significance with respect to ERP project success.

A theoretical framework is developed that includes organizational, technical and methodological factors that are relevant success factors described in the literature.

This thesis aims to answer the following research question:

*How to ensure the successful delivery of ERP projects through different success factors?*

A qualitative research study is performed on an ERP consulting firm- TietoEVERY, which is located in Trondheim, Norway. While conducting the research study, this particular firm was discovered as a small to medium although it is an international organization. One of their implemented projects was also chosen for deeper insights on the success factors. Semi-structured interview was conducted with four project team members and an email-based interview with the customer. Findings from these interviews, were then used to compare the theoretical propositions framed with respect to the organizational and technical factors, and methodological factors.

The research findings indicate that not all success factors can equally contribute to ERP project success. The success factors can be influenced by factors like organizational size, structure, project size, customer requirement and business, and might not necessarily contribute to success in all ERP projects. This research also reveals the important roles and activities that can be applied to ERP projects.



## Preface

This thesis has been carried out on behalf of the Department of Industrial Economics and Technology Management, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. This Master thesis is written in connection with the Master's degree program in Project Management.

I would like to extend my gratitude to my supervisor Associate Professor Ole Edvin Vie for giving me an opportunity to work under him and helping me with my former research ideas. I would also like to acknowledge the guidance, supervision, and encouragement I have received from my co-supervisor, Parinaz Farid. Her help, knowledge and expertise has guided me through every step of the process and has been highly appreciated.

I would like to extend my appreciation to Mr. Vidar Nergaard from TietoEVERY for providing me an opportunity to collaborate on my Master thesis. I also acknowledge the cooperation of all the interviewees who participated in my research, as it would have been impossible to achieve the results of this study without their valuable inputs.

Lastly, I would like to thank my family and friends for all the love and support especially during the difficult times. Without all of you, the process would not have been easier.

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## List of Abbreviation

BPR	=	Business Process Reengineering
CIO	=	Chief Information Officer
CSF	=	Critical Success Factor
ERP	=	Enterprise Resource Planning
IS	=	Information Science
IT	=	Information Technology
MIS	=	Management Information Systems
NSD	=	Norsk Senter for ForskningsData
PMBOK	=	Project Management Body of Knowledge
PMM	=	Project Management Methodology



# 1 Chapter- Introduction

In 1960s, the former version of Enterprise Resource Planning (ERP) systems called Manufacturing Requirements Planning, MRP was designed and mainly used for organizational tool for scheduling in the manufacturing industries. It was used for handling the orders and scheduling demand inventories (Klaus, Rosemann, & Gable, 2000). After the ERP system was coined in the mid 1990s, the use of this tool spread beyond internal use and included customers and suppliers (Babaei, Gholami, & Altafi, 2015). These systems were soon used to organize and outline business processes.

In past years, ERP systems have gained popularity in organizations and as a topic to research in the academic literature. These systems are integrated with ERP software that is capable of providing different functionalities to the organization. It is important to consider the organization's business model and business process before introducing such technological change. Nowadays the ERP system has become a vital product with various options for operation like web based and cloud based solutions (Asprion, Schneider, & Grimberg, 2018).

Despite its popularity the ERP systems has also some gained bad reputations. There are cases were the systems failed to achieve the required functionalities. These systems are also expensive and time consuming to implement. Hence successful implementation of systems requires careful consideration and achievement of certain factors (Asprion et al., 2018).

Furthermore, ERP solutions are characterised as complex and vast solutions. Organizations can sometimes confuse ERP systems as software installation and thereby faces many challenges. Depending on how ERP is implemented, it can be a competitive advantage or a corporate problem. Along with high implementation cost and technology risks, there are other challenges like functionality limitation, data migration, change management and data security. Some of the post implementation issues organizations face are mis match of culture, team formation, top management approach and fear of losing jobs (Faisal Mahmood and Abdul Zahid Khan). Considerable attention has been given in the academic literature to prevent these challenges. There are numerous factors that can prevent these failures and assure successful implementation of ERP. However, these factors are generally applied to all ERP projects. In

this thesis, I will perform a qualitative study to understand the relevance of these key factors with respect ERP project success.

It is worth mentioning that most the studies on success factors of ERP systems have been quantitative, without considering the human and external settings that can have a moderating influence on project success.

In order to understand the relevant factors for all ERP projects' success, I underline the success factors in the theory and verify these factors in an organizational setting through a case study. In addition to that, I take the stance that the success factor model is applicable in all organizations, despite their size and structure. I have elaborated 'project management' as a factor in the thesis, which is also generalized in the literature. There are two methodological factors that I will attempt to be verify with respect to ERP project success in this case (see section 2.3).

## 1.1 Research question and approach

Based on this discussion, I have framed a research question that will verify the success factors in the theory and understand if these factors are applicable in all ERP projects.

I investigate the most important success factors listed in the literature and the methodological factors associated with successful implementation of ERP projects. The factors identified from the theory are then compared to the empirical data from the case company

RQ: How to ensure the successful delivery of ERP projects through different success factors?

As mentioned earlier, considering that there is a lack of qualitative research on ERP project success, I intend to fill the gap by contributing the relevant factors for successful delivery of ERP projects based on performing a qualitative study in an organizational setting. A qualitative research design is selected for this study as it enables to investigate further project characteristics in a consulting environment. Furthermore, I conduct the case study in an ERP consulting firm- TietoEVERY Trondheim and retrieve insights from an ERP project. All employees' perspectives including the customer of the project are captured during the data analysis. A deductive approach is followed in order to develop necessary conclusion on theory from the empirical data.

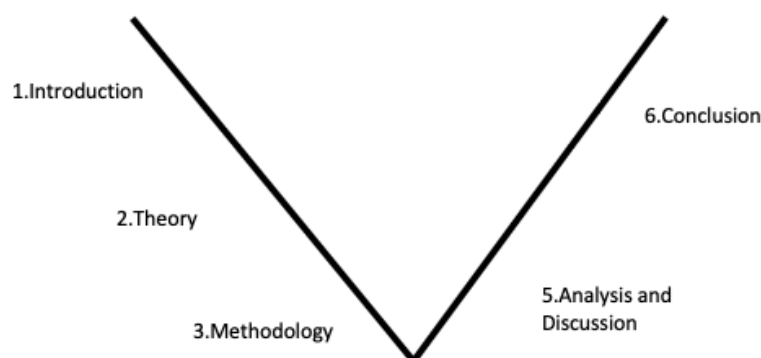
## 1.2 Research importance

Besides the lack of qualitative research on successful ERP project delivery, the study will help the project manager to evaluate the factors relevant in their projects. Project managers spend significant time in enhancing the success of ERP implementation. So, the results of this study can serve as a guide for consultants and project manager to focus on the relevant factors for successful execution of ERP projects.

In addition, the project management factors considered in this study will also help the consultants to consider these factors' importance in their project and evaluate their impact to project success.

## 1.3 Thesis Structure

This report is structured while considering readers to be academicians or practitioners. This research approach makes it suitable for academic purposes and for highlighting the important factors for ERP project success. Figure below illustrate the structure of the thesis that I have followed in order to answer the research question. Following the figure, I have also outlined a brief description on the structure of this thesis.



*Figure 1 Structure of the thesis*



The structure below outlines the contents of this thesis:

- ❖ Chapter1: Introduction: The introduction contains background about ERP projects. Followed by a problem description with the research question, and the research approach for this thesis. At the end of the chapter, importance of this research and the thesis structure is presented.
- ❖ Chapter 2: Theoretical background: This section presents the theory and concepts of ERP implementation. Followed by a description of the organizational and technical factors through the success factor model and project management aspects of ERP projects.
- ❖ Chapter 3: Methodology: Presents the workflow used in this report. Explains the nature and approach used for the research and data collection. The method of choosing appropriate tools for the analysis and quality assurance of data are then discussed. Subsequently the overall process and my personal reflections are described in the end of this chapter.
- ❖ Chapter 4: Empirical Data: Presents the empirical findings from the data collected through the semi structured interviews.
- ❖ Chapter 5: Analysis and Discussion: This section analyses the collected data from the previous section and reference it with the theory from Chapter 2. The aim is to connect theory and results in the effort to understand the relevance of each factor all perspectives.
- ❖ Chapter 6: Conclusion: Summarizes the results found in the study and evaluates the lessons learnt. Limitations and Further research with respect to this thesis are also presented in this chapter.

## 2 Chapter - Theoretical background

The theoretical background has three main sections- 1) introducing the concepts relevant to ERP systems 2) describing organizational and technical factors for ERP projects 3) describing methodological factors relevant for ERP projects. This chapter begins by introducing the Enterprise Resource Planning (ERP) systems and project activities. Following that, organizational and technical factors are described based on the literature review performed on success factors for ERP implementation. Furthermore, two methodological factors relevant for ERP projects are also described. At the end of this chapter, theoretical background along with the list of all propositions are outlined.

### 2.1 What is an Enterprise Resource Planning System

An enterprise resource planning system can be defined as “ *a fully integrated business management system covering different functional areas of an organization such as logistics, production, finance, accounting and human resources*” (Babaei et al., 2015). Most of the organizations are trying to digitally transformation, implement ERP systems as the initial step towards digitalization. ERP system is the core of organizations with shared databased which provides information across each business area (C. Costa, E. Ferreira, F. Bento, & M. Aparicio, 2016). These systems are user-interfaced and developed to retrieve information to aid strategy, operations, management and decision-making processes in organizations. So, the users of these systems range from top management to low level employees (Matende & Ogao, 2013).

According to Matende and Ogao (2013) ERP systems are one of the most innovative developments in IT. The benefits of these ERP systems range from information sharing, better decision making and planning, faster responses to customer queries and better coordination within the organization increasing the efficiency of the workplace. Babaei et al. (2015) emphasized two major benefits of ERP (1) a unified enterprise view of the business that encompasses all functions and departments; and (2) an enterprise database where all business transactions are entered, recorded, processed, monitored, and reported. With better communication and responses within the organization, these systems can increase cooperation and productivity.

Implementation of an ERP system can be an expensive task and often involves risk. Academic literature often highlighted the high costs associated with such a venture in an organization. According to Babaei et al. (2015), not all ERP systems are successfully implemented, despite the different benefits it can achieve. Challenges of these systems include delays and cost overruns. These systems also bring massive changes to organizations and also increases complexity (Ehie & Madsen, 2005). These challenges have led to major focus in the academic literature, trying to find the success and failure rates of ERP systems.

Successful ERP implementation has been highly discussed in academic literature. C. J. Costa, E. Ferreira, F. Bento, and M. Aparicio (2016) performs literature review and highlights research areas in implementing ERP systems. The result of his study shows that the main focus of these literature has been on ERP software, ERP implementation, ERP supply chain. Due to the complexity and failure rates of ERP projects, considerable amount of focus has been given on the implementation success. Different success criteria have been discussed with respect to ERP project success. According to C. J. Costa et al. (2016), top management support and user satisfaction, and training are considered as the most important activities for ERP project implementation. However, the success factors for each phase might differ in projects (Hussein, 2018). So, in the following section, I will describe the ERP project lifecycle and project activities.

### 2.1.1 Project Lifecycle and Activities in ERP implementation

The most accepted project life cycle model for a typical project has four phases- conceptualization, planning, execution and termination (Jeffrey K Pinto, 2000). An ERP project can have about project five phases : initiation, design, building, test & integration and release, which is similar to the lifecycle model depicted by Jagroep, van de Weerd, Brinkkemper, and Dobbe (2014). A similar model was proposed by AboAbdo, Aldhoiena, and Al-Amrib (2019) with lifecycles- 1) planning 2) implementation 3) stabilization 4)enhancement. The author emphasizes that several life cycle models have been proposed, based on the activities that take place in the project. On one hand, lifecycle models framed by authors M Lynne Markus and Tanis (2000) focus on each activities from the start till the execution, on the other hand some models proposed focus on post implementation activities (AboAbdo et al., 2019).



*Figure 2 Project lifecycle*

In this model, the last stage enhancement can have subphases like backlog, new module, and major upgrade. Motiwalla and Thompson (2012) pointed out that these subphases are unique with regards to the post implementation periods and their activities.

As discussed in the previous section, implementation phase has been the focus in ERP development. Different authors have framed different project lifecycle models for ERP development projects. Table 1 below, is a modified table adopted from Somers and Nelson (2004) that highlights the different classification of stages of ERP projects according to different.

For this thesis, the lifecycle model chosen is the most frequently used in literature on technology driven and ERP projects (AboAbdo et al., 2019; Wang, Shih, Jiang, & Klein, 2008) and is shown in Figure 2 above. This lifecycle model is suggested in Project Management Body Of Knowledge (see 2.3.1). Hence this model can be considered suitable for this study as the case company utilized PMBOK methodology for the case project, which is used for the data analysis in Chapter 5.

*Table 1 Different ERP implementation stages in Literature*

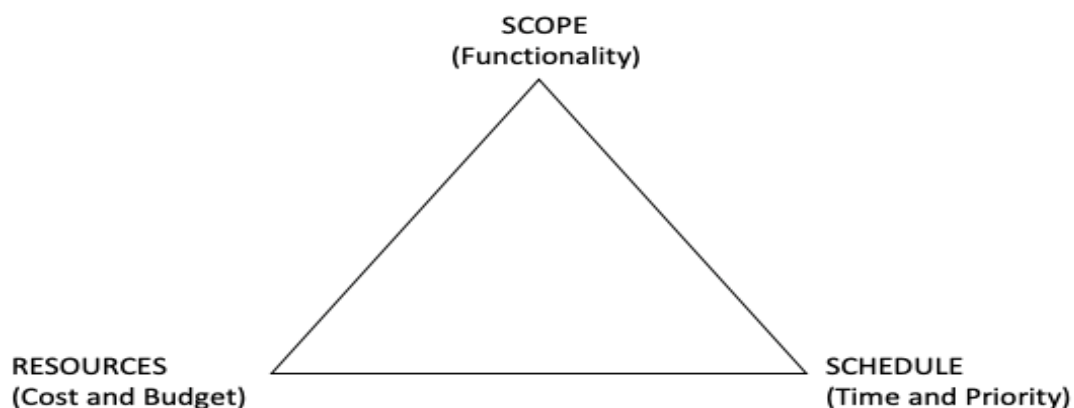
<b>Authors</b>	<b>ERP imp stages</b>
M. Lynne Markus, Axline, Petrie, and Tanis (2000)	(1) Project chartering, (2) The project, (3) Shakedown, (4) Onward and upward
Shanks (2000)	(1) Planning, (2) Project: a) setup, b) reengineer, c) design, d) configuration and testing, e) installation (3) Enhancement
Kuruppuarachchi Palitha, Mandal, and Smith (2002)	(1) Initiation, (2) Requirement definition, (3) Acquisition/development, (4) Implementation, and (5) Termination
Rajamanickam (2005)	1) Initiation, 2) acceptance, 3) routinization, and 4) infusion

To remind, the significance of project phases in this study is that it gives a better understanding of the project activities in the section 2.2. As mentioned earlier the project lifecycle model followed in this study is shown in the figure above. The following section will highlight the most discussed project activities in ERP.

Somers and Nelson (2004) study on complex ERP projects, found the key activities based on the key players of ERP projects. The author considers user training and education as a key activity throughout acceptance and also latter stages. Management of user expectation is important for a successful implementation of a project. Somers and Nelson (2004) lists this activity as the second important factor in ERP projects. A highly contributing ERP system which did not meet user expectation are often considered to be unsuccessful. Overall success can also be greater with the effort in choosing the ERP package(AboAbdo et al., 2019). This key activity decides the time, budget and scope for the overall project (Figure 1). This model indicates that successful ERP implementation is characterized with less customization as it leads to increased IS costs and upgrades. Additionally, data analysis and conversion, the next key activity, and a requirement for an effective ERP system. Data issues must be handled throughout the lifecycle of the project. For better organizational performance, business process

reengineering activity is also critical while implementing ERP systems (AboAbdo et al., 2019). Lastly, dealing with organizational changes becomes vital while implementing ERP systems. Introduction of ERP systems can cause confusion, resistance and redundancies in the organization if the change management is not addressed effectively (Tam, Moura, Oliveira, & Varajão, 2020). Hence these are the critical activities for ERP system implementation. These actors are further discussed in the following sections along with other relevant success factors (see 2.2).

To summarize this section, an ERP can adopt different frameworks for stages. According to PMBOK framework, a typical project consists of mainly involves four stages- conceptualization, planning, execution and termination. Different frameworks can be applied to ERP projects as it depends on the activities that are in focus for the outcome of the project. For this thesis work, I have adopted the most frequent model used in ERP software projects that include 4 stages- 1) planning 2) implementation 3) stabilization 4) enhancement. To remind, the last phase can also include subphases like defining- backlog, new module, and upgrade.



*Figure 3 Iron Triangle*

### 2.1.2 ERP project success

Before describing ERP project success, I will look into the general definition of project success. According to Atkinson (1999), a project is said to be successful if it meets time and budget goals. In contrast Hussein (2018, p. 50) considers meeting time, cost and scope to be project management success. Author defines project success as “*an expression of the value of the project when the result or product is put into operation*”. This indicates that project success

intends to see the effectiveness of the project rather than the efficiency. According to Serrador and Turner (2015), project efficiency implies meeting time and budget goals. The author defines project success in terms of project efficiency and stakeholder success. Müller and Turner (2007) have also listed different dimensions required to understand project success.

While all these authors are measuring the project success against the time cost and scope as in the Figure 3 above, meeting cost, time and scope goals are considered as project efficiency rather than project success (Serrador & Pinto, 2015).

For an ERP project to be successful, organizations will not only have to consider the project efficiency but also other factors. M. Lynne Markus et al. (2000) highlighted that each stages of ERP projects should include factors like operational metrics, project metrics and focus on reducing the time frames in order to reduce the cost. Wang and Chen (2006) argues that the project success is also impacted by the project governance factors like reputation and trust. There are several issues discussed in literature with respect to ERP projects implementation. Sumner (2000) identifies that the ERP systems can sometimes be a misfit when introduced to a new organization. The author suggests that in order to have a successful ERP projects, organization will have to re-engineer their existing process to make a fit with the existing structure. Hence satisfying cost, time and budget is not enough in order to under how to successfully deliver ERP projects.

Soja (2006) indicated that there are many factors and conditions that are part of ERP implementation which either helps the projects in success or cause problems during the implementation. Al-Mashari, Al-Mudimigh, and Zairi (2003) have identified that understanding the success factors in ERP implementation, helps to understand how the project can be successfully delivered. Following Soja's (2006) study on success factors in terms of ERP implementation success, the result clearly highlighted that the key factors positively influence the project outcomes of ERP. Therefore, I will be using the success factor model to gather the factors that can help to deliver ERP project successfully.

There are different classicisation among critical success factors (see section 2.2). Most of the factors discussed are usually with respect to the organization itself. Maxie Burns, Turnipseed, and Riggs Walter (1991) classifies the factors into methodological factors and environmental factors. The authors defined that methodological factors are associated with the approach of the implementation. I found that most of the theories have not highlighted much on the

methodological factors, instead discussed project management in brief as one factor. Since Maxie Burns et al. (1991) study showed significant relevance of these factor on project success, I will be looking into methodological factors along with other organizational and technical factor. The section below will be discussing the first aspect of finding the relevant success factor and their contribution in ERP project success. Following that, in section 2.3, I will be discussing the methodological factors relevant to ERP project success.

## 2.2 Organizational and Technical Factors

This section aims to identify key organizational and technical factors in ERP project. The organizational and technical factors are evaluated based on success factors in this section. There are different terminologies used in the literature like ‘key success factors’, ‘critical factors’, ‘success factors’, ‘critical success factors though the definition and meaning of these terms are the same in the literature. The reason for adopting success factor or CSF model in this thesis is because these factors are defined in limited areas and meeting their objectives will guarantee success for the project (Françoise, Bourgault, & Pellerin, 2009).

An ERP project is said to be 20 percent technology 80 percent people processes and organization (Guinan, Parise, & Langowitz, 2019). These projects, as discussed earlier, has huge cost involved and scope. Françoise et al. (2009) pointed out the gap between the initial objectives and results that occurs in ERP projects. The author identifies the reason for this gap is the expertise required by the project managers which includes both technical; human and organizational knowledge. Hence these success criteria are important when it comes to ERP project, along with technology and expertise. As discussed earlier, ERP project can be complex. Based on the scope of the project, the success factors can vary and are subjected to change from one project to another.

Additionally, there has been different classification of success factors. Some of the classifications are 1) in-project vs project environment, 2) project management or implementation vs process vs project, 3) based on project characteristics, 4) Strategic-Global-Organizational-End User-Tactical-National-Technological Management. Hussein (2018) has three categories of classification- case specific, cultural and structural factors. In this chapter, I have categorised the factors as organizational and technical factors; and methodological factors. However, based on the themes received after data analysis and coding (in Chapter 4)



this category is revised to- People vs Project activities related (Non-people) factors, which is a similar categorization followed by Wang et al. (2008)

There has been plenty of research identifying the success factors and project success related to ERP implementation. Soja (2006) has performed a literature review on success factors for ERP system where all the factors were verified, and a general model was created. Nah and Delgado (2006) formulated a similar model of 11 success factors based on a survey of 54 CIOs who implemented ERP. His study found the most important success factors as top management support, project champion, ERP teamwork and composition, project management, and change management program and culture. Somers and Nelson (2004) have broad list of 22 success factors for ERP implementation and found that most important factors are top management support; project team competence; interdepartmental cooperation; clear goals and objectives; project management; and interdepartmental communication. Similarly Al-Mashari et al. (2003) also presented 12 success factors where emphasis was given on clear vision, business process management and performance monitoring that leads to project success. Françoise et al. (2009) study on ERP implementation success lists 13 factors which covered various areas of expertise. The factors ranged from processes to organization and technological.

### 2.2.1 The 12 critical success factors

The factors in each study varies from one another. These studies also follow different categorisation of success factors. I have considered the results of the literature mentioned above and listed the most discussed success factors (Al-Mashari et al., 2003; Françoise et al., 2009; Nah & Delgado, 2006; Soja, 2006). These factors include broad areas like organizational, technological factors and seems to be more established in literature. Table 2 below, highlights the factors that I will be look into, in this thesis. To remind, the order of these factors is based on their significance and relevance in the project lifecycle.

Table 2 List of critical success factors based on literature review

Factors	
1.	Project teamwork and composition
2.	Organizational culture and change management
3.	Top management support
4.	Clear goals and objectives
5.	Business process reengineering and customization
6.	Effective Communication
7.	Software development, testing and troubleshooting
8.	Monitoring and evaluation of performance
9.	Project champion and leadership
10.	Vendor support
11.	End user involvement
12.	Knowledge management and training

### Project teamwork and composition

Nowadays, organizations are focusing to bring diversity in the project teams to increase productivity. Teamwork and composition are the most important aspect of project activities. This factor is considered as the “*amount of knowledge and understanding the various team members have with respect to the ERP system as well as the business operation process*” (Nah & Delgado, 2006). AboAbdo et al. (2019) found team composition to be the most significant factor for ERP project success. Based on the nature of ERP projects, a multidisciplinary team is often required. It is common to have both technical and business competent team members in the project team (Ngai, Law, & Wat, 2008). However, a good team is incomplete without an efficient leader, most of the literature also discusses about the team support by the manager (Wang et al., 2008). Ngai et al. (2008) discusses the sub factors which includes availability of project members and managing project members. Since this success factor is most discussed and generally important in terms of ERP project, I state that better teamwork leads to better project.

*Proposition F1. Project teamwork and composition can contribute to ERP project success.*

## Organizational culture and change management

Digitalization initiatives are known to bring changes in the organization. Change management have been receiving considerable attention in the academic literature. ERP implementation brings change in the way of working and is subjected to reluctance by the end users. Hence change management practices becomes crucial to deal with ERP projects (Françoise et al., 2009). Existing culture in the organization is also affected by the ERP implementation. Kumar, Maheshwari, and Kumar (2003) highlights the need of integrating change in the business practices with appropriate training of end users to accept change as a part of the organization. This helps in acceptance and readiness of the new system. Human factors and culture are important if the ERP systems have to implemented successfully (Ram, Corkindale, & Wu, 2013). Hence the change and organizational culture have to considered for the ERP system to be successful.

*Proposition F2. Organizational culture and change management helps in attaining ERP project success.*

## Top management support

One of the most discussed and important success factors is top management support. Prior to any implementation of ERP, there is a need of support and approval from the top management (Ngai et al., 2008). Along with approval, top management allocates resources, monitors progress and provide direction during the implementation of the project (Nah & Delgado, 2006). Ngai et al. (2008) and Françoise et al. (2009) highlights the role of top management in conflict resolution. Senior executives are responsible for resolving conflicts as ERP projects are known to affect many stakeholders. This ensures smooth execution of projects. So, the proposition can be stated as:

*Proposition F3. Top management support helps in attaining ERP project success.*

## Clear goals and objectives

Implementation of ERP is bound to go beyond the time frame set for the projects. It is thus important to set clear goals and vision. Vision which is set at the beginning of the project should clearly describe how the organization and the new system will relate to each other (Nah & Delgado, 2006). These goals and vision set for the project should be understood and shared

among all the project members involved. This helps in reducing the project lag (Françoise et al., 2009). A business plan with a vision helps in understanding the strategic benefits, identifying risks, resources and cost involved in the project (Ngai et al., 2008). The author also suggests setting the goals for the project before the top management is set for the project. So, the proposition can be stated as:

*Proposition F4. Setting Clear goals and objectives can contribute to ERP project success.*

### Business process reengineering and customization

Business process reengineering (BPR) is very specific success factor for ERP implementation. The package of the software might not be always compatible with the existing business process of the organization. Hence customizing and BPR is crucial while implementing ERP projects to achieve desired benefits (Ngai et al., 2008). According to Françoise et al. (2009), business process must be continuously reviewed throughout the BPR. The authors indicate, “*the more in-depth this review is, the better the outcome of the BPR will be*”. However, the cost and errors are bound to increase with more customization of the package. Nah and Delgado (2006) highlights that organizations and BPR package must mutually fit in order to achieve successful implementation. Hence, both BPR and customization makes the ERP system suitable to the applied organization. Theory also indicates that the customization should be not be widely performed for ERP systems as this can cause delay in the project (Finney & Corbett, 2007). Hence the proposition for BPR and customization be stated as:

*Proposition F5. Use of Business process reengineering and customization in ERP implementation, might lead to ERP project success.*

### Effective Communication

Need for effective communication is inevitable in ERP implementation in all levels of organization. Communication is not limited to information sharing but affects conflict resolution and definitions of roles (Kumar et al., 2003). Thus, this success factor directly or indirectly influences the above-mentioned success factors. According to Ngai et al. (2008) it also effects the acceptance of technology in an ERP project. PMBOK methodology also advices the use of communication management plan for all the team members involved in the project. Use of such charter provides details of who shares information, when and how (Françoise et al., 2009). Improved communication can also reduce conflicts and mis

understanding in the project (Finney & Corbett, 2007). Hence, there is smooth flow of information in the organization.

*Proposition F6. An effective communication in a project can help in achieving ERP project success.*

### Software development, testing and troubleshooting

As discussed in the previous section, not all software package is fully adaptive to the business process. After BPR, the software developed is tested and modified (Soja, 2006). The testing phase often involves several stages. Authors Al-Mashari et al. (2003); Finney and Corbett (2007); Françoise et al. (2009) highlights that organizations' programming talent and skills differentiate them in troubleshooting activities performed on the software, before it is implemented. These activities are not easy tasks and organizations requires consultants to perform them (Al-Mashari et al., 2003). Kim, Lee, and Gosain (2005) highlights software testing is key factor to avoid failure of ERP implementation.

*Proposition F7. Implementation of software development testing and troubleshooting can contribute to ERP project success.*

### Monitoring and evaluation of performance

Many IT systems considers this as a critical success factor during the final phase. As Françoise et al. (2009) indicated “*It is necessary to monitor and evaluate project performance since anything that cannot be measured cannot be managed*”. According to Soja (2006) goals and objectives are better achieved with monitoring and evaluation of ERP systems. The entire team members are expected to participate in this activity right from the management to the champion and each of these groups' expectation should be converted to deliverables (Françoise et al., 2009). This will reduce any misinterpretation in the ERP project.

*Proposition F8. Monitoring and evaluation of performance after implementing a system might lead to successful delivery of ERP project.*

### Project champion and leadership

Like all IS projects, project champion plays an important role in ERP projects and also in change management that is caused by the ERP projects. According to Ngai et al. (2008) a

project champion in an ERP project should be someone who is a higher-level executive in the organization who can champion the entire ERP project. A typical project champion creates motivation and enthusiasm among the team members to achieve the project goals (Françoise et al., 2009). Additionally, Wang et al. (2008) adds that project champion who not be just a leader who achieves goal but also one who understands the team's problems. Individual skills should highly possess leadership skills. Further, leadership in organization leads to smooth running of management (Finney & Corbett, 2007).

Finally, the project champion also involves in activities like follow up and monitions of the progress and executing the entire implementation (Françoise et al., 2009) to make sure that there is no complications or complexity in the project. A project champion with necessary leadership skills is thus essential for a successful ERP project.

*Proposition F9. Use of Leadership through a project champion in ERP projects can contribute to project success.*

#### Vendor support

Choosing the right vendor becomes crucial when it comes to ERP implementation as there are plenty of ERP vendors in the market (Ngai et al., 2008). The author emphasizes that choosing the right vendor can aid in getting support for technical issues, training and also use of right customising tools which in turn can help in reducing the implementation cost. Since ERP involves module installed and upgradation to increase the fit with business, Somers and Nelson (2004) indicated there is a need of long-time support required from vendors. Finney and Corbett (2007) that the support of vendors can lead to more flow of business data and information. They are required for technical assistance and services during the project. Françoise et al. (2009) indicated the vendor support as a 'vendor-user relationship' which is critical and strategic to enhance the efficiency and competitiveness of organization.

*Proposition F10. Having a vendor support in a project can increase the chances of successful project delivery.*

#### End user involvement

End user involvement is also an important factor in ERP implementation. It is defined as a state where there is good participation from the target group or users (Finney & Corbett, 2007). The main reason that the theory pointed out this success factor is because the user expectations are met if they are involved earlier in the project (Françoise et al., 2009). With better user satisfaction comes higher chances of project success (Soja, 2006). For a large system like ERP,

user input is necessary. Nah and Delgado (2006) considers that user involvement in every stage of an ERP project can lead to successful implementation. Author highlights users of all departments must be equally involved during the implementation. Many authors have highlighted this and points out that if there are more users' involvement, there is less chance of resistance to the system (Françoise et al., 2009; Somers & Nelson, 2004). In addition to that, better psychological acceptance of the new technology can lead to information on the system and preparedness for change. Due to these reasons a lack of user support may still hinder successful ERP implementation as indicated by Wang et al. (2008).

*Proposition F11. User involvement in project activities helps in attaining ERP project success.*

### Knowledge management and training

An implementation of ERP systems is incomplete without adequate knowledge sharing and training. Françoise et al. (2009) suggests that training and knowledge sharing among the employees and end users is crucial for project success and must be implied to all organizations as a process. The author also highlights that it is important to make sure the information is shared correctly to facilitate project management. However Kumar et al. (2003), found that the training and knowledge management cost during an ERP projects are considerably low. Additionally, this factor creates a common language for the non-technical individuals in the projects, which can lead to better communication among vendors, consultants and the customers (Ram et al., 2013).

*Proposition F12. Knowledge management and training can contribute to ERP project success.*

To summarize, most listed 12 success factors were chosen from the literature. These factors are categorized as organizational and technical factors for ERP projects. Propositions for these factors are outlined after each discussion. The Figure 4 below shows the overview of all the factors discussed in this section. The next section focuses on the second category of success factors of this thesis.



*Figure 4 Organizational and Technical factors*

## 2.3 Methodological Factors for ERP implementation

In this section the two interesting factors related to the methodology used in ERP projects, which was found in the theory and in the discussion above- project management methodologies and role of project manager, are discussed. Different PMM are briefly discussed and their relationship between the success and other factors are identified. In the following section, I also describe the role of project manager in ERP projects and how they contribute to successful delivery of ERP projects. This section intends to frame the proposition relevant to the methodological factors of an ERP project.

Jeffrey K. Pinto and Prescott (1988) highlighted that there are few topics in project management that are often discussed but so little discussed with regards to project success. Several literature have highlighted the importance of project management and how it contributes to project success. An effective project management use can help an ERP implementation in planning, coordinating and monitoring different activities (Ngai et al.,



2008). Better project performance are expected when companies adopt effective project management.

Project management is used in project planning and cycles, and their usage extends to different methodologies, tools and various players (Finney & Corbett, 2007). Several literatures have listed project management as a success factor but lacks emphasis on these methodologies or actors. Fui-Hoon Nah, Lee-Shang Lau, & Kuang (2001) considers project management is essential for any ERP implementation. The author emphasized that an effective project management should be chosen so that, it helps in achieving project milestones and setting realistic scope for the project. Nah and Delgado (2006) indicated that the right responsibility should be assigned to the project manager due to the large parties involved in ERP projects.

Based on this discussion, I will consider two factors under the methodological aspect. Firstly, how project management methodologies play a role in ERP process success and secondly the responsibility of a project manager in ERP projects. The following section will be focusing on the project management methodologies where I find the relation of project management methodologies with respect to project success, highlight the most used project management methodologies in ERP and their relationship to project activities and factors.

### 2.3.1 Project Management Methodologies used in ERP

Many studies have been performed to identify the relationship between project management methodology and project success. Mir and Pinnington (2014); Pace (2019) indicate that the project success is likely to achieved with the right project management methodology.

Based on these literature, I found the most discussed project management methodologies in ERP projects to be the iterative project management like Agile, and traditional approaches using Prince 2 and PMBOK. A traditional project management utilizes the concept of project life cycles. The project life cycles comprise five phases which includes initiation, planning, executing, monitoring and controlling and closing. A fundamental assumption of the traditional project management approach is that systems are predictable and can be built through extensive planning (Dybå, 2000). Project activities are carried out in a sequential order, while not considering the emergent nature of the project. A project's performance is reviewed on three criteria- time, cost and scope (see Figure 3) and focusing on quality. As this approach assumes that the project information is perfect, deviation in scope, schedule and resources might not be possible. The criticisms on this approach is that it can be bureaucratic and non-adaptive (Matos

& Lopes, 2013). Every project requires different approach. According to socio-technical theory there are many optimal solutions to one problem which implies that a technical system can be efficient in multiple ways. When it comes to different Project Management Methodologies (PMM), it is important that the chosen methodology can meet the necessary requirements in order to build the project (Dybå, 2000; Matos & Lopes, 2013). The authors define methodology as a “an indispensable tool used in project management, which allow measure the progress and tasks control”. As mentioned earlier, the most commonly discussed methodologies for ERP implementation -PMBOK, Prince2, and Agile project management are discussed briefly in following subsections.

### Agile: Iterative Project Management

The traditional project management method, was the usual approach that the industries followed till the 90s. So, the teams had to lay out the requirements, plan and design the project and at the end code the software. The nature of rigidity caused uncertainty, scope changes, and misunderstanding of the customer requirement regarding the projects which in turn lead to cost overrun. The term agile is originated from the Latin word ‘agilis’ which means to do or to drive and see. According to Dybå (2000) the main idea of Agile methodology is to be organized in order to deliver faster, better and cheaper solutions during software development.

Agile methodology is all about handling the uncertainty and complexity on a project. Unlike the traditional methodologies, this approach has short time frame between planning and execution (Goncalves, Heda, & Goncalves, 2010). Agile methods eliminate all the activities that do not create any value to the project with minimum set of rules. Agile projects accepts and adapts to changes through self-discipline and self-management (Cohn, 2004). Hence creativity and learning are very important part of an agile environment.

Furthermore, there are different applicability for this methodology in ERP projects. Even though use of Agile in ERP is not often discussed in literature, few authors have highlighted its strength and weakness while implementation. Isetta and Sampietro (2018) identified that this method can be applied in different project activities effectively. He highlighted the strengths of adopting these methodologies as better scheduling, risk reduction, better trust, and flexibility. Tam et al. (2020) identifies people factor criteria for an agile ERP to be successful which includes team capability, customer involvement, culture, training and personal characteristics. Serrador and Turner (2015) points out that agile methodology also influences project outcomes leading to overall success.

To summarize, agile works on the underlying foundation of its principles. This methodology takes a generative approach with the usage of only required tools, process and activities in the project. Agile emphasizes on the usage of different solutions for different situations (Fernandez 2008). Unlike the traditional project management with well-defined activities, agile method comprises short iterative cycles. Agile project management relies more on people and creativity to overcome a project complexity rather than on standard processes approach drifts the focus from planning to execution. Hence there is no command and control structure like traditional approach, but rather focuses on self-management, shared decision making thus dealing uncertainty and complexity.

## Prince 2

Projects in Controlled Environments or Prince 2 originated in 1989 found by Central Computer and Telecommunications Agency (Matos & Lopes, 2013). This method is found to be more flexible and is used in different types of projects. This method was developed by experienced project managers based on different context (Bentley, 2010). The highlight of this approach is that the techniques required and management are clearly differentiated. Matos and Lopes (2013) highlights the features of this method as the focus on the business and structure of the organization directed towards the team. Prince 2 is steered based on the business case which is continuously reviewed and compared against the objectives over the project lifecycle. According to Bentley (2010) this method provides

- ◆ *Controlled management of change by the business in terms of its investment and return on investment;*
- ◆ *Active involvement of the users of the final product throughout its development to ensure the business product will meet the functional, environmental, service and management requirements of the users;*
- ◆ *More efficient control of development resources.*

Use of Prince 2 in projects can provide a common language and gives the control to work with a conceptual framework. However, this methodology has not received much attention when compared to other PMM in ERP related literature. The methodology was applied for Risk assessment and management in ERP projects (Zhang & Fan, 2014). Risk Management is a difficult task in ERP projects however risk management framework can be applicable to ERP projects based on Prince2 methodology.

## PMBOK

This section will discuss the PMBOK framework and its usage in ERP implementation. To remind, the project in the case study uses PMBOK for project management methodology. Describing this methodology can help in better understanding of the usage of this methodology and guide me further in the analysis part of this thesis. I have also listed the relationship between this framework and the success factors of ERP projects, at the end of this section.

Project Management Institute (PMI) created set of principles and knowledge on project management, which is termed as Project Management Body of Knowledge. PMBOK focuses on nine knowledge areas which are divided into 5 processes over the project lifecycle which are good practises for project managers (Ruhe & Wohlin, 2014). These 5 processes are- initiating, planning, executing, monitoring and controlling and closing. As mentioned in section 2.2 these processes or, lifecycle can sometimes overlap and different in various organizational setting.

PMBOK are based on methods and processes focusing on balancing scope, time, quality, resource and risk for project success (Ruhe & Wohlin, 2014). In addition, there are 42 management process which defines the activities throughout stages of a project lifecycle. They include techniques and tools in the 9 areas- project integration management, project scope management, project time Management, project cost management, project quality management, project human resource management, project communication management, project risk management and project procurement management.

Nasir, Sahibuddin, Ahmad, and Fauzi (2015) also suggested the correlation between PMBOK and success factors. As discussed in the previous section, project teamwork and composition are important for performing any activities in a project. The focus on the team commitment is highlighted in the Project Managers interpersonal skills under Human resource management knowledge area. Referring to findings of Nasir et al. (2015), the team interaction has been highlighted in developing project team section in PMBOK. Authors findings states that the team's productivity is increased through a good teamwork and interaction which in turn increases the project success.

To summarize, project management methodology is said to help projects in deriving successful outcomes and project performance. Three methodologies were most discussed in literature with respect to ERP projects- Agile, Prince 2 and PMBOK framework. Agile methodology helps in dealing with risk, more flexibility and trust due to collaboration, Prince 2 mainly aids in risk management and PMBOK aids in better project scope, time and schedule and better cycles for ERP projects. In the end of the section, relationship of PMBOK with respect to success factors are highlighted. Based on this discussion, I frame the proposition for this factor as below

*Proposition M1- Use of appropriate project management methodology can help in ERP project success.*

The following section will look into the responsibility side of project management which includes the main role and competence of project manager.

### 2.3.2 Role of Project Managers

Project manager is the one who spends most of his work in implementation duties (Soja, 2006). An ERP project manager is said to have tight involvement along with team members. Theory suggests that users and managers are two key players in managerial aspect in ERP implementation. In section 2.1 above, I discussed that ERP systems not only have technical functions but also includes management functions. Hence every organization implementing it will need a project manager to take care of management functions of the projects.

Responsibility of project manager was set as an internal factor by Wang et al. (2008), where the author indicated that ERP project manager is important for the project team as he is the one who sets vision and direction for the project and also aid in bringing energy and creativity out of other team mates, so as to improve the quality of the technology solution. The competencies of manager include technical skills, business competencies and also personal skills. Kræmmergaard and Rose (2002) also highlights that these different skills are required in different stages of ERP. The authors suggest a blend of competencies are ideal for ERP projects. Françoise et al. (2009) discusses the effect of project manager in relation to the success factor found in section 2.2 above. The authors highlight that the talented project management has good understanding of system development and BPR and also are expert in user involvement and organizational change management.

Solving different management issues that ERP projects face, have also been discussed with respect to the role of project manager. Ara and Al-Mudimigh (2011), found the management issues that ERP projects face are- project size, risk management, staffing, deadlines which are not reasonable and organizational politics. Risk management was found to be addressed by Prince2 project management methodology in the earlier section 2.3.1. However, these issues are also found to be solved by a talented project manager. Ara and Abdullah point (Ara & Al-Mudimigh, 2011) out the characteristics that are important for a project manager includes flexibility, learning ability, decision making, ERP expertise, education and experience. The author indicated that by performing focused management of the project's main activities that streamline ERP project management, the chances of successful project outcome increases. In addition to this, Carton, Adam, and Sammon (2008) adds that project manager recognizes and tries to overcome difficulties in project implementation through project management knowledge of *know-how*. The author also indicates Kumar et al. (2003) findings that shows that project management knowledge of a project manager is more important criterion than experience for executing an ERP project successfully. However, Kræmmergaard and Rose (2002) found different skills to be important in different stages. Hence it is not easy to choose which competence are more important for project managers instead I find that technical, business and personal skills are all important for a project manager. Despite the discussion on the competencies, all the literature indicates that a project manager is vital and plays an important role in project success of ERP.

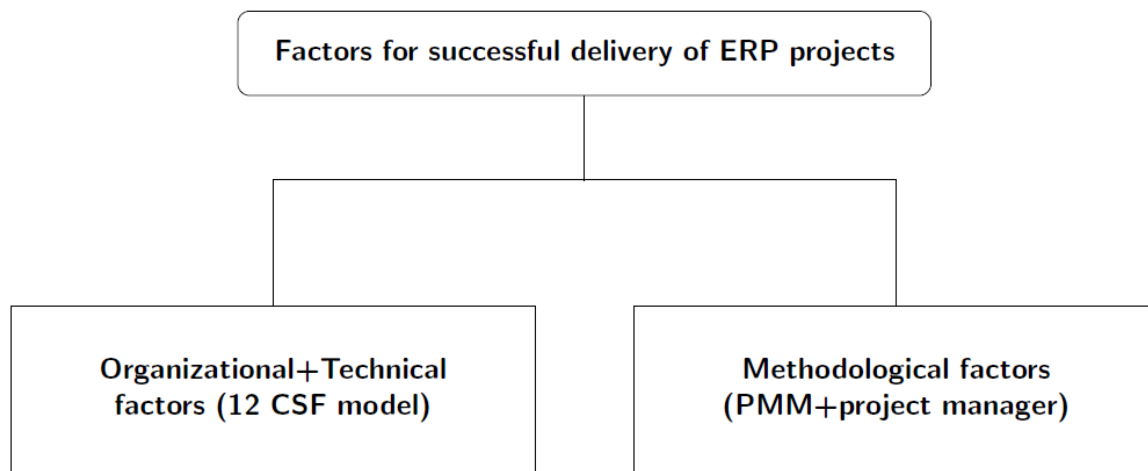
To conclude, role of project manager can be important for ERP project success. Different characteristics that includes both personal and technical, along with knowledge of project management aids in successful delivery of the project. Issues regarding risk management, staffing, deadlines which are not reasonable and organizational politics, are resolved by a talented project manager with better insights, decision, ERP expertise, education and experience. Project manager also helps in bringing creativity in the other project team members and guides them in the right direction.

Hence a competent project manager along with the personal skills mentioned above can help in successful delivery of ERP project. Thus, I formulate the proposition for this factors as below

*Proposition M2- A competent project manager can contribute to ERP project success.*

## Summary

In this chapter, Enterprise Resource Planning systems are defined along with the project lifecycle and activities. The successful delivery of ERP projects is evaluated based on organizational and technical success factors. Additionally, two interesting factors on methodology was also considered important while considering successful delivery. So, I have included- project management methodology and role of project manager to the success factors that are significant in aiding successful delivery of ERP projects. The two categories considered in this chapter are depicted in the theoretical framework, as shown in figure below.



*Figure 5 Theoretical Framework*

The theoretical framework thus involves 14 factors that contributes to project success which are formulated in my propositions listed in the Table 3 below. To rewind, these propositions are framed in order to answer the research question:

How to ensure the successful delivery of ERP projects through different success factors?

Table 3 List of Propositions

<b>ID</b>	<b>Proposition</b>
<b><i>Proposition M1</i></b>	<i>Appropriate project management methodology (PMM) helps in ERP project success.</i>
<b><i>Proposition M2</i></b>	<i>A competent project manager can contribute to ERP projects success.</i>
<b><i>Proposition F1</i></b>	<i>Project teamwork and composition contributes to ERP project success.</i>
<b><i>Proposition F2</i></b>	<i>Organisational culture and change management helps in attaining the project success.</i>
<b><i>Proposition F3</i></b>	<i>Top management support helps in attaining ERP project success.</i>
<b><i>Proposition F4</i></b>	<i>Setting clear goals and objectives can contribute to ERP project success.</i>
<b><i>Proposition F5</i></b>	<i>Use of Business process reengineering and customization in ERP implementation, might lead to ERP project success.</i>
<b><i>Proposition F6</i></b>	<i>An effective communication in a project can help in achieving ERP project success.</i>
<b><i>Proposition F7</i></b>	<i>Implementation of software development testing and troubleshooting can contribute to ERP project success.</i>
<b><i>Proposition F8</i></b>	<i>Monitoring and evaluation of performance after implementing a system might lead successful delivery of ERP project.</i>
<b><i>Proposition F9</i></b>	<i>Use of Leadership through a project champion in ERP projects can contribute to project success.</i>
<b><i>Proposition F10</i></b>	<i>Having a vendor support in a project can increase the chances of successful project delivery.</i>
<b><i>Proposition F11</i></b>	<i>User involvement in project activities helps in attaining ERP project success.</i>
<b><i>Proposition F12</i></b>	<i>Knowledge management and training can contribute to ERP project success.</i>





### 3 Chapter- Methodology

This chapter outlines the methodology that is used to carry out the research and formulate this thesis. The workflow for this thesis is inspired by the research process workflow diagrams developed by Bryman (2016). The Figure 6 below, illustrates the important steps in the methodology adopted and each step is explained further in the following subsections.



*Figure 6 Steps in the process of social research*

The main idea of this thesis is to find out the relevant success factors for an ERP projects and apply the theory and concepts to understand its relevance with respect to project success. This thesis is exploratory in nature which means that the empirical data that I'm interested to look at are the factors or attributes relevant to ERP projects. Referring to Bryman (2016) and Saunders, Lewis, and Thornhill (2016), I found that qualitative research method is best suited for my research type. This is discussed further in the following sections.

The initial sections of this chapter will be focusing on the research design and research method. In the following section the method of data collection and how the data was analysed is discussed. Bryman proposes few criteria for evaluating the quality of research data. So my research is evaluated against these criteria, in section 3.5. The last section lists all the process that was undertaken as part of this research and also some of my personal reflections.

#### 3.1 Research Design

According to Bryman (2016) “A *research design provides a framework for the collection and analysis of data*”. A research design is a logical plan or blueprint for the research study that strengthens the credibility and accuracy of the study (Yin, 2011). Bryman (2016) proposes five types of research designs- 1) Experimental, 2) Longitudinal, 3) Case study, 4) Comparative, and 5) Cross-sectional. Experimental research design is not common in social research as this type of study is based on real time experiments and results. The Longitudinal research design

involves high cost and time, where surveys are carried on in more than one occasion. This type of research design is again not common in social research. The third type of research design is case study. Bryman (2016, p. 60) defines a case study research design as ‘*an intensive and detailed analysis of single case*’. This is applicable to this thesis as I’m focusing on a single organization’s ERP implementation. To remind, I seek to answer the research question in this thesis: *How to ensure the successful delivery of ERP projects through different success factors?*

So, the research design has to be carefully chosen to obtain different possibilities of conducting the whole research. As there is no study on multiple project nor industries, the fourth type of comparative research design is also not applicable. According to Bryman (2016, p. 59), “cross-sectional design entails the collection of data on more than one case (usually quite a lot more than one) and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables (usually many more than two), which are then examined to detect patterns of association”.

Among the five-research design, case study method has been chosen based on the nature of my thesis. To verify this, I have followed Yin’s (2009) theory where he suggests that case study is appropriate when the research question seeks to explore a present circumstance. Yin (2009) has framed a table (see Table 4) that observes the relevant situation in studies in order to choose the appropriate research design. The author set three conditions - 1) the type of research question posed, 2) the extent of control an investigator has over actual behavioural events, and 3) the degree of focus on contemporary as opposed to historical events (Yin, 2009, p. 81). From the table, a case study is applicable when the form of research question is ‘how’ or ‘why’, do not require control over behavioural events and more emphasizes on contemporary events. My research study is aligned to all of these three conditions; hence case study method is appropriate in this thesis.

*Table 4 Selection of Research Method (Yin, 2009)*

Method	Type of Research question	Requires Control of Behavioural Event	Focuses on Contemporary Events
<b>Experiment</b>	how, why	yes	yes
<b>Survey</b>	Who, what, where, how many, how much	no	yes
<b>Archival Analysis</b>	Who, what, where, how many, how much	no	yes/no
<b>History</b>	how, why	no	no
<b>Case Study</b>	how, why	no	yes

My perspective in choosing the research design was also based on time, along with validity and reliability factors, to answer the research question. Since the time frame for the master's thesis is limited, the research design had to be realistic. Hence a case study on multiple organizations or projects was beyond the attainable time frame. In my thesis, I have interviewed people from one firm and focused on the firm's employees and a case project (NSF project). However, some of the people who worked in the case project are not part of the organization anymore.

Considering the data collection at a single point, it was not possible to interview all the interviewees at the same day. Based on each of the interviewee's availability, interviews were scheduled at different points but within a week's time frame, which can be considered as a single point in time, in my case.

### 3.2 Research Strategy

Bryman (2016) discusses three research strategies- 1) quantitative research 2) qualitative research and 3) Mixed method research. Quantitative research involves quantification or number in the research data (Bryman, 2016, p. 32). In addition, quantitative research requires large sample of data for analysis (Yin, 2011). Considering scope of this thesis, analysing larger sample of data is not possible for my study. Hence the former type of research is not applicable.

On the contrary qualitative research focuses on words rather than on quantification or numbers in data. This type of research strategy requires sample of data but provides in depth insights on the topic of study(Yin, 2011). Qualitative research strategy is thus chosen over the quantitative strategy, through which an in-depth insight on project delivery is obtained based on the limited data sample.

Additionally, project success is a comprehensive field of study. Based on my problem description, the nature of my study follows an exploratory approach so as to look into the factors for small ERP projects in organizations. According to Bryman (2016), an exploratory research lacks new insights to cases which in turn leads to uncertainty in the nature of the phenomena that's being observed. The authors suggest qualitative approach for exploratory research. Furthermore, Bryman (2016) indicates that case studies employ qualitative research. Since the research design chosen for my thesis is case study research method (see section 3.1), qualitative research strategy is conformant for this study.

To justify further on why I chose this research strategy, the qualitative research stands out when it comes to the features, this type of research provides. The five features, listed in Yin (2011, p. 9) are as below:

- *Studying the meaning of people's lives, in their real-world roles;*
- *Representing the views and perspectives of the people in a study;*
- *Explicitly attending to and accounting for real-world contextual conditions;*
- *Contributing insights from existing or new concepts that may help to explain social behaviour and thinking; and*
- *Acknowledging the potential relevance of multiple sources of evidence rather than relying on a single source alone.*

I will employ more than one interview in this case study, in order to understand how each of the participants perform different project tasks in their everyday life; try to capture each of their perspectives and also try to explain the existing and new concepts related to the theme of study. This indicates that qualitative research study will be ideal and will provide features that are beneficial for my studies.

### 3.3 Data collection

Data collection is the key part of any research (Bryman, 2016). I have followed the method of semi-structured interviews for data collection. Following Bryman (2016), more open mind approach was followed where interviewees could express more on the questions asked during the interview so that relevant concepts and theory can emerge through the data.

All the data were collected through interviews from the project members specific to the *NSF project*, the project on which the case study is performed in the following Chapter 4 (Empirical Data).

#### 3.3.1 Sampling of case company

The case company that I have collaborated with, for this thesis is TietoEVERY (see Table 5). The company was earlier known as EVERY before the recent acquisition. The sampling approach I follow is convenience sampling approach (Bryman, 2016) as I already had access to the first point of contact at the case company. In addition, snow sampling approach (Bryman, 2016) was followed while obtaining the interviewees for the data collection.

*Table 5 About the case company*

<b>Firm Characteristics</b>	<b>TietoEVERY</b>
<b>Type of Industry</b>	IT Services
<b>Geographical context</b>	Global (Around 20 countries) Norway (In 15+ cities)
<b>Organization Size</b>	TietoEVERY Trondheim is a small to medium sized firm. However, the organization has about 9000 employees in Norway

#### 3.3.2 Selection Process

Most of the contact information of the interviewees were obtained through the project manager of the company. He was part of one of the PMI events I conducted on behalf of the student organization and initial contact regarding the collaboration was done after the event. Case study of NSF project was given by the company to perform a detailed study of the success factors.

All the initial inquiries were performed through emails and few visits to the company. However due to COVID-19 all the plans to lay out on-premise interviews were cancelled. List of interested people to participate in the study were given by the project member. The data sampling approach in this case resembles the snowball sampling technique (Bryman, 2016). Only the project members of NSF projects were interviewed for this thesis but data on general ERP factors were also collected from them. Total of five interviews were conducted including the customer of the NSF project although most of the interviews with the customer was carried out through emails.

Emails were sent out to all the five interviewees and convenient dates according to the interviewees were chosen for scheduling the interviews. My sampling resembled more of the convenience sampling discussed in Bryman 2012.

It was not possible to get participants with expertise in project management. However, all the interviewees in this study were experts in their respective fields (technical fields). All of them had long years of work experience which in turn benefited my research data.

### *Relationships*

As I had no prior relationship with any of the interviewees, interviews were not impacted due to any reasons like personal bias. However, I was able to get in touch with the Project Manager who had great interest in the thesis collaboration which helped me build a good communication with him initially. On premise meetings were held prior to the start of the thesis, which also helped in establishing comfortable conversation and thereby forming better relationship with the project manager. The thesis work was initially intended to conduct at the company premises. Due to personal reasons (see section 3.7) and COVID-19, on premise work did not take place. Hence, I was not able to create better relationship with any of the interviewees prior to the interview.

### *Backgrounds*

All the interviewees work or have worked in consulting firms and possess experience with ERP system, both in technical and non-technical areas. Each interviewee had different roles in the project. However, my research data reveals that people with different roles can also reveal different insight on the same activities and projects. Therefore, it was interesting to note that each interviewee had some kind of consulting experience and possessed customer handling skills.

Detailed description of the interviewees regarding the role, experience and duration of the interview are listed in the table below. I have assigned pseudonyms for each interviewee so that all the participants are concealed from their identity which can help them in expressing the unpopular view and sensitive issues related to the topic. Pseudonyms would also help me in highlighting interesting points said by the interviewees in the form quotation. Original name and interviewee recordings are not shared with any other individual based on the rules and regulation of NSD (see appendix). Table 6 shows the diversity in the role of each interviewee. I have also mentioned the seniority in table below. I have categorized this into either more than 10 years or less than years of experience. In Chapter 5 (Empirical Data), will observe if this factor has any influence on the data collected. Additionally, I have not assigned any pseudonyms to the customer as customer identity and organization are not revealed in this thesis. As mentioned earlier, I have assigned pseudonym only to the case project which is as ‘NSF project’ that has no significance nor any relevance to the original name of the project.

*Table 6 Interviewee Information*

	<b>Pseudonym</b>	<b>Position</b>	<b>Interview length*</b>	<b>Seniority</b>
<b>1.</b>	Alan	Sales Consultant	55 minutes	10< years
<b>2.</b>	Bruce	Senior consultant	57 minutes	10> years
<b>3.</b>	Charlotte	Team Manager (HR, payroll)	46 minutes	10> years
<b>4.</b>	Denis	Project manager	62 minutes	10< years

\*Note- the interview length is based on the recorder and might vary when introductory and closing statements are included.

However, the table above do not include the customer as most of the data collection was done over the emails. The initial meeting with the customer was cancelled due to my personal reasons which I have reflected in the section below (see section 3.7). In addition to the interviews listed in the table above, follow up interviews were conducted with these participants through emails. This was due to the limited time and capacity of this thesis.

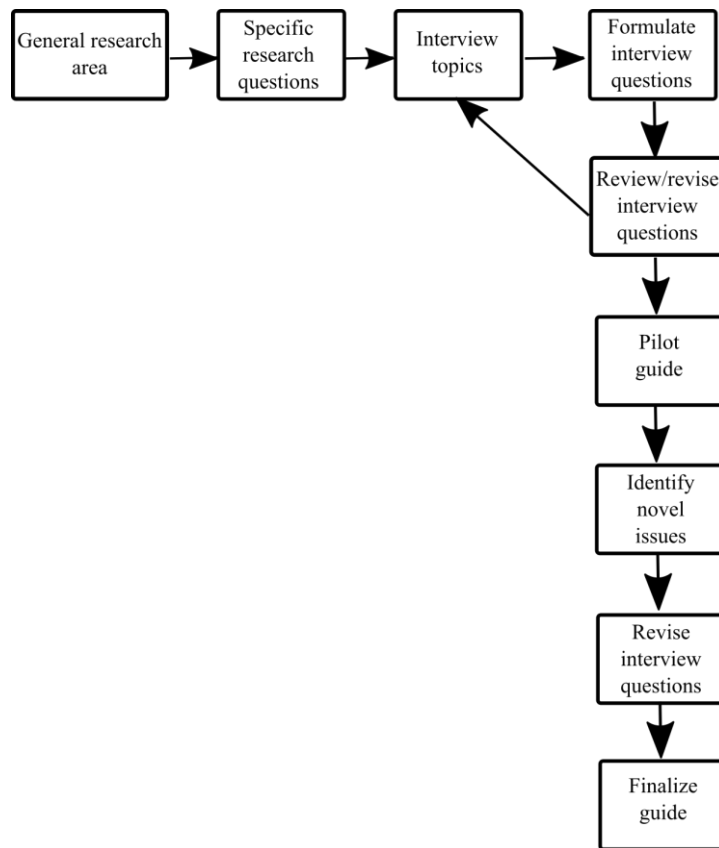


### 3.3.3 Interview guide and Preparation

An interview guide lists the questions that has to be addressed in order to address the research (Bryman, 2016). This tool is of three types - structure, unstructured and semi structured interview type. In structured interview, a set of question are prepared based on the relevant topic and asked in the same manner to all the participants. In contrast the unstructured interview follows no guide, instead the researcher asks one or many questions on different set of topics making providing more freedom for the participant to express any insights on the questions. Lastly, semi structured format follows a guide that lists questions on specific topic. However, the interviewer has the freedom to ask the follow up questions or questions that are not in the list. It is also not necessary to follow the outlined guide exactly the same manner it is set (Bryman, 2016). Since I had specific areas that I wanted more insights on, I followed the semi-structured interview format.

A rough guide was initially prepared for all the project team members of the case study. I have mainly used the theory discussed in Chapter 2 (Theoretical Background) to decide on the interview topic and followed the steps (see Figure 7) described in Bryman (2016) to frame the interview guide. After reviewing the interview questions, I conducted a pilot interview with a friend who had working experience in Norwegian industry. I ensured that the guide was simple and easy to understand so as to avoid any language barrier. Pilot interview helped me in understanding - few unclear questions where an explanation on the terminology was necessary, questions that were too short and of course point out similar questions. It also helped me in adding few more questions on certain topics. Following (Bryman, 2016) the questions were made as open as possible so that the participant can have freedom to discuss more on the topic.

The interview guide was sent to the project manager before I got the list of interviewees. Upon receiving the list of interviewees, the interview guide was changed after the pilot interview, so modified interview guide was sent out to the interviewees. I believe sending interview guide prior to the interview helped in participants to be prepared on certain topics. Since the project was executed few years ago, I believe sending the interview guide in advance helped the interviewees to recap the events and factors related to the project.



*Figure 7 Steps to create the interview guide (Bryman, 2016)*

Since most of the questions in the interview guide were organizational specific, I created another interview guide for the customer. Customer's point of view was taken into account while outlining this guide. As most of my conversation with the customer was in Norwegian, this guide had to be translated and written in Norwegian. In addition to that, review of the interview guide was performed with the help of a friend.

### 3.3.4 Interview Process

My initial timeline for the interviews were in end of January until end of February. However, this time frame was not suitable as I had to leave Trondheim. So, most of the interviews were conducted in May and June 2020. During this period of time, the company's premise was not accessible due to COVID-19 situation. Hence all the interviews had to be conducted online. Microsoft Teams and Outlook were used for conducting the interviews. Due to this reason, there were few challenges that I faced which was listed in Bryman (2016). First challenge was participant observation and building rapport. Face to face interaction would have led me to introduce myself to the interviewees beforehand and quick chat would have made it easier to

make the interviewee comfortable prior to the interview. Understanding the body language of the interview would have helped me in understanding the state of mind of the participants. Secondly, conversations were sometimes cut-off as it was difficult to understand the pause while speaking during the interviews. Lastly, technical issues were also a concern. This was not frequent, but the meeting was disconnected in some of the interviews. The issue could have been on either on my end or the participants end. This also increased the length of the interviews. Since interview with the customer was entirely conducted over the emails, there were delayed responses and requirement to follow up on emails.

The interviews usually began by introducing myself, the purpose of my research and the intention of the interview. Interviewees were reminded about the invitation letter (see Appendix A) that I sent out while scheduling the meeting and consent from each interviewee were reassured. Following this, the interviewees were reminded that about recording the interview so as to transcribe the recordings and extract the required data. Rights of each participant and privacy information were also indicated in the introductory session. Data control protocol has been followed as per the guidelines provided by NSD (see Appendix C). The recording was stored in a password protected folder in my laptop.

After the introductory part, I usually ask the interviewee to introduce themselves and tell a bit about their role and experience in the industry. Rest of the interview usually followed the interview guide however the order was usually changed based on the conversation and additional follow up questions were asked. Notes were taken either on my notebook or in a word document.

At the end of the interview, I assured that the interviewees were fine in answering to any of the follow up questions. This helped me in gathering data on questions that I missed during the interview.

### 3.3.5 Transcribing the data

All the interviewees were recorded on Microsoft Stream and the application had the platform to store the data. This data was also stored locally in my laptop. The application also had an option to transcribe while conducting the interview. However, I preferred manual transcribing of the interviews so as to highlight interesting facts in the presented data. Although this process

was time consuming, transcribing helped me in accurate examination of what the interviewees said, as indicated in Bryman (2016).

There were few interviews where the interviewee spoke in Norwegian. It was difficult for me to listen and follow the language especially on a recording. Hence, I had to seek help from a Norwegian friend to translate few parts of the interview. I informed my friend about the privacy conditions and I ensured that the data was kept confidential. Even though Bryman (2016) suggests transcribing all the data in the interview, I have not included the introductory part and also few discussions on irrelevant topics with respect to my thesis.

All the transcriptions were stored as document files in my laptop. This was necessary to code the transcribed data which will be discussed in the next section.

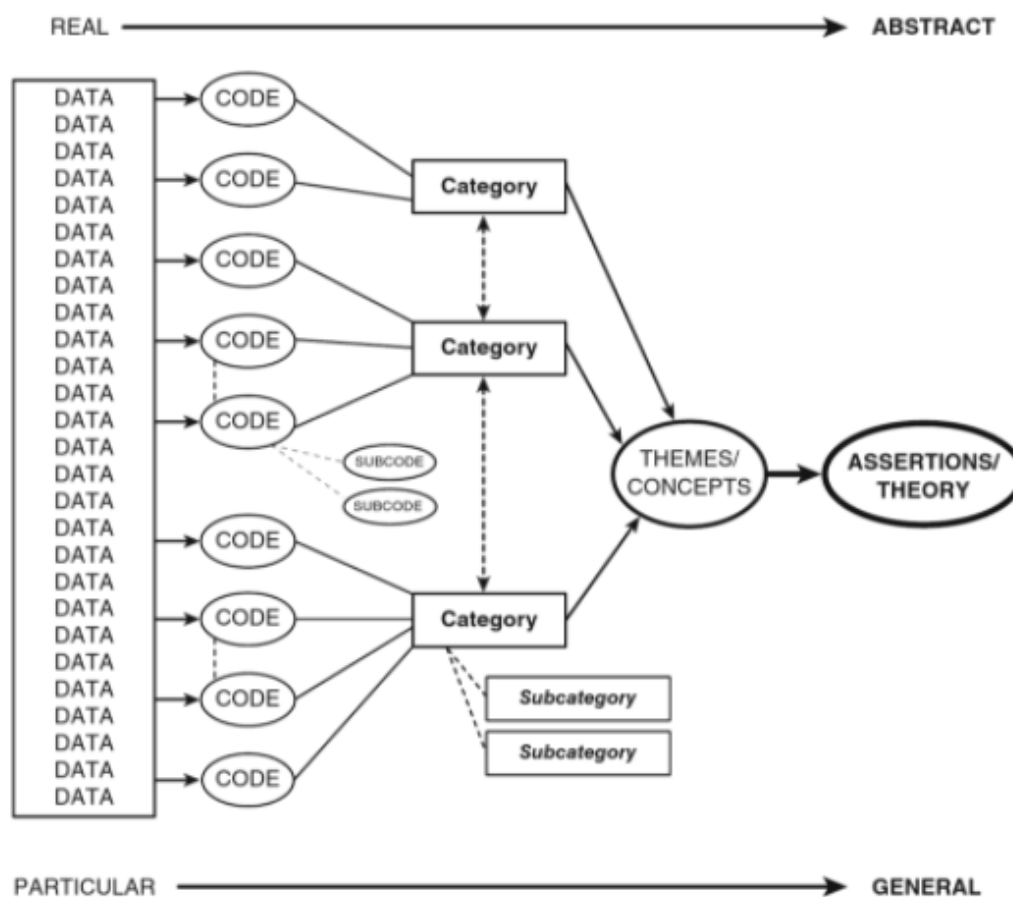
### 3.4 Data Analysis and Tools

As discussed earlier, there was one round of interviews with each participant. Follow up questions were either asked during the interview or through emails after the interview. Second round of interviews were arduous to achieve in the given time frame. Some of the data analysis were performed simultaneously while transcribing. The framework chosen to analyse the qualitative data, in this case interview data, is Grounded theory which is recommended in Bryman (2016). Tools of grounded theory that I made use of include coding, constant comparison and theoretical saturation.

The process of breaking down the data into components and tagging them with names is termed as coding (Bryman, 2016). I began the coding process by reviewing all the transcripts and my notes. I went through each word, sentence and segment in the transcripts and notes and assigned short but accurate codes. So, my coding process resembled that of initial coding highlighted in Bryman (2016). Following the author, I remained close to the data while exploring what the data interpret. My initial set of codes were massive and faced difficulties in finding the relevant ones for my study. Initial coding was done by creating a template manually on word and highlighting the data for assigning the code. Clearly this approach was tedious and time consuming.

To resolve this issue, I followed Bryman's (2016) recommendation and used the software Nvivo 12. There were detailed instructions on how to use the software in the book by Bryman (2016). So, the learning of this software was quick. I found this tool very easy to use, self-explanatory and smart way to organize the codes. Most of the overlapping codes were sorted in this software. The software also had options to highlight and comments on the uploaded data. This is the last tool of grounded theory indicated in Bryman.

I followed Saldana (2016) to get better understanding on coding and also creating sub-categories and categories from the codes obtained. The author provided a streamlined schematic model for coding and categorizing which is shown in figure below. These categories turn into concepts that is answers the research question of the study.



*Figure 8 Steps in Data Coding (Saldana, 2016)*

The categories that was developed as a result of data analysis were used to structure Chapter 4 (Empirical Data). This chapter do not follow the structure that was followed in Chapter 2 (Theoretical background). After the data analysis it was more meaningful to group similar factors together. This helped in presenting all the empirical data which was easily retrieved

from the software after the final coding process. Continuous comparison also helped in entailing the central subjects that was necessary in this study. Finally, all the propositions were analysed based on the collected data. Both supportive and contrast data were obtained and compared with each proposition. In Chapter 4 (Empirical Data) I have discussed if the analysed data supports or contradicts with the proposition framed in the previous chapter. As mentioned earlier, most of the follow up questions intended to fill the gap in the analysis when the collected data I was insufficient to support the proposition.

I was inspired by the tool of grounded theory-theoretical sampling, although there was limited use of this tool in this study. By definition, theoretical sampling is collection of more data after the first iteration of framing the categories in order to add more data on the categories. As mentioned earlier, I have followed up on interviews to fill some gaps on certain topics. However, I have not followed up with all the participants to conduct secondary round of data collection. So theoretical sampling was not extensively in this thesis.

### 3.5 Quality of the Research

Quality of the research are evaluated against two factors – reliability and validity. However, reliability and validity are more appropriate for quantitative research (Yin, 2011). Bryman (2016) suggests an alternative method to evaluate quality for qualitative research. Two criteria used to assess the quality are trustworthiness and authenticity which will be discussed in the following subsections.

#### 3.5.1 Trustworthiness

There are four criteria to the factor of trustworthiness- 1) credibility, 2) transferability 3) dependability and 4) confirmability. Hence in order to demonstrate trustworthiness I have considered all the four criteria to my research which are discussed below.

It is worth to highlight the reproducibility of this study even if this factor is highly applicable to the quantitative research. I believe most of the areas of my studies can be reproducible and might be achieved by another researcher apart from the initial contact with the project manager. Any researcher may use the same sample for the data and same results might be observed.

Referring to Bryman (2016), credibility determines the acceptability in social settings. It ensures the researcher has followed good practices and the results are well documented and presented to the social world. To ensure credibility, I have been open minded and maintained transparency when it came to the interviews with the participants. The research method chosen for this study has been validated multiple times before I started my data collection. I ensured that all the conveyed information by the interviewees has been well documented. As stated before, the rights of each interviewee were conveyed through invitation letter. Interviewees were also given the freedom to question any aspect of the research study. In addition to that, I asked more open-ended questions to the interviewees in a neutral tone so that their insights are clearly expressed in the collected data. I also intend to present the findings of my thesis to all the interviewees participated in the interviews.

Transferability of the research implies how the findings can be applied outside the context (Bryman, 2016). Since my research was aimed at ERP projects, the results can be applicable to the consulting firms and most of the organizations implementing ERP systems. Hence the research might be applicable outside the context. Moreover, it is good to keep in mind that the results might vary based on the geographical region. During the data collection, interviewees highlighted that the organizations they work with have similar culture and organizational structure. Depending on the region, the results of the study could vary if organizations have an entirely different culture and settings. However, I believe this research meets the transferability criteria and is valid to a great extent.

Dependability criteria entails that all the documents from all the phases are kept accessible (Bryman, 2016). This criterion indicates the extent to which all research data are documented. I have maintained exemplary documentation in this research study. I have a detailed spreadsheet that gives information on what data I have stored and its folder location in my laptop. As discussed earlier, password protection was done for all my documents to ensure privacy and confidentiality of the collected data. In addition to that, I have a dedicated planner where I have logged all the activities relevant to this thesis along with some relevant notes. I believe this chapter should provide more information on how I have performed this study. Auditing (as suggested by Bryman (2016)) was not possible due to the time frame of this study and the COVID-19 situation. I believe an external auditing is not practical in case of most of the master thesis due to the limited timeline of the study.

Lastly, confirmability criteria imply that the researcher has ‘acted in good in faith’ and no personal values are swayed over the research (Bryman, 2016). I believe that there was no possibility for any bias in my case. I had no prior relationship with any of the interviewees which means that there was no impact on any of the participants viewpoint. As discussed earlier most of the questions asked in the interview were open ended questions which also eliminated any chance of personal bias in my case.

### 3.5.2 Authenticity

This factor is related to the political impact of the research (Bryman, 2016). I believe it helps to evaluate the political impact of this study. However, this study can be useful for consulting firms. Furthermore, different perspectives of ERP projects have been considered in this study which includes the customer aspects, team member’s and the project manager’s point of view. Hence authenticity is valid for this study to an extent.

## 3.6 Evaluation of the Entire Research

Duration of this thesis ranged over five months’ time. Majority of my previous research study were modified for this thesis. My initial work generalized over the digitalization project but in this thesis, I have narrowed it down to ERP projects. The theoretical background was modified numerous times to fit the research question. Different aspect and factors were brought into consideration while some of them had to be eliminated to the scope of the study. With assistance of my co supervisor, I was able to filter out the necessary aspects and categorize them in the theory. As major extent of previous study was changed, I have spent considerably more time and work on framing my theoretical foundation.

While majority of the theoretical background was underlined, I started with my initial interviews in the month of May. Considering the sample size of the interview, I had minimum influence on the number of interviewees. The main contact person was the project manager of the organization who provided me the list of participants entirely based on their willingness and interest to participate in this study. As most of the participants would be away for vacation by June end, I had to finish all my interviews within this time frame. All the interviews were online and all of them went smoothly even though I was an amateur in online meetings.



Although few sections of the transcriptions had to be translated, I was satisfied with the collected data and I reviewed them numerous times.

After reviewing the data, I altered few factors in the theory. The categories obtained after the coding were used to underline the Chapter 4 (Empirical Data). Some of the propositions were also modified based on the collected data. Chapter 5 (Analysis and Discussion) is a result of my comparison between the theory and collected data.

The only barrier that would have had an impact on this study would be the language. Some of the interviewees struggled to express few statements in English. However, all the interviewees were given the option to also speak in any language they prefer. Overall research process was challenging but at the same time very interesting.

### 3.7 Personal Reflections

The official start of this thesis was in the month of January. After a rough outline of theory, I had set the initial interview with the customer during the end of January. Unfortunately, the meeting was cancelled as I had to travel to India due to personal reasons. I had to fly back to Trondheim before the lockdown as I had to conduct all the interviews by June as per NSD regulations.

However, the situation got more difficult when Norway was also impacted by the corona virus and had to undergo into a lockdown. Unfortunately, after my quarantine, NTNU and the office of the case company were closed. Initial plan for data collection had to be changed. All the planned meetings with the interviewees were changed.

With the great help and guidance my co supervisor I was able to make necessary changes to the initial research idea of the thesis. Due to the limited time frame I had to make changes to the research question and plan of action to conduct all the interviews. Moreover, with great help of technology, interviews were conducted on time. Regular meetings with my supervisors pushed me and motivated to work further on my thesis during the difficult pandemic situation. So, my official start of work was changed to March 2020 and spanned until July 2020. Few extra weeks were also allotted for all the students due to the corona situation. Hence my final submission was moved to August 2020.

Apart from my personal issues, the research is based on a topic that I have great interest in. A short presentation was given by the Project Manager to all of the project management students during a PMI event that was hosted by me and some of my friends. My interest was stemmed from the event and wanted to know more about the organization and project teams. I believe my research question really helped me in understanding majority of these aspects.

The courses that I took on ERP implementation also helped me in understanding some of the aspect that the project team members tried to explain. As far as language is concerned, most of the interviewees were fluent in English. Some of the words or facts were expressed in Norwegian which I translated over the meeting or later while transcribing the interviews.

Furthermore, if this research had to be conducted again, I would carry out multiple follow up interviews for data collection. As this research study was impacted by COVID-19, some of the research methodology would have been different if it was conducted like in a normal scenario. As discussed earlier, I prefer to conduct face to face interviews rather than online interviews.

## Summary

This chapter covered the research strategy, research design and data collection method used in this thesis. Based on the detailed analysis described in this thesis, qualitative research with a case study method was followed for this thesis. Semi structured interview was conducted online in order to collect the required data for this thesis. A brief discussion on the impact of COVID-19 was also reflected in this chapter. Later section of this chapter includes the evaluation of the quality of this research along with an overall assessment of the process. At the end of this chapter, some of my personal reflections on the process of this thesis are also described.

## 4 Chapter- Empirical Data

In this chapter, data collected through interviews from the case company are presented. The chapter is divided into two sections - people related factors and project activities related factors, and these are based on the categories obtained after coding see figure. Firstly, a brief description on the company and the case are presented. Following that, the factors corresponding to people or key players in ERP projects are discussed in the section 4.2. Subsequently, section 4.3 discusses all the project activities related factors. I have not followed the same structure as in Chapter 2 (Theoretical background) as the categories and subcategories organized my codes and made the data analysis easier. The two methodological factors are also included in these categories. The data listed in this chapter is then compared against the propositions and forms the basis to highlight the empirical findings and further discussion in Chapter 5 (Analysis and Discussion)

### 4.1 Case description

TietoEVERY is Scandinavia's largest provider of IT, spread over 50 cities. They focus on selected industries like the public sector, banking and finance, insurance, health, the energy industry, oil and gas, manufacturing companies, trade and logistics, technology and communications and service companies. Before the merger with Tieto in December 2019, the company was known as EVERY.

TietoEVERY has two offices in Trondheim with over 250 employees. I have collaborated with one of their offices in Trondheim, which is dedicated for ERP solution. This office is specialized in implementing the whole ERP solutions. They are a small and dedicated team with experts that handle payroll process and HR process, experts in finance who handle sending and receiving of bids, experts within asset modules, consultants and technicians.

TietoEVERY has been working with both public and private customers. Based on the customer, the size of the project team also varies. More consultants are involved in the project team while handling a critical customer. This professional and experienced team has implemented several ERP projects and majority of the project have been successful.

For my empirical data analysis, the employees of the organization that handles ERP projects, were chosen. Data collection included general insights of the factors and one example of a project case. As discussed in the Chapter 3 (Methodology), I have named the project as ‘NSF project’. This was a small ERP project undertaken few years ago with a customer based in Trondheim. The customer’s organization is social research institute, which is part of an university. The customers’ identity and organization are not revealed in this thesis due to the data privacy regulation.

The following data presented in this chapter are based on the interviews of the employees at TietoEVERY. Some of the employees were not part of the organization at the time of the interviews; however, they had long working experience at the company and had worked in the ERP projects. I have highlighted the data related to the factor in case of the NSF project. Initially a former organization handled these projects, which was acquired later by the current organization. As mentioned earlier, pseudonyms were assigned to the interviewees (see Table 6). The data includes general opinions of the interviewees on the factors and some data specific to the project.

This following section will present the data retrieved from the interviews relating to all the success factors. At the end of each section, relevance of all the factors with respect to the case study (NSF project) are discussed. As mentioned earlier, the factors are grouped based on the categories obtained from coding the empirical data.

## 4.2 People related factors

### ***Project teamwork and composition***

All the interviewees agree that project teamwork is important when it comes to projects. While rest of them agreed that it is important to have the right people with right amount, Charlotte considered an ideal team to be one that has right people but less in number and believed this creates efficiency in the teamwork. A very interesting characteristic was observed and said by Bruce

*“There could be individual difference here. Some of the team member like to be independent and likes to work on their own” (Bruce).*

When it came to the competence of the team members, all the interviewees emphasized that it is important. However, different opinion was expressed when it came to the level and experience for the team members. The important criteria for the team members were that they could understand the customer needs. Incompetent team members might not be noticed initially but will be seen when the project outcomes are not received from the project.

Considering the case study of NSF project, the customer was very happy with the competent team at EVRY. However, both customer and two of the interviewees- Alan and Denis mentioned few issues that they faced concerning the project team. Customer identified that one of their team members lacked the competence required and approached the company, on which this team member was replaced. Denis said that replacing the team member lead to better functioning and made the customer happy at the end.

### ***Top management support***

All the interviewees disagreed that top management is required in organizations for executing ERP projects for success. Top management is involved in the project activities however only to a certain extent. Most of the projects run without any meetings or their involvement. According to Charlotte the top management might be needed in cases where things don't go as planned. The top management usually approves the project in the initial stages and mediates when the project is on hold or stops unexpectedly. Denis highlighted,

*“As long as the project goes well you can basically go without them.. so you don't need top management involved in activities or act in your behalf as long as the project goes as planned . They just approve the project”(Denis)*

Bruce and Alan highlighted that top management involves in private and public projects. Alan indicated:

*“Top management support and commitment is not very important, or its probably important when we check with a case outside, like in the private sector or public sector”(Alan)*

Since most of the projects do not involve top management at TietoEVRY, in case of NSF project there was less involvement from the top management. Denis mentioned that the top hierarchies includes the project owner, who is a part of the steering group and this steering

group meetings are not frequent. Usually the project leader sends the report on updates regarding the project.

### ***Effective communication***

All the interviewees had similar view when it came to effective communication. While all of them believed that it was not critical for project success, the most important communication considered were between the customers, in order to get their expectations right and it also helps the team understand what the customer needs. Alan mentioned that it is important to re confirm with the customer and team members regarding the right information available on hand. Otherwise, it might affect the project outcome leaving the customer dissatisfied. Good communication was emphasized at the TietoEVERY through workshops. While communication was important, most of the interviewees pointed out that, they do not have regular team meetings unless it is a big project or a big customer. Charlotte considers it is important to get the right consultants than getting all the information through meetings.

An effective communication helped in case of the NSF project. Denis says

*“...we had to make lot of communication to customize and get the way they wanted, that required them to explain us several time. It shows that it is important to communicate with each other and show that the other ones understand it and deliver what you want them to” (Denis).*

### ***Leadership - Project Champion and Project Manager***

Project manager was categorised under the methodological factor in Chapter 2 (Theoretical Background). However, based on the data and category, it made more sense to discuss the factor along with project champion under leadership factor. Most of the interviewees discussed these two factors simultaneously.

Considering two positions- project champion and leader, all the interviews said that they prefer to have a leader, but a project champion was not necessary. No interviewees had prior knowledge on ‘use of a project champion’. When the concept was explained, all the interviewees said this would be useful only in case of huge projects. When asked about leadership, all the interviewees agreed that a project manager is important for a project success. Some of the characteristics required for a project manager is to talk to the customer, satisfy the

customer, being accessible, have good competence, handle issues well, make reports and monitor project progress. Bruce had two arguments regarding both leadership and project champion. He says

*“...sometimes we are used to work and take responsibility ourselves so often you do not need a lot of help from a project leader nor a champion” (Bruce).*

Alan highlighted some personal skills that a project manager should possess. He indicated

*“Usually in the project lot of people have heavy shoulders and stressed, and project leader is the one who can cool them down” (Alan).*

Denis, the project manager in this case, highlighted that a manager has lot of impact on success and the entire project. The main responsibility of a manager includes efficient information flow, contact with vendors and customers, follow the methodology and activities. A higher executive is usually involved when an issue must be addressed. When asked, Denis mentioned experience is more important than certifications. He also indicated that in most of the cases the project members can deliver the project themselves and might need only an admin. So not all projects need leaders.

Since NSF project was not a big project, all interviewees believed that project champion was not an important factor in terms of project success. Alan said if the project was done for entire NSF then the project might need a leader and a project champion. However, the end customer believed that a good leader contributed to attaining project success in this case.

### ***Vendor support***

While most of the interviewees considered this factor as a requirement, it wasn't considered to be very important. The company usually customized the systems when customer needed to make changes. However, support of vendors is also required in certain cases. According to Denis, the systems are usually standard and do not always need customization. Alan said a similar argument,

*“.... any problem with the systems, we take care. If we sell a solution with bad software that's our problem and not the vendor's” (Alan).*

The end customer, in case of the NSF project, mentioned that they consider the competence of both TietoEVERY and supplier or vendors were important for the ERP implementation.

### ***End user involvement***

All the interviewees equally considered that end user involvement is a critical success factor in project success. As mentioned earlier, the important thing in the initial stage is used to involve customer the most and get the expectation of theirs right. If not, the project outcomes are not going to be beneficial leaving the customer dissatisfied. Alan says customer involvement starts with a tight dialogue in the initial stage. At the end of the project, the end users will be using the system, which means they should know how to use the system. Alan highlighted

*“For a project itself you need to have the customer involved in all phases and you need to make sure that they get all the information they need from you and you get the information from them. It’s very easy to overlook something during the project and you end up with something that they does not really fit what they need so . full transparency and making sure the information flows from both sides.”*

Bruce also highlighted that the involvement of customers can also depend on their technical ability. He indicated,

*“some customers do have the technical ability to understand all the project activities but most of them don’t. So the customers use externals if not they are involved in all other phases but not involved in technical phase.”*

## **4.3 Project activity-related factors**

### ***Organizational culture and change management***

One of the interviewees, Denis, highlighted that organizational culture has not been an issue during any of the ERP implementation. He pointed out that most of the customers had similar organizational culture to their own organization’s culture. He said that most of the customer’s organizations had a flat structure that makes it more open and creates a friendly environment and culture.

All the interviewees noted that change management is an important factor when it comes to ERP projects, but the customers are usually prepared to accept the changes before implementing the system. However, each of them had a different take on change management.



On one hand Alan and Charlotte says change management starts from getting the customer requirements right- replacing old system with a new system and change management helps in getting the project economy goals right. On the other hand, Denis and Bruce mentioned that since the implemented projects are small, change management are not much emphasized. Both mentioned that the customers are usually prepared for change and the ERP implementation do not introduce huge changes in their organization. Bruce said

*“...change management is not a common topic. The ERP implementation gives more functionality rather than changing the structure” (Bruce).*

In case of NSF project, all the interviewees’ project change management were not very well introduced. Bruce reasoned that the organizations size and scope of the project matters and thinks change management is relevant when it comes to big companies. The customer of the NSF project mentioned that they dealt with change management through training and highlighted that good attitude of the people is important while implementing a change through a new system. Customer said that updating to newer system would streamline the process and employee would be able to see it and now the system gets better.

### ***Clear goals and objectives satisfaction***

Main points mentioned by all the interviewees were similar when it came to clear goals and objectives. All of them linked this factor with success and considered this as the important success factor. Charlotte considers this factor as the foundation for the project. She said

*“...you don’t know where to go if you don’t have goals” (Charlotte).*

Denis considers that it is important to repeat the goal and objectives to make sure that the project is going in accordance with these goals. He said

*“More complex the goals and objective the more important it is to focus on it and achieve it” (Denis).*

He also highlighted that some of the goals are not realistic and it becomes important to discuss with the customer. However, Alan points out that clear goal and objectives are important in the initial stage where they discuss the resources and their competence with customer. He also mentioned

*“it is waste if the system is not built according to the customer needs, so getting the goals becomes an important factor” (Alan).*

In the case of the NSF project, the customer goal was to streamline routines, reduce the number of systems and replace existing software. Denis identified the goal of the project as to get a better financial control of their projects and a system that included payroll and HR. They swapped their old ERP systems for better functionality and economic outcome on the implementation along with some management goals.

### ***BPR and customization***

Bruce and Denis expressed the same points on customization of project. Most of the ERP implementation projects they handled did not have much customization or reengineering. Denis said

*“ We try to deliver as standard solution as possible because we know that it will be less hassle for the customer in the end and they too probably need to meet their needs but we need to go through each business process ”(Denis).*

He also highlighted that NSF included several customizations and they had to be tested when the changes were made. However, both mentioned that sometimes customers do have special needs, so they had to make customization in some way. However, Charlotte talked about avoiding customization by getting the initial customer requirement right.

### ***Software development, testing and troubleshooting***

All interviewees mentioned that software development, testing and troubleshooting happens in the last phase of the project. Denis highlighted that, since there was not much customizing work, there was not much in-house software development. Testing and troubleshooting however were highlighted as the mandatory activity before selling the solutions to the customer. Alan said

*“No testing means failure” (Alan).*

Denis highlighted more on the testing and troubleshooting aspect in ERP projects. He mentioned

*“what you test is like the processes and making sure that the configuration that you have done is right and there is no problem there” (Denis).*

The NSF project had several customizations, which needed testing. However, Denis informed that there was no intensive testing or troubleshooting in the project. Customer on the other hand related the testing and software development as great work and activities done by highly competent project manager.

### ***Monitoring and evaluation of performance***

When asked about the activity of monitoring the system, all the interviewees expressed their different understanding. According to Alan, the company (before acquisition) did not have specific project activity and did not have paper works when it came to risk. He expressed

*“we have to fix if something goes wrong, even if it is a Saturday or a Sunday” (Alan).*

Charlotte on the hand related this factor to the size of the project. She highlighted that in small projects the customers would directly approach them. She said

*“...you can sense if something is a risky part or something is wrong, so you don’t need a system for it to understand...” (Charlotte).*

Denis considers this as a very important factor. He related this factor in the phase where the systems are handed to the customer. He pointed out that

*“...when you are introducing a new system to the end users, they are not keen on change and not keen on ERP systems at all. You need vendor support. If there are some issues, then they will handle right away. You need to be there.” (Denis).*

In case of the NSF project, Denis mentioned about the issues that happened with one of the consultants. Due to this reason monitoring and evaluation were performed in the project to avoid further problems.

### ***Knowledge management and training***

Three interviewees while discussing the knowledge management aspect in the project mentioned different perspectives. While Alan said that it is important factor especially for project manager in order to make the right decision and predict the project outcome, Bruce expressed knowledge in terms of consultants and used the phrase “*sources of knowledge*”.

All the interviewees said that the training is one of the important factors in any ERP implementation project. While considering this factor important, Bruce also

highlighted that some products are self-explanatory and do not require training. He also mentioned about creating documents for customers to use through which they gain support from the customers. Alan and Charlotte explained training as a human factor where training is way to make the customer happier, feel safe and relive them from any troubles. Both mentioned that training increases the chances of customer satisfaction. Alan also added

*“...involve the customer and give them the right training and users on the customer side should take the training part for end users. It’s a key success factor. Not in sales but in production” (Alan).*

Denis introduced three different types of training that they provide to the customer. He mentioned

*“We have one for the really heavy users of systems, but they are also part of project team, they get training during workshop phase, we also have more formal training and they are the super users of the system. Next is end user training... The system should be so simple to use that you give as little training for end users as possible” (Denis).*

Bruce and Denis mentioned that their customers conduct internal training before implementing the ERP projects. In case of the NSF project, customer also mentioned that they had internal training and from the previous organization (company before acquisition). Customer said,

*“super-users ran internal courses and learned from each other. Then we created a user documentation on time tracking, travel bills and simple report extracts...” (Customer)*

Customer also added that it is important to have training in ERP projects and mentioned

*“people who participate in the construction of the system are well trained and see that the new system has a value” (Customer).*

### ***Project Management Methodology***

When it came to the relevance of project management methodology as a factor, each interviewee had a very different view on frameworks and methodologies and its possible impact in the project. The NSF project used traditional PMBOK methodologies and waterfall approach for software iterations. This subsection will present the data that was derived from each interview.

Alan emphasized project management an effective tool that contributes to project success. He believes most of the factors are influenced by project management. However, he considers more importance on the project manager itself and not the methodology. PMBOK or Prince 2 was not considered as important factor for laying out better management within the project.

Bruce mentioned about a different project that required Prince 2 methodology. He highlighted that in that case customer satisfaction would have been different if Prince 2 was not used. He said

*“I think for instance Prince 2 will have impact on the way you work and be a good aid for Project manager and Project organisation in conducting proper Project management. It will provide a good framework and basis for the Project organisation.” (Bruce).*

Bruce pointed out that he would like to see more use of Prince 2 methodology and see how it impacts the project success.

Charlotte expressed different opinion on project management. She said the project management becomes important in big organizations and for smaller projects, there is no need of any use of project management framework. She highlighted

*“...use of framework depends upon the size of the project. It’s not that important in small projects but in big projects, it is. In big projects you must see the risk factors, right place etc” (Charlotte).*

While talking about NSF project, she mentioned there was no significant use of any project management methodology. She said

*“We just discussed each other on where we were in the project. It was more of an informal way” (Charlotte).*

However, she also mentioned that she believes project management can influence the project success and success factors. According to her, communication with customers and setting milestone can be improved with an effective project management methodology.

Denis highlighted that the project management methodology that will be used in the project are usually discussed with the customer in the early stages of contract signing. The organization also has a dedicated team to choose the appropriate project management methodology and provide guidelines. Denis highlighted that

*“a joint consensus regarding what methodology will be used. In some cases, customer has told us regarding what kind of methodology what they would like to be used in the project. So, we comply to that.” (Denis).*

Denis expressed few things on the project management aspect and methodology. He said that project manager should be following up on the activities prescribed in the methodology. It is the project manager's duty to prepare reports to the top management, as they are not involved in most of the problems.

When asked about the relevance of project management methodology, Denis agreed that project management can have impact on project success. Knowledge and use of PMBOK methodology were considered important. He mentioned

*“certain knowledge is better suited to diff projects. For a software project- an agile works best, and if you can deploy changes all the type I think it's more important that the members are familiar with their methodology than the methodology itself. If you would follow Prince 2 methodology and none of the project members know anything about it, that would just mess up the project. They won't see the value in Project Management Methodology” (Denis).*

Denis pointed out that project management becomes suitable and important in cases where it is executed properly. While he said that project management methodology can contribute success, he also pointed out that Agile methodology (discussed in Chapter 2) have caused troubles. He believes effective communication can be improved when an effective project management methodology like PMBOK is implemented in projects.

## Summary

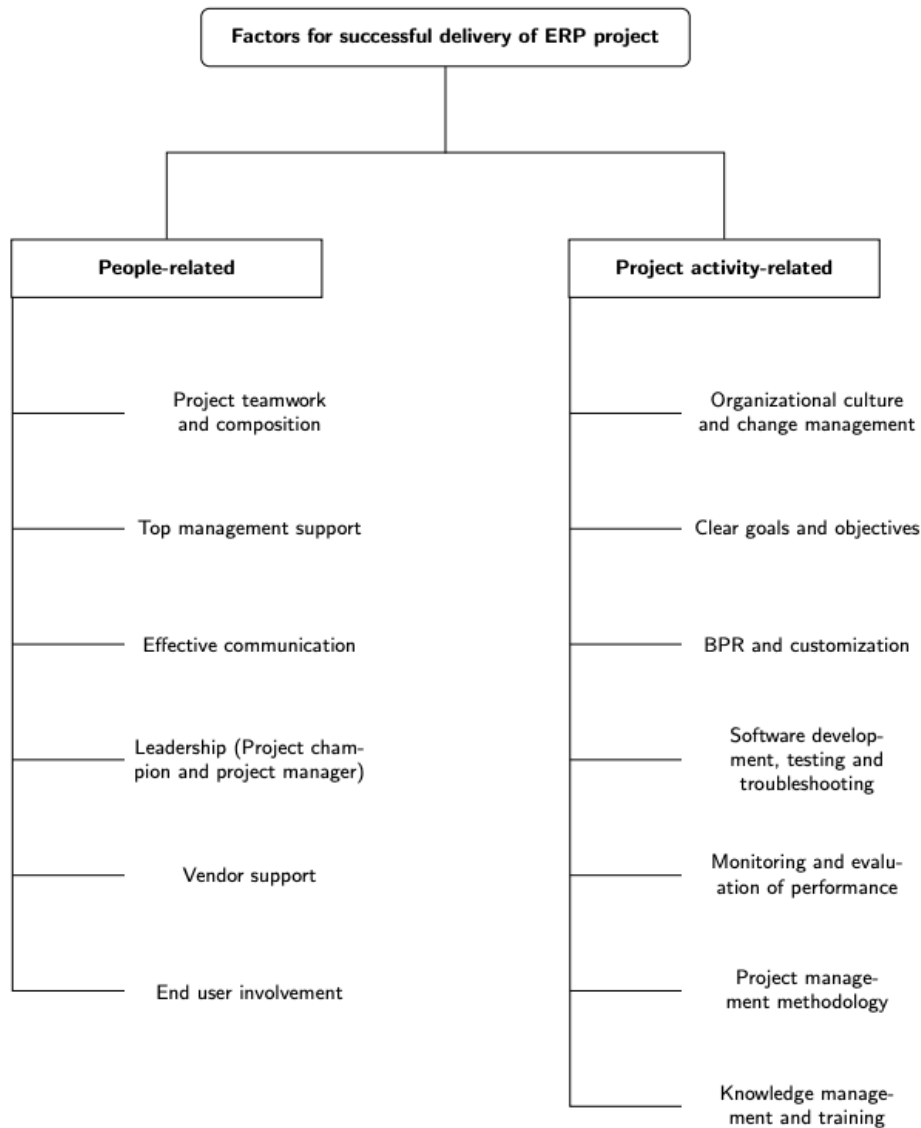
All the interviewees talked about the 14 success factors and expressed its relevance in an ERP project success. The NSF project and relevance of these factors in this project, are also discussed. All the statements have been highlighted and quoted in every sections. The two sections in this chapter section is divided based on the subcategories and categories retrieved from coding. The management factors discussed in the previous chapter are also included and categorized. The 'role of project manager' factor was included along with the project champion factor under leadership factor. In the following Chapter 5 (Analysis and Discussion) I will reference this empirical data to evaluate the proposition outlined in Chapter 2 (Theoretical Background).

## 5 Chapter- Analysis and Discussion

This chapter aims to review the data derived from the interview and evaluate with the theoretical framework that was discussed in the Chapter 2 (Theoretical Background) in order to see how my propositions are applicable in ERP projects. To recap, my theoretical chapter listed the propositions with respect to the organizational, technical and methodological factors that influence the successful delivery of ERP projects.

The categories followed in the previous Chapter 4 (Empirical Data) will be used in this chapter. To remind, these categories were obtained while coding the empirical data. Consequently, based on the empirical findings the theoretical framework can be modified as below (see Figure 9).

Following the analysis, the data is also referenced with the theory and evaluated to see if there is a need to change the theoretical framework. This chapter will focus on the validity of the proposition and see if there is a need to change them, based on the research data. Data from the theoretical background is also presented to show if it supports the collected data, to evaluate the validity of the propositions. At the end of each section, summaries of propositions with is applicability post-analysis is listed along with the result on the NSF project discussed in the previous chapter.



*Figure 9 Revised Model for factors in successful delivery of ERP projects*

## 5.1 People related factors

Firstly, the people related factors are discussed in this section, which includes Project teamwork and composition, Top management support, Effective communication, Leadership - Project Champion and Project Manager, Vendor support, End user involvement. Thus, key players (people) with respect to the ERP projects were found to be – Project team, Top management, End users or Customers, Project Manager and Champion and Vendors. Hence these factors are grouped together. As communication is involved with the key players – Customer and Project team, I have listed the factor ‘effective communication’ in this category.



## ***Project teamwork and composition***

### *Proposition F1- Project teamwork and composition can contribute to ERP project success*

In section 2.2.1, I discussed how teamwork is a key factor for project activities and competence of the team members leads to better projects. My empirical data (Chapter 4), suggests the same about this proposition. All of the interviewees considered it is a very important factor when it came to ERP projects. Team work could also be a collection of individual work done by the team members, who aim towards finding the right solutions for the customers. While my data suggests that regular meetings and discussions are not important, individual working space was also considered necessary. This can be an individual preference as some might need their own on working space to get the work done effectively.

There are two aspects that was discussed when it came to project composition: number of team members and competence of team members. The first aspect, the number of team members, differs from one project to another. My data suggests that small ERP implementation project requires small numbers of team members. As the projects scope increases the requirement for team members can also increase. Nevertheless I believe this aspect can be dependent on the nature of the project and project size. The second aspect is about the competence and years of experience of the team members. Different interviewees had different point of view when it came to years of experience. The reasons for the different opinion on this aspect can be individual experience in projects and current working environment. The thought process of each individuals differ and I believe these are mainly impacted by these two reasons of experience and exposure.

However, competence of team members are very critical for any projects. My data also suggests that team members have to be competent enough so that they get the customer needs right and also work towards the solutions in order to satisfy them. Incompetent team are seen as a negative factor that effects the project outcome. This was one of the reason that impacted the customer in case the NSF project.

Françoise et al. (2009) highlights that project teamwork is the core of project activities. The theory and collected data seems to show that this factor is relevant and important. Furthermore, the theory emphasize on the multidisciplinary nature of the project. Project team members are

expected to be competent about both business and technical areas (Sarker & Lee, 2003). Similar findings were observed in the empirical data when it came to competence. The data clearly indicated that the project members are expected to be competent. Based on my findings, I believe Gupta, Kumar, Singh Sanjay, Foropon, and Chandra (2018) correctly state that the project teams are accountable for the interactions within different departments. The customer expectations and requirements have to be captured exactly for the project success. Sarker and Lee (2003) indicated that the project team has to be balanced. I can correlate this with the data where the interviewees expressed that team size can be dependent on the project scope. The requirement of years of experience can also be dependent on the project scope. However, there can be difference here depending upon the individual's point of view or environmental influence. Sarker and Lee (2003) also indicate the freedom for the team members to work individually which was exactly stated by one of the interviewee (Bruce) in the data.

Consequently, my findings indicate that project teamwork and composition can be a relevant factor for small ERP projects. Similar theory was highlighted regarding this factor in the literature. The project team is expected to be highly competent while the experience of individual can be dependent on the project scope. The size of the project team might have to be balanced with the right amount of people. Both project teamwork and composition can contribute in getting the adequate information, maintain interaction in the team, and the capture customer requirements are correctly. Hence, I would argue that the proposition F1 holds true and need not be revised.

### ***Top management support***

*Proposition F3- Top management support helps in attaining ERP project success.*

In Chapter 2, I discussed that this is one factor among the most mentioned success factor in the literature. This factor is mainly responsible for the resource allocation and approvals within the organization. Top management support is also found to play a significant role in conflict resolution. My findings on top management reveal different insights on this factor. All the interviewees said that the top management is least involved in any projects they handled. This factor can vary in three scenarios - pre project, during project and post project stages. The support from the top management can be different in all these stages. As the approval of the project happens in the initial stages of bidding, most involvement of top executives can be

during this stage. The role of top management tends to be minimum as the project commences. Therefore, most involvement of top management seems to be during the pre-project stage.

Considering 'during the project' stage, all the interviewees highlighted there was slightest involvement of top management. Most of them mentioned that there were very few meetings that involved the higher executives. As for the conflict resolution, interviewees revealed similar statement to that of theory. Most of the top management employees only get involved when the project is not going on the right track or any problem in the project arises. This is not necessarily considered as a conflict but can be stated as an issue resolution. While talking about the top management support in NSF project, least involvement was observed throughout the project.

Nearing the post-project stage, my data only suggests that the project manager sends reports to the top management. The reason for this could be the existence of horizontal coordination rather than vertical coordination in the organization and the organizational structure itself. Horizontal Communication indicates more communication among employees at similar level. Postmes, Tanis, and de Wit (2001) study states that less commitment from hierarchies are found in horizontal coordination. However, findings by Chenhall (2008) reveal that more customer focus and continuous improvement in horizontal coordination. I believe the case company focuses more on customers and continuous improvement rather than commitment from the hierarchies and it is more reasonable in a practical setting. This might not be the case with all the organizations.

Nah and Delgado (2006) states that the top executives have to be involved throughout all the project stages. Top management involvement is required in executing the project successfully with the necessary resources. Ang, Sum, and Yeo (2002) indicated top hierarchies supports all the decision and guides the project team towards the goal. As some of the interviewees indicated, the case company involves experienced team members who are capable of making decisions, along with an efficient project manager. During the project, the decisions are taken by the project leader. Top hierarchies are updated with the necessary information and are informed of the decision made before and after the project. This indicates that the case company, in this study, follows more transactional relationship with top management (Shao, Feng, & Hu, 2017)

Thus, I would argue that the proposition should be revised. The top management involvement can be dependent on the organizational structure and coordination. The capability (decision making) of the project team can also contribute to the amount of top management involvement. The support of the top management (in this case study) was only required in the pre project stages and the rest of the communication was based on reports. However, the data highlighted the reason that the project team is considerably small and usually has tight collaboration during the project which required no or little involvement from top management. My observation is that the support is required for all the projects especially in the pre-project stage. However, based on the nature of the organization and project, their involvement can vary.

### ***Effective communication***

*Proposition F6- An effective communication in a project can help in achieving ERP project success.*

Theory suggests that communication is an inevitable factor for success in ERP projects. It helps in information sharing, conflict resolution and better team work. While effective communication was necessary in a project, most of the interviewees did not have insights with respect to the criticality of the factor for project success. Interviewees correlate this factor with the information sharing within different departments and getting the customer requirements right. Data reveals that the most important communication is the one with the customer. Interestingly, I observed that the requirement of communication can be dependent on the size of the project and the customer. One of the interviewee pointed out that there was more communication flow in the project while working with a big customer. The reason I believe for this is to attain better satisfaction from the customer. This would also increase the chances of getting future projects with them. Most of the customer involvement discussions are in the end stages of the projects. In case of NSF project, the effective communication helped to mitigate the issue with respect to one of the team member.

This might not be the case in all other organizations. Referring to Chapter 2 (Theoretical Background), François et al. (2009) stated that effective communication assigns responsibilities among different roles in the organization. This makes it easier for the project team members to approach the right person for attaining specific data. To avoid misconception, Finney and Corbett (2007) suggested that the organization should improve communication among stakeholders and keep the customer apprised. User resistance was also found to be

reduced with effective communication (Somers & Nelson, 2004). Poor communication was considered one factor that lead to failure of ERP projects (Ngai et al., 2008).

From the above discussion, I see that my empirical findings agree with the theory with respect to effective communication with customers but not while considering all the stakeholders. I believe, results in this case might not applicable to all ERP projects. Following the theory, I believe that interdepartmental communication increases efficiency at work place. Most of the literature has emphasized on this factor as well (see subchapter 2.2). The data with respect to interdepartmental communication might be thus applicable only to this case company. This might also be the in small implementation team and small organization like the case company in this study.

Nevertheless I believe the factor can be case specific when it comes to communication among stakeholders. The proposition can be re-stated as effective communication helps to get the customer requirement accurately. Depending on the project and the customer, interdepartmental communication in the project might differ from one to another. Therefore I would still consider my proposition as valid and need to revised.

### ***Leadership- Project Champion and Project Manager***

#### *Use of Leadership through*

*Proposition F9- A project champion in ERP projects can contribute to project success.*

*Proposition M2- A competent project manager can contribute to successful delivery ERP projects.*

In subchapter 2.2, the concept of leadership with regards to ERP project was discussed. As ERP implementations are related to have higher scope and complexity, theory suggests to make use of a higher level executive who can champion the entire ERP project. In addition to that leadership is also found crucial for smooth execution of projects. From the empirical data, it was observed that there was no project champion in their organizations. I noticed that most of the interviewees were unaware of the term ‘project champion’ and their usage in the project. When the concept was explained, all of the interviewees disagreed that there is no requirement of an additional role as a project champion for ERP projects. This is contradicting to what theory says about project championship. Issue of complexity were handled even without an additional role. All the interviewees indicated that they find the relevance of championship

only for huge ERP implementation. My data highlights that small ERP projects are less complex and one project manager is enough to manage the entire projects.

Theory suggests that project champion is an enabling factor in many cases (Somers & Nelson, 2004). This leadership role is a higher level executive who is present throughout the different phases (see section 2.2) who has the power to champion the project. Nevertheless literature has emphasized the leadership skills for a project champion. Ngai et al. (2008) indicates this role as a leader who supports and encourages the employees in stressful environment of ERP projects. One of the interviewee revealed this characteristic of a leader in a project manager and not a project champion. I believe the skills of a project champion can be conflicting with that of a project manager. (Françoise et al., 2009); Wang et al. (2008) lists the important activities of project champion as monitoring progress, motivation the project team, resource allocation and work towards project goal. My empirical data shows that these activities can also be performed by the project manager as these were also the responsibility of the project manager in the case study. I believe the literature do not investigate further on the leadership roles that is typically in ERP projects. While most of the projects have project manager, most of the authors do not indicate why there is a need for a specific role as project champion.

When it came to a project manager for projects, there were mixed opinions on the criticality with respect to project success. While some of the data revealed this factor as critical, my empirical data also indicated that competence of the project team can have an impact on the use of project manager. While a project manager is required for most of the projects, my empirical data indicates that it is one among the other factors that will impact the project outcomes however most of the interviewees believed that if the project team members are highly competent, they can handle the entire project themselves. This can be due to the difference in the organizational structure and as discussed earlier, the horizontal coordination in the organization. My findings support the notion that when the project team is small and highly competent, the requirement of a project manager remains the same but the amount of contribution and dependability on the manager might vary. Let's see the case of NSF project. Project manager indeed was necessary in order to resolve the issue the customer faced. This confirms my notion that project managers presence is required and contribution can differ in each project. Since this project faced some issues, the contribution from the project manager was higher. However there was no use of project champion and was not a factor that contributed to project success.

Considering the theory, Kræmmergaard and Rose (2002) described a comprehensive lists of roles and competencies for a project manager which includes – working with the power distribution in the organization, project planning and finding qualified people, shaping technology, training, leadership and ability to communicate with people. Some of the interviewees also revealed these responsibilities of a project manager and highlighted that their use can lead to efficient working in the project. Evidently my collected data and theory state the same for the responsibility of a project manager. The project activities definitely contribute to successful implementation of projects.

Based on these findings, I believe that the Proposition F9 can be combined with Proposition M2 excluding the role of project champion. The proposition M2 is supported by my empirical findings and can be considered as valid.

In conclusion, project championship might not be necessary for all ERP implementation projects and can be useful in huge ERP implementation. The role of project champion and project manager can be overlapping in some cases. Although including a Project Manager in ERP projects can be beneficial and can contribute to project success, the degree of involvement and contribution is dependent on the competence and capability of existing team.

### ***Vendor support***

*Proposition F10. Having a vendor support in a project can increase the chances of successful project delivery.*

As discussed in the theoretical background (Chapter 2 ), choosing good vendors help projects in technical issues, training and reduces the overall implementation costs. They also help in customizing the ERP package. In Chapter 4 (Empirical data) I presented the data with respect to this factor. My research findings were found to be in accordance with the theory on vendor support. One of the interviewees indicated that vendor support is required if the customer gets back with any technical issues. However, what I analysed from the data is that this might not be the case in all the projects. The ERP package is usually standardized solutions. Interviewees agree that if customer needs customization, they need to contact the vendors. Additionally, the data shows that this might not occur often, especially in case of small ERP projects. Interviewees indicated that the projects are usually similar which include upgrading old system or similar business process, where involvement of vendors is limited.

One of the interviewees also pointed the facet of responsibility. Once the customer signs the contract most of the technical assistance is done by the organization itself and not the vendors. In contrary, customer of the NSF projects revealed that a support is always important and appreciated from the vendors. However not all issues can be handled by the vendor. My understanding of vendor support in ERP projects is thus mainly in the initial stages of the projects where they provide the software and during training and final stages if there are any issues on the system though this might not be common in most of the projects. I believe that the involvement of the vendors could be in the critical stages of the project. Referring to some of the interviewees indicated 'every project has some kind of customization', I believe there can be involvement of vendors in most of the projects in some areas at least as most of the customization process can include vendors. Since the vendors usually assist with the technological aspect (with respect to ERP system), I believe successful delivery might not be possible without their presence, as there might not be any use of an ERP system that do not work effectively (in Chapter 4).

As Wang et al. (2008) states, the modules of ERP system need to be maintained, updated and requires technical assistance. The author suggests that in order to maintain service responsiveness, a great deal of vendor support has to maintained in projects. Theory also states the ERP consultants to reduce the dependence on the vendors (Al-Mashari et al., 2003) which was indicated by some of the interviewees where they revealed that they perform most of the maintenance and technical assistance in house and not with the vendors. I believe when organizations implement ERP system, it can be a long-term commitment where one will need some kind of technical assistance and upgradation, so vendor support is inevitable.

Overall, my findings reveal that it might be necessary to have vendor support in projects for successful delivery however the amount of involvement can certainly differ throughout different stages of project. It is also indicated that companies try to reduce the dependence on vendors. This is revealed in the theory and the data I collected. Hence evaluating the importance is intricate in this case. Considering the different project stages, vendor support might be required in the initial stages and post project stage, if any technical issue occur.

Thus, I would say that my proposition might be valid but can be modified where it indicates vendor support can be the most important in initial and post project stages if any technical



assistance is needed. However, I would not consider the factor imperative as my findings suggest that reducing the dependence on vendors can be beneficial for ERP project success.

### ***End user involvement***

*Proposition F11. User involvement in project activities helps in attaining ERP project success.*

User satisfaction is one criterion the project success is measured upon. The theoretical findings in section 2.2 discussed that this is one of the most important success factor in ERP projects. End user involvement is necessary to get the requirements right and understand and articulate their problems. My empirical findings reveal that end user involvement can be a critical factor for ERP implementation. All the interviewees had the same point of view regarding end user satisfaction. One of the interviewee highlighted that the solutions they provide is mainly used by end users and it becomes important that they are involved in most of the project activities. The end user involvement again is said to be effected by the use of project management methodology like Agile (see section 2.2) where there is more customer involvement. My research data reveals that the customers are usually involved in the initial stages where customer requirements are noted during- software development, to update the customer and get the feedback, final testing at their organization and while monitoring. Some of the interviewees believe that at some point of the project there is no need of involving the customer as there is less or no need of any communication or feedback required from them. Customer involvement was also the most discussed while considering the factor- effective communication. The customer in NSF project were satisfied with the amount of involvement in the project and believe there was considerable amount of communication. I believe this might be the reason why the customer still consider project as successful, even if project faced some challenges.

As (Françoise et al., 2009) state end users must be involved in the project from start till the end. The user involvement is highly emphasized for the reason to get the requirements right and The empirical data (Chapter 4) also indicates the same. More than the ease of use, user involvement was found essential (Amoako-Gyampah, 2007). Involving customers can increase the user acceptance and less likely to resist the changes in the system. Abdinnour and Saeed (2015) also indicated that involving end users in decision making, is highly linked to project success.

My collected data revealed that customers might set unrealistic expectations with respect to project scope. Thus I believe it is beneficial if the customer is involved through the project activities to come in terms with a realistic deadline. This is in line with the theory François et al. (2009) where he highlighted the need of developing realistic expectation, reducing the conflicts and better mastery of the system. I relate this with the NSF project in this case study. Customer's interview data (NSF project) suggests the issues they faced was well handled by the project team by replacing one of the team member. This would not have been possible if there was no involvement of the customer with the organization itself. I believe the customer of the NSF project considers this project successful is due to the adequate involvement of the customer throughout the project. Hence I would say end user involvement can be inevitable for projects to be delivered successful. As my collected data observes the same as that of the theoretical concepts I consider there is no need of modifying of the proposition. I would say the proposition F11 is accurate.

## Summary

Based on the analysis of people related factors, five propositions remain valid while one of the proposition can be revised. Effective communication was partly supported by the theory (with customers) and further research is required on stakeholder communication. Table 7 below, lists all the relevant propositions before and after analysis. Two of the factors- *top management support* and *project champion* were dependant on organizational structure and project size respectively. Hence the proposition on these factors were considered not valid, with respect to all ERP projects. These two factors are considered as ad-hoc factors, as these can vary from one project to another.

Table 7 Analysis of propositions (people-related factors)

Pre-Analysis	Post Analysis	Result
Proposition F1- <i>Project teamwork and composition can aid the chances project success</i>	Valid	Imperative
Proposition F3- <i>Top management support helps in attaining project success</i>	Not valid; Top management support can vary in different projects based on the existing organizational structure and coordination.	Ad hoc
Proposition F6- <i>An effective communication in a project can help in achieving ERP project success</i>	Valid  < An effective communication with the customer in a project can help in achieving ERP project success. While communication with customer is critical, internal communication might vary in different projects. Further research is required on interdepartmental communication in ERP projects>	-
Use of Leadership through Proposition F9- <i>a project champion in ERP projects can contribute to ERP project success</i>	Not Valid; Use of project champion can be dependent upon the project size and requirements.	Ad hoc
Proposition M2- <i>A competent project manager can contribute ERP project success</i>	Valid <In ERP projects, a competent project manager with leadership skills can help in successful execution of projects>	Imperative
Proposition F10- <i>Having a vendor support in a project can increase the chances of successful project delivery.</i>	Valid <Having a good vendor support in early stages and post implementation stages can increase the chance of successful delivery of ERP projects>	Imperative*
Proposition F11- <i>User involvement in project activities helps in attaining ERP project success.</i>	Valid	Imperative

Note-\* Theory and Empirical study suggested this factor can have an opposing impact on project success and this factor has be limited in the projects to deliver project success.

## 5.2 Project activity-related factors

All the factors, that do not necessarily focus on one or a group of key player, have been categorised under the project activities-related factors. This was the other category obtained while coding the collected data.

### ***Organizational culture and change management***

*Proposition F2. Organisational culture and change management helps in attaining the project success.*

In section 2.2, the importance of change management related to ERP implementation are discussed. Theory indicates that the existing culture is said to be disrupted by ERP implantation. Culture and change management becomes important to have a successful ERP projects.

In my research findings, different views were expressed in terms of change management and culture. As of culture was concerned, most of the interviewees highlighted that most of the customers they work with have similar culture. The reason for similar culture could be contributed by the geographic location. Norwegian traditional organizations can have similar working culture which means the culture at the customer and case company could be the same. This could also be a reason why customers chose a particular consulting organization.

Françoise et al. (2009) highlighted that an organizations culture reflects its openness to accept change. I could not however establish a correlation of culture and change management in the data I collected. As the organization has not emphasized much on the culture, I believe there was no much discussion among the employees. The data clearly states dealing with cultures was never an issue. However I infer that the organization prefer to work with customers with similar culture. In this way, there is better communication and understanding with the customer which helps in getting their requirements right. This could be an implementation strategy which helps in attaining success.

All the interviewees agreed that change management is an important factor to consider during ERP implementation. While way of handling the change management was seen differently by the interviewees, it was considered as a way to get the project goals right. While some of the interviewees consider change management could differ based on organization size and project scope. This is arguable as ERP projects are characterised to bring more functionality (Françoise

et al., 2009). This can be a change from the routine work or functionality at the workplace. The intensity of the change might be different with projects of different scope or based on the organizational size. If the organizational structure is complex, implementing new system might be prone to disrupt the way of working bringing more complexity. Hence the need of change management in such cases might be higher. The customer of NSF project considered the change management was very important to be addressed. She says that they were handled by positive mindsets of her employees. She also highlighted that the internal and external training was also useful for change management.

Somers and Nelson (2004) states ERP systems can bring huge changes in organizations. If the change is not handled, there can be resistance, errors and confusion. Finney and Corbett (2007) highlights that change management is underestimated by most of the organizations and suggests to prepare the team in early stages. The data collected shows that there has been considerable amount of change management initiatives in the organization. I believe this might be the reason my empirical data did not highlight any issues with change management. However, both data and theory agrees that change management has to be in the initial stages to get the project goals right, as indicated by (Wang et al., 2008). I believe both the activities of setting goals and change management should be addressed together so that there is better understanding among all stakeholders. Nevertheless, I believe there is more emphasis in the theory on how to resolve issues with change management practices rather than how it is done. My data indicates different intensity of change and this might be related to organizational structure but theory relates change to culture and employees (Finney & Corbett, 2007). Few insights from the customer interview support this theory that a positive employee attitude can help in accepting changes in the organization. Hence culture and employee attitude can be correlated to change management, though I believe there is a lack of evidence in ERP literature to prove relation between change and organizational structure. Based on my findings, more complex the change is, more difficult it is to bring all the employees on board in organizations.

In conclusion, my collected data and theory shows the importance and contribution of culture and change management for project success. Although the inter relationship is not clearly addressed in my data, I believe setting change management practices in the initially stage can be equally important. Hence I would still consider that my proposition is valid

### ***Clear goals and objectives***

*Proposition F4. Setting Clear goals and objectives can contribute to ERP project success.*

Theory emphasizes that effective project execution needs well-articulated project goals and objectives required for the implementation. Since the scope of ERP projects tend to go beyond the scope, so setting clear and realistic goals is vital. Goals and objectives should be consistent throughout all the project phases (Nah & Delgado, 2006).

In my empirical data (Chapter 4), all the interviewees revealed that getting the clear goals and objectives are the most important activity in every project. Some of the interviewees indicated that this is the core of the project and provides direction. It is the basis for projects and lets the team knows what to achieve. I believe there are two facets for this factor-1)getting the right information from the customer and 2) getting all the project members understand and work towards it.

In most of the discussions with the interviewees I felt that the emphasis on this this factor was given in the initial stages where most of the involvement with the customer took place. It was interesting to note that some of the customers have higher expectations and the project team has to work towards bringing down the expectation to more realistic goals. The theory also highlights this aspect. While involving the customer in the early stages, it is important to come in terms with respect to required goals and objectives (Françoise et al., 2009). My data also agree to this aspect and considers that goals and objectives are restated to the customer before starting the project. The data also revealed that this factor contributes the most to customer satisfaction in projects.

The second facet regarding this factor is related to the project team. As (Somers & Nelson, 2004) highlighted, the purpose of the project must be clear in all the stages of the project. My data indicates that the project team are all aware of the project goals in most of the projects, however if the goals and objectives are complex then it might be more important to focus on achieving them. The theory do not classify goals into any categories and gives equal consideration. Since goals are the base for any project, I believe it is not necessary for the goals to be classified in order to allocate focus on achieving them but this might work in a practical setting.

Al-Mashari et al. (2003) also highlighted that clear goals helps in assigning business goals to strategy of the organization. Customer of the NSF project indicated the clear goals were set in the initial stages of the project. My data also indicated that all the team members had the right understanding of the projects which would have contributed to the project success although the project faced some challenges.

Evidently, I believe my data is in accordance with the theory related to the factor of clear goals and objectives with respect to ERP project success. I believe there are two facets to consider while setting clear goals and objectives- 1) communicating with the customers for creating project plan 2) communication with project team in order to achieve the right goals. Both of them can be important and can shape the projects for successful delivery. Clear goals can be the foundation for the ERP projects and provides direction throughout the lifecycle.

I believe this demonstrates that my proposition F4 is supported by the data and is valid

### ***BPR and customization***

*Proposition F5. Use of Business process reengineering and customization in ERP implementation, might lead to ERP project success.*

Theory demonstrates that all the ERP packages need to be compatible with the business process and the system itself is customized in a way that it fits the organization. This factor is specifically important for ERP projects. As documented in Chapter 4, my empirical data reveals that there can be minimal customization and reengineering in the projects. It was interesting to observe that the customers avoid the hassle to go through each business process and reengineer it. The customer in NSF project wanted several modifications and had to perform multiple testing. The data clearly states that the case company tries to provide standard solution. This was also highlighted during the discussions on vendor support. Since the organization is trying to reduce the involvement of the vendors in the project, customization of the ERP system is held minimum in the project.

I believe that the reason for avoiding customization and reengineering in this case could be related to the project scope. As most of the interviewees indicated, the projects they handled are small ERP implementation projects. In such cases the focus can be more on the entire implementation so as to finish the project on time and specified budget. Customers might prefer

to avoid customizing as the process can involve vendors and extra hours in the project which can possibly increase the overall project cost. The theory supports my notion with respect to cost. Gupta et al. (2018); Kumar et al. (2003) pointed out that BPR can lead to delays and increase in project cost. Françoise et al. (2009) hence suggests that BPR and customization must be carried out carefully and requires appropriate tools and in-depth reviews.

Most of the theory indicates that BPR might be crucial for ERP implementation. Françoise et al. (2009) pointed out that it helps to revisit processes and find out new ways of doing things. While most of the theory suggests that the organization need to reengineer business process in ERP projects, there are few confusions with respect to customization. Finney and Corbett (2007) highlighted the term ‘vanilla ERP’ which emphasizes on less customization. These discussions indicate that the theory supports my empirical findings.

To conclude, I believe there might be a confusion in terms of the requirement of customization. Most systems might some kind of customization to fit into organization. So, it is not possible to completely avoid customization in ERP. There are different opinions in the theory and my data also suggests that there might be more focus on avoiding customization in ERP projects. My data also suggests that the customer prefer to avoid BPR which does not agree with the theory. Therefore, my proposition cannot be considered to be valid in this case.

### ***Software development, testing and troubleshooting***

*Proposition F7. Implementation of software development testing and troubleshooting can contribute to ERP project success.*

Theory demonstrates Software development, testing and troubleshooting are three activities considered to be crucial for any ERP projects. My findings in Chapter 4 (Empirical data) reveal the same about these three activities. All the interviewees considered these activities to be important in all the ERP projects. However, it was revealed that software development is not usually performed in house, and majority of the development is handled by vendors. The main activities the organization (in this case study) focus on is testing and troubleshooting. These activities are carried out the final stage of the ERP projects. My data clearly stated that the absence of these activities in the project indicates failure of the project. Testing and troubleshooting the system at the end is way of confirming that there are no issues with the system, in this way the customer does not come back with any technical issues.



If ERP implementation have to be successful then the project must have a testing phase (Kim et al., 2005). ERP implementation projects are also expected to foresee the unplanned issues. Hence Al-Mashari et al. (2003) emphasize that organization should include troubleshooting and testing as an ongoing requirement for success. I believe not all software can be developed perfectly and might need some kind of modification and testing before it is implemented at the customer end. Françoise et al. (2009) indicates the organization need to place strategies for bug fixing once the software is ready.

Clearly, theory emphasizes the importance of software development, testing and troubleshooting in ERP projects and its contribution to project success. Although my data do not include any information on software development, testing and troubleshooting were considered to be important and might contribute to project success. Thus, I would say my proposition can be still valid. The organizations can outsource the software and also perform this activity in house; however, I believe the process of software development might be inevitable in ERP projects.

### ***Monitoring and evaluation of performance***

*Proposition F8. Monitoring and evaluation of performance after implementing a system might lead to successful delivery of ERP project.*

In Chapter 2 (Theoretical Background), I framed the proposition that monitoring, and evaluation are important project activity which contributes to project success based on the theoretical background. However, the degree of monitoring and evaluation can vary in different projects.

Different perspectives were observed with regards to these activities, in the empirical data in my Chapter 4 (Empirical Data). Although some of the interviewees considered that there is no requirement to monitor and evaluate the performance of the system, some indicated that there is need for being available for the customer after implementation so as to help them with any issues they face. The reason for this deviation in the data can be the different roles, as some roles might have more responsibility in assisting the customer after implementation. For example, the project manager might be the first contact for the customer to approach after

implementation. Therefore, the manager monitors the system and its performance. Project Manager can also be the one responsible if there is any issue with the system after implementation. This might not be the case for another project team member in the team. For example, a software test engineer might be only called upon if there is any assistance needed in testing. Therefore, I believe that different project team members can have different ideas when it comes to the activity of monitoring and evaluation.

According to the theory this is the final activity in the ERP projects and is critical while considering project success. As Françoise et al. (2009) highlighted if the system cannot be evaluated then it cannot be managed. Furthermore, from my data analysed I believe not all the project members were part of this activity. This might be the reason why it is suggested that all the project members should be involved in the project activity in order manage their expectations (Kumar et al., 2003).

Overall, I believe it is difficult to evaluate the proposition F8 without more empirical data. Since the theory references only to some parts of the collected data, further research and interviews (large sample) are needed to verify the validity of the proposition. Therefore, I consider the validity of the proposition to be indecisive.

### ***Knowledge management and training***

*Proposition F12. Knowledge management and training can contribute to ERP project success.*

Theory highlights the importance of training and knowledge in ERP projects. Without adequate knowledge and training for the users, the system is practically of no use. My proposition considers both are crucial and contributes to project success. As documented in Chapter 4 (empirical data), my empirical data reveals that these factors can be important in all the ERP projects they handled. Training is seen a means of establishing happy customers. One of the interviewees indicated that by providing adequate knowledge and training the users, they establish trust with organization and the system. In case of self-explanatory products, user manual and documents were provided to the customer. I infer that some kind of information or training can be provided to the customer thereby maintaining customer's trust and better satisfaction with the system.

Furthermore, different types of training for customers were also indicated in my findings. Heavy users have dedicated workshop phase in the project, formal training session for the super users and normal end user training receives simple training. The data also highlights that training usually take place in the final stages of ERP projects.

From the customer end, additional internal training was provided to the users of the system. My findings from the interview data with the customer (NSF project) revealed that they conducted internal training and the super users also learn from each other. Customer emphasized that the training and knowledge is critical when a new system is implemented in order to receive its value.

My findings indicate that this factor might be inevitable in any case of ERP projects. I believe if there is no adequate knowledge and training, then the users might not be able to see the benefits of the system and the technology implemented becomes insignificant. Additionally, source of knowledge can be different perceived by different roles. It can be project manager or the consultants of the project.

The role of training and knowledge sharing is well documented in the theory. Somers and Nelson (2004) highlighted that if the users' skills on ERP system have to be improved, training has to be provided on a continuous basis. There is different focus on theory with respect to training. Bingi, Sharma, and Godla (1999); Kumar et al. (2003) highlighted the uses of project team training and the user training for ERP projects respectively. This is confirmed by the empirical data where the project manager indicated the different types of training. Kumar et al. (2003) also indicated that training can improve the chances of user acceptance of the system, which was highlighted in my empirical data. As discussed above, my findings revealed that training and knowledge can help in build trust in the customers. User acceptance might only be possible when there is confidence for using the system. I believe that training and knowledge can create trust in the users bringing in more confidence and acceptance on the system. Hence I believe both my empirical data and theory might be in accordance. Theory also reveals that training and knowledge management is a vital consideration for ERP projects for successful implementation (Wang et al., 2008). Theory also indicates that this project activity takes place in the final or enhancement stage (Figure 2) of the project (Somers & Nelson, 2004).

Overall, my empirical data and propositions are supported by the theory. Both theory and my findings suggest that training and knowledge management can be an important part of ERP projects and it might help in building trust within the users and leads to better customer satisfaction with the system. Though this activity takes place in the final stages of the project, I believe it might be important to ensure some kind of documents or training before implementation at the customer site. Hence I consider that my preposition for knowledge management and training is still valid.

### ***Project Management Methodology***

*Proposition M1. Use of appropriate project management methodology can help in ERP project success.*

Theory has emphasized there is a relationship between project management methodology and project success. There are different project management methodologies, however I have found that Agile, Prince2 and PMBOK are the most applied ones in ERP projects. In Chapter 2, I demonstrated how these methodologies can contribute to project success. Agile methodology introduced better scheduling, flexibility, risk management and trust in the ERP projects. Prince2 methodology lead to better risk reduction and PMBOK aids better project planning and provides knowledge on scope, time and cost. I have also emphasized the relevance of PMBOK with respect to all other success factors.

In Chapter 4 (empirical data) different perspectives can be observed, when it came to project management methodology as a success factor for ERP project success. Some of the interviewees indicated that the use of project management elevates customer satisfaction, while some of the interviewees believed that the use of project management methodology can be dependent on the projects. However, all of them agreed that project management is an effective tool which can be essential for ERP projects.

My findings also indicate that there is more emphasize on the project manager rather than PMM. This is arguable as I believe project manager might need to have the competence and knowledge on project management frameworks and tools and know to implement them in the project. I believe that effectiveness of the project can lie in both project management methodology and project manager. There were different perspectives, while considering the factors that are likely to be influenced by PMM. On one hand, some of the interviewees strongly believed that setting milestones, clear goals and objectives is likely to impacted by an

effective PMM like PMBOK. On the other hand, the other interviewees believed that communication can be improved with the use of an effective PMM. These perspectives were also expressed in the case of NSF project.

I anticipated that the Project Manager in this case might have more insights on the PMM and project success. He indicated that it is important to follow the activities prescribed in the chosen methodology for the projects. Choosing the right project management methodology for certain projects might be important consideration for the project team, unless the customer demands for certain methodology. I believe in such cases it might be important to discuss with the customer about the relevant methodology for the projects and come in terms with the customer regarding the most effective project management methodology for their project. As highlighted in my findings, the customers are not satisfied if the methodology they propose is not used in the project. My findings also reveal that not all the methodologies might be suitable for ERP projects. To remind in Chapter 2 (Theoretical Background), I listed three PMM – Agile, PMBOK and Prince 2. My data revealed that Agile might not be a preferred methodology for the ERP projects and indicated there are issues associated with agile methodology, however PMBOK was found to be effective in most of the projects in the case company.

My findings indicate that the project manager had more knowledge and understanding with respect to project management methodology when compared to any other interviewees. I believe this can be due to the lack of in-depth in project management.

Based on the empirical data and theory Agile methodology might not be an effective methodology for ERP projects. Isetta and Sampietro (2018) highlights that there are few challenges while using Agile methodology for ERP projects and necessary adjustments might be made to the methodology. Carton et al. (2008) indicated that PMBOK can be an effective framework for ERP projects. This methodology also addresses some of the success factors of ERP projects. The study by Nasir et al. (2015) reveals that change management activity was influenced the most by the use of PMBOK methodology. However, my findings indicated effective communication and clear goals and objectives might be the two factor that was influenced the most. Referring back to the study, both of these factors were found to be addressed by the PMBOK to a certain extent (Nasir et al., 2015). Hence, I consider that the data might be partly supported by the theory.

The PMBOK framework was considered as a fit methodology for the ERP projects by (Ara & Al-Mudimigh, 2011). This methodology was found to efficient and helped in reducing delays and re-work. Deploying ERP projects with effective PMM might lead to adaptability and agility. This supports some of my findings where effective PMM was correlated to clarity in goals as I believe that clarity of goals can reduce delays.

Overall, it is difficult to conclude the relevance of project management methodology with respect to success of ERP projects in this case. Some of my findings are partly supported by the theory. My empirical findings indicate that PMBOK might contribute to project success and can address the other relevant factors of an ERP project. However, there might be a lack of empirical evidence with respect to Agile and Prince2. Hence, I believe the empirical data is not sufficient to find the relevance of this factor and need further research. I consider that the validity of my proposition to be inconclusive in this case.

### Summary

Based on the analysis of the project activity-related factors, four of the propositions remain valid. However, proposition F2 might be revised. Table 8 lists all the proposition pre-analysis and post analysis along with its importance (result) for the project success. Business process reengineering and customization is analysed as not valid as this factor can depends on the project size and customer; and might not be applicable to all ERP projects. Two propositions related to- Monitoring and evaluation of performance and use of project management methodology were inconclusive as there was no adequate empirical evidence to support the theory. Hence further research is proposed for these two factors.

Table 8 Analysis of propositions (project activity-related factors)

Pre- Analysis	Post Analysis	Result
<i>Proposition F2-Organisational culture and change management helps in attaining the ERP project success.</i>	Valid < Setting organizational culture and change management in the initial stages of the project can help in attaining ERP project success>	Imperative
<i>Proposition F4. Setting Clear goals and objectives contributes to ERP project success.</i>	Valid	Imperative
<i>Proposition F5. Use of Business process reengineering and customization in ERP implementation, might leads to ERP project success.</i>	Not valid  Use of business process reengineering and customization can depend on the customer and the project size. Customization can be a reverse factor for success as it increases time and cost in the project	Ad hoc
<i>Proposition F7. Implementation of software development testing and troubleshooting can contribute to ERP project success.</i>	Valid	Imperative
<i>Proposition F8. Monitoring and evaluation of performance after implementing a system might lead to successful delivery of ERP project.</i>	Inconclusive  <Needs further empirical evidence>	-
<i>Proposition F12. Knowledge management and training can contribute to ERP project success.</i>	Valid	Imperative
<i>Proposition M1. Use of appropriate project management methodology can help in ERP project success.</i>	Inconclusive  <Needs further empirical evidence>	-





## 6 Chapter- Conclusion and Future research

The main purpose of this thesis is to explore the applicability of different success factors, organizational and technical and methodological factors, for successful implementation of ERP projects. In previous chapters, I outlined the theoretical framework and evaluated it against the empirical data. Data was collected from the case company by conducting semi-structured interviews of the project team members of the NSF project. Previous chapter described the analysis of the data and outlined the characteristics of different factors in a small organizational setting. To recap, the purpose of this research is to answer the research question:

*RQ:* How to ensure the successful delivery of ERP projects through different success factors?

The following section will elaborate the main findings of this research. Subsequently, I have also discussed the practical implications of this research along with the limitations and future work relevant to this thesis.

### 6.1 Main findings

To answer the research question, a qualitative study of ERP projects in TietoEVERY, Trondheim was performed. Semi structured interview was carried out with participants who works at various positions in the case company, ranging from sales consultant to project manager. The intention of interviewing different participants at different levels were to obtain different perspectives on the success factors with respect to ERP projects.

A theoretical background was introduced that included factors from both organizational and technical factors based on critical success factor model (adapted from Finney and Corbett (2007) and methodological factors of ERP implementation. The former category included factors 12 factors and methodological aspects included two factors - role of project managers and project management methodology. For each factor, relevant proposition was made in terms of successful project delivery. To remind, these factors were equally applied to all ERP implementation projects.

Subsequently these propositions were assessed based on the data I collected from the interviews. The analysed data revealed that the organization is a small to medium organization.

In chapter four, the data was categorised as People-related factors and Project activity-related factors and discussed the relevance and applicability of each factor for ERP project success. Overall research shows that the success factors were generally applied to all ERP projects in the theory and my findings indicate that these factors might not be generalisable for all ERP projects. The literature on successful delivery of ERP projects highlights numerous factors relevant to ERP project. However, all the factors might not be critical for project success in all the ERP projects. Though there are several quantitative research papers and literature reviews related to this topic, number of qualitative researches I found were few. This is was one of my main inspiration to conduct this study.

Additionally, the theoretical background also suggested that the studies on the success factor do not necessarily consider the factors like project size, type of customer and organizational size. Based on the results of this thesis, I believe these factors can have moderating influence on ERP project success.

#### *People-related factors*

Based on the findings from my empirical data, not all factors could equally contribute to ERP project success. Among the people-related factors, project teamwork and composition, effective communication, vendor support, project manager and end-user involvement can be imperative in ERP project success. Propositions related to these factors were supported the empirical data. However, my empirical findings did not clearly show the relevance of internal or interdepartmental communication in ERP project success. Effective communication was addressed in terms of customers and getting the requirements. Hence, I proposed further research on the importance of internal communication is necessary to determine the degree of importance. Additionally, vendor support was found to be important in the initially stages of ERP implementation. Although vendor support was necessary for ERP projects, my findings indicated that organizations emphasize on reducing the dependence on vendors in order to reduce the overall project cost. Based on my empirical findings, role of top management and project champion were not found to be a crucial factor in ERP projects. The importance of these factors can be dependent on project size, requirement and organizational structure. Since my case study was on a small to medium sized organization, these factors might be considered less important than the others. Consequently, I considered these factors as non-generalisable and ad hoc factors that can vary from one project to another.

### *Project activity-related factors*

Organizational culture and change management, setting clear goals and objectives, software developments, testing and troubleshooting were the project activity related factors with respect to ERP project success. My findings emphasized that the organizational culture and change management can be relevant during the initial stage of the ERP project. Additionally, my empirical findings indicated the relevance of business process reengineering can be totally dependent on the size of the project and the customer. My findings also indicated that excess use of customizing the system can increase the delay, cost and could be a negative factor while considering the project success. Hence, I considered this factor as ad hoc with respect to ERP projects. Additionally, there were two factors I considered to inconclusive with regards to ERP project success. Due to the lack of empirical evidence to support the propositions related to monitoring and evaluation of performance and project management methodology I concluded that there is a need of further in-depth research to evaluate their contribution to ERP project success.

### *The NSF projects*

To get more insights on ERP project, a case study was performed on an example ERP project. I assigned a pseudonym for this project as the 'NSF project'. Overall the project was considered to be successful. Although the project faced some challenges with one of the team members, customer indicated the issues were well handled by entire team at TietoEVERY. Some of the success factors for this project based on my empirical findings are- Effective communication, Teamwork, Efficiency of Project Manager, Vendor support and User involvement. My empirical findings indicate that effective communication and user involvement were two key success factors in this project which resolved the challenges and lead to overall project success. The customer also indicated that the positive employees, and external and internal training at their organization helped in acceptance and success of the new ERP system

## **6.2 Practical Implications**

The practical implication of this thesis is that organizations need to be aware, that project management as a factor is undervalued. Although my main focus has been in evaluating factors for successful implementation for ERP projects, I have also given considerable emphasise on project management as a factor. My findings indicated that role of project manager can be a key success factor in ERP projects. Although inconclusive, project management methodology

can also be a potential success factor for ERP projects. Moreover, managers need to carefully choose the project management methodology which is suitable for a particular ERP project. Subsequently, more emphasise must be given to the imperative success factors and focus on the ad hoc factors based on the nature of the project and the customer. I have enlisted the project activity and people factors as a checklist that project managers could consider while focusing on the activity for assuring project success (see Table 9 below).

*Table 9 Plan of Action for Project Managers*

	<b>Actions Required</b>
	Ensure effective communication and adequate involvement with the customers to get project requirements right
	Evaluate the requirement and involvement of top management in the project, ensure there is efficient communication within the team and vendors.
	Restate the goals of the project, communicate and guide the project team with clear objectives and also choose the right methodology for the project
	Ensure the system requires minimal changes, thus reducing the need of customization of the system.
	Once the system is developed, test the system in order to reduce the chance of failure of the system.

### 6.3 Limitations

Although I followed case study research method, I believe the sample size of the study was small. A larger sample size would have provided more insights on the success factors. Due to limited scope of this thesis and COVID-19 situation, the interviews were also conducted online where I could not perform participant observation (as suggested by (Bryman, 2016)). Additionally, I believe a comparative research design on multiple cases would provide better insights on different types of ERP projects in different organizational setting.

Secondly, most of the participants (except the project manager) had limited experience or lacked in depth knowledge in project management. This affected my empirical data while evaluating the project management methodology as a factor. Interviews, including more project

managers with experience in ERP projects, could have provided better insights on relevance of Project Management Methodology in project success.

The third limitation is regarding the number of success factors. Based on the size of the project the lists of factors that facilitates the project success can be in numerous. Ngai et.al' s (2008) study underlined about 82 success factors across various countries. As mentioned earlier, due to the limited scope and capacity of this thesis, it was not possible to include all the factors in this thesis.

The final limitation of this research is the cultural difference. My findings revealed the results based on a traditional Norwegian organization. The results might vary if this research is performed in an organization with different culture and different geographical region.

## 6.4 Future Research

Based on my findings and considering few limitations discussed in the previous section, there are few potential areas for further research. Firstly, I believe similar qualitative research could be conducted in various small to medium consulting organizations to gather more insights on all factors listed in this thesis. This research will provide conclusions on the factors- Monitoring and evaluation of performance and internal communication. I would also propose a large sample size for this research.

Secondly, I propose further research on the factor project management methodology and its significance in ERP project success. As mentioned earlier most of the academic literature do not specifically investigate the importance of project management methodology in ERP projects. Based on my findings, there can be considerable relationship between both project management methodology and ERP project success. A possible research question for this research can be – How does project management methodology influence the ERP project success?

Lastly, there are digital advancement in ERP systems (Gupta et al., 2018). Further research can be applied to advanced ERP system that includes AI and cloud computing. It will be interesting to observe the applicability of results of this thesis in such a complex ERP system.

## 6.5 Conclusive Remarks

My findings suggest that although ERP systems are widely implemented, the success factors for each implementation might not be the same. This is an important aspect to keep in mind while investigating the success rate of ERP projects. My findings suggest that potential of few factors like project management methodologies seems to under researched. I believe the theory on successful ERP implementation must be adjusted and focus on including factors like project size, customer, technology type and organizational setting.

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## Appendix A- Invitation and Consent Letter

### Invitation to participate in a research project

We hereby invite you to participate in our research project. The objective of the research is to identify the benefits of digitalization and its success factor in terms of a digitalization project. We, therefore, want to investigate what organizations have been, are, and will be doing - in terms of digital initiatives and organizational development. The research is conducted as part of our master thesis at, The Department of Industrial Economics and Technology Management NTNU. TietoEVERY AS is a collaborative third-party providing guidance and supervision for the research project.

#### Why are we inviting you to participate?

We are reaching out to organizations who are in the process of digitalization and are able to benefit from digital initiatives and outcomes.

#### What does it mean for you to participate?

- Interviews will be conducted Face-to-Face by Yamini Jayaram. All interviews will be conducted at the respondent's preferred location. The interview will take roughly one hour. We plan to record the interview for transcription (pending permission from the respondents).
- The interviews will be conducted in English, but we can also conduct the interviews fully, or partially in Norwegian.
- The interview will revolve around the organization's digital initiatives – from an organizational perspective. Therefore, digital initiatives and their relation to the overall business strategy and organizational development will be in focus.
- We promise full anonymity. All transcripts will be anonymized, and the participants may receive the recordings on request as well as the transcribed key findings from the interview with the option to confirm, withdraw, or add information.
- If you accept to participate, you are free to withdraw your participation at any time.

#### Data protection – how we store and process information.

We will only use the information you provide according to the guidelines as presented in this document. We shall manage your data with confidentiality and in accordance with the data protection regulations. Only Yamini Jayaram – the researcher will have access to the collected data. Neither TietoEVERY AS, nor our supervisor at NTNU will have access to the collected data. To protect the data, we are using recording equipment and computers provided by the Norwegian University of Science and Technology – NTNU – Department of Industrial Economics and Technology Management. All data collected will be stored locally on a personal computer.

- In regard to personal information, we will use codenames, and the coded personal information will be stored separately from the device we are using to process the data.

- The participants and their organizations will not be recognizable in the publication, and we will only present extracts of the anonymized findings from the interviews.

#### **What happens to your data and information after the research project?**

The project will end in June, and we will store the data until the end of July 2020. I.e., the information will be deleted from the computer and returned to the research institution responsible for the research project - Norwegian University of Science and Technology - NTNU - Industrial Economics and Technology Management.

#### **Your Rights**

As long as you can be identified in the data material, you have the right to:

- Insight in the personal information, which is registered about you,
- have your personal information corrected,
- Have your information deleted,
- Obtain a copy of your personal information (data portability), and
- To send a complaint to NTNU's Data protection officer (personvernombud), or The Norwegian Data Protection Authority (Datatilsynet) regarding the handling of your personal information.

#### **What gives us the right to handle your personal information?**

We handle your personal information base on your consent.

On the assignment from the Norwegian University of Science and Technology - NTNU - Industrial Economics and Technology Management, NSD - Norske senter for forskningsdata AS (the Norwegian center for research data) has assessed that the handling of personal information in this project is in accordance with the GDPR.

Best regards,

Parinaz Farid  
(Supervisor)

Yamini Jayaram  
(M.Sc. student)

---

I have read and understood the information about project "Organizational Capabilities as an Enabler for Digital Transforming," and have been given the opportunity to ask questions. I consent to:

- ☐ To participate in the interview.

I consent to my information being handled until the project end at the end of July.

---

(Date, project participant signature)

## Appendix B- Interview Guide

### Interview guide- Customer

1. Hva er din nåværende rolle i organisasjonen din? Hvor lenge har du vært i den nåværende organisasjonen?
2. Er du enig i at ERP er det første trinnet til digitalisering av en organisasjon?
3. Hva var hovedmålet for å implementere ERP i organisasjonen din?
4. Var du involvert i diskusjoner med EVERY i alle faser av prosjektet? var du fornøyd med mengden diskusjon du hadde med EVERY under prosjektet?
5. Oppfylte prosjektet alle kravene eller var det noen endringer til- TIME, BUDGET, SCOPE?
6. Tror du implementering av ERP var gunstig? Gjorde det forretningsprosessene mer effektive?
7. Hadde du tilstrekkelig opplæring i ERP?

### Project Success

8. Anser du dette prosjektet som vellykket?
  - Hvis ja, hva bidro mest til dette prosjektets suksess?
  - Hvis nei, hvorfor tror du prosjektet var mislykket?
  - Tror du dette prosjektet hadde en effektiv leder? Tror du det påvirket prosjektets suksess?
  - Tror du teamet hos EVERY hadde god kompetanse? Tror du det påvirket prosjektets suksess?

### Project Management

9. Tror du dette prosjektet brukte en effektiv prosjektledelsesteknikk?
  - Tror du prosjektlederen har god kunnskap om verktøy for prosjektledelse og teknikker? Tror du det påvirket prosjektets suksess?
10. Tror du bruken av effektiv prosjektledelse bidro til prosjektets suksess? hvis ja, hvordan?

### Interview Guide- Project Team Members

#### Role

1. Could you explain your role in the organization?

### **Talent and people**

2.Can you describe how the talent pool in the organization has developed over the given period?

### **Project specific**

3a. How do you think the stakeholders/ project team would rate the success of the project? How do you rate the project success?

3b. How do you rate the client's satisfaction with the project's results so far?

### **ERP projects**

4.Do you think ERP implementation can impact in modern business and their journey towards digital transformation? If yes, How?

a Could you, in a introduce us to the strategic objective of a typical ERP project?

b. How many stages or lifecycles does a typical ERP project have?

c. What do you consider as the important activities of the ERP project?

d. How is the Customer involvement in ERP projects?

### **Success factors**

5.How do you think are the factors listed below relevant to ERP project success, Lets discuss one by one?

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List of factors

Project teamwork and composition
Organizational culture and change management
Top management support
Clear goals and objectives
BPR and customization
Effective communication
Software development, testing and troubleshooting
Monitoring and evaluation of performance
Project champion
Organizational structure
End-user involvement
Knowledge management and training

### **Project Management**

6a. How do you think a project manager contributes to project success?

6b. How do you think the organizations project management techniques and framework addresses these success factor?

7. **How** do you think use of an effective project management framework (like PMBOK or PRINCE2) has an effect on project success?

8. Which of the factors listed in the table might be impacted by a project management methodology and why?

## Appendix C- Research Permit from NSD



### NSD sin vurdering

#### Prosjekttittel

Determining the impact of digitalization project of streamlining the business process

#### Referansenummer

279753

#### Registrert

13.03.2020 av Yamini Jayaram - yaminij@stud.ntnu.no

#### Behandlingsansvarlig institusjon

Norges teknisk-naturvitenskapelige universitet / Fakultet for økonomi (ØK) / Institutt for industriell økonomi og teknologiledelse

#### Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Parinaz Farid, parinaz.farid@ntnu.no, tlf: 73412123

#### Type prosjekt

Studentprosjekt, masterstudium

#### Kontaktinformasjon, student

Yamini Jayaram, yaminij@stud.ntnu.no, tlf: 92063639

#### Prosjektperiode

13.03.2020 - 30.06.2020

#### Status

16.03.2020 - Vurdert

#### Vurdering (1)

##### 16.03.2020 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet 16.03.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

#### MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. For du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:

[https://nsd.no/personvernombud/meld\\_prosjekt/meld\\_endringer.html](https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html)



Du må vente på svar fra NSD før endringen gjennomføres.

#### TYPE OPPLYSNINGER OG VARIGHET

Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 30.06.2020.

#### LOVLIG GRUNNLAG

Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

#### PERSONVERNPRINSIPPER

NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke viderebehandles til nye uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

#### DE REGISTRERTES RETTIGHETER

Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

#### FØLG DIN INSTITUSJONS RETNINGSLINJER

NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

#### OPPFØLGING AV PROSJEKTET

NSD vil følge opp planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet. Lykke til med prosjektet!

Tlf. Personverntjenester: 55 58 21 17 (tast 1)

