

Mika Hartio

**CRITICAL SUCCESS FACTORS IN MULTINATIONAL
ERP PROJECTS - PREPARING AND EXECUTING THE
IMPLEMENTATION ACROSS BORDERS**



UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF INFORMATION TECHNOLOGY

2019

ABSTRACT

Hartio, Mika

Critical success factors in multinational ERP projects - Preparing and executing the implementation across borders

Jyväskylä: University of Jyväskylä, 2019, 79 pp.

Information systems, master's thesis

Supervisor(s): Pulkkinen, Mirja

ERP implementation projects and critical success factors (CSFs) in those projects have been studied in length in the past two decades. Still, ERP projects that are conducted across the borders of country where the project is initiated have not received the attention they deserve in academic literature, especially when it comes to the studies that combine CSFs and multinational ERP projects. Interconnections of the CSFs have also been scarcely studied in the previous literature, even though many of those connections seem highly obvious. This study dove into these issues first as a literature review and then as a qualitative case study. Employees of a Japanese ERP consultant company that specialize in multinational implementations were interviewed in order to identify the managerial differences between domestic ERP projects and multinational ERP projects through the theory and connections between CSFs. After analyzing the data, multiple implications in the CSFs were found that strongly separated the domestic and multinational implementation types from each other. Also, multiple connections between the CSFs were identified. By combining the implications and the connections, a nascent framework was created that can be used by the managers and consultants likewise as guidelines to prepare and execute multinational ERP implementation projects.

Keywords: Enterprise Resource Planning, ERP, Critical Success Factor, implementation, multinational, global, local

TIIVISTELMÄ

Hartio, Mika

Kriittiset menestystekijät kansainvälisissä ERP-projekteissa - Käyttöönnoton valmistelu ja toteutus yli valtiollisten rajojen

Jyväskylä: Jyväskylän yliopisto, 2019, 79 s.

Tietojärjestelmätiede, pro gradu -tutkielma

Ohjaaja(t): Pulkkinen, Mirja

ERP-käyttöönottoprojekteja ja kriittisiä menestystekijöitä näissä projekteissa on tutkittu paljon viimeisten kahden vuosikymmenen aikana. Tästä huolimatta ERP-projektit, jotka on toteutettu yli valtiollisten rajojen, eivät ole saaneet ansaitsemaansa huomiota akateemisessa kirjallisuudessa, erityisesti sellaisten tutkimusten tapauksessa, jotka yhdistävät monikansalliset ERP-projektit ja kriittiset menestystekijät. Kriittisten menestystekijöiden välisiä yhteyksiä on myöskin häidin tuskin tunnistettu aiemmissa tutkimuksissa, vaikka monet näistä yhteyksistä vaikuttavat erittäin selkeiltä. Tämä tutkimus sukelsi näihin aiheisiin ensiksi kirjallisuuskatsauksena ja tämän jälkeen laadullisena tapaustutkimuksena. Monikansallisiin ERP-projekteihin erikoistuneen japanilaisen ERP-konsulttifirman työntekijöitä haastateltiin, jotta tunnistettaisiin johdannolliset eroavaisuudet kotimaisten ja monikansallisten ERP-projektien välillä, tarkastellen kyseisiä projekteja kriittisten menestystekijöiden ja näiden välisten yhteyksien kautta. Datan analysoimisen jälkeen useita implikaatioita löydettiin, jotka erottivat vahvasti kotimaiset ja monikansalliset käyttöönottoprojektit toisistaan. Useita yhteyksiä löydettiin myös kriittisten menestystekijöiden väliltä. Yhdistämällä löydetyt implikaatiot ja yhteydet luotiin viitekehys, jota johtajat ja konsultit voivat käyttää ohjenuorana valmistellessaan ja toteuttaessaan monikansallisia ERP-systeemien käyttöönottoprojekteja.

Avainsanat: Toiminnanohjausjärjestelmä, ERP, Kriittinen menestystekijä, käyttöönotto, kansainvälinen, globaali, lokaali

FIGURES

Figure 1: ERP implementation Context	14
Figure 2: ERP system implementation phases (version 1).....	15
Figure 3: ERP system implementation phases (version 2).....	17
Figure 4: ERP system implementation phases (version 3).....	18
Figure 5: Microsoft Sure Step	21
Figure 6: Software development across multiple time zones.....	37
Figure 7: Connections between the CSFs	57
Figure 8: A nascent framework for multinational ERP project preparation and execution.....	68

TABLES

Table 1: Global CSFs in ERP Implementation projects.....	27
Table 2: CSFs with local implications	34
Table 3: Interviewee backgrounds	46
Table 4: Local implications in global CSFs.....	54

TABLE OF CONTENTS

ABSTRACT	2
TIIVISTELMÄ.....	3
FIGURES	4
TABLES	4
TABLE OF CONTENTS.....	5
1 INTRODUCTION.....	7
2 LITERATURE REVIEW	10
2.1 Term Definitions	10
2.1.1 ERP System.....	10
2.1.2 ERP Implementation Process.....	11
2.1.3 Critical Success Factors.....	12
2.1.4 Global	12
2.1.5 Local	13
2.2 ERP Implementation Process Models.....	13
2.2.1 Academic Models.....	13
2.2.2 Commercial Models	19
2.2.3 Comparison of the Models & Conclusion.....	23
2.3 Critical Success Factors in ERP Implementation Projects.....	25
2.3.1 Past studies.....	25
2.3.2 Global CSFs	26
2.3.3 Conclusion for Global CSFs	31
2.3.4 Local CSFs	32
2.3.5 Conclusion for Local CSFs	33
2.4 Multinational IT Projects	35
2.4.1 Multinational IT Project Dimensions.....	35
2.4.2 Comparison to Multinational ERP Projects.....	38
3 RESEARCH SETTING	41
3.1 Chosen Methods & The Case Company.....	41
3.2 Interview Structure & Execution	43
3.2.1 Interview Setting	43
3.2.2 Interviewee Backgrounds.....	45
3.3 Data Analysis Methodology.....	46

4	RESULTS & FINDINGS	48
4.1	Interview Results	48
4.1.1	Local Implications in Global CSFs	48
4.1.2	Connections Between the CSFs	56
4.1.3	Multinational ERP Implementations Through CSF Management	60
4.2	Enfolding Literature	63
4.2.1	Comparison to Literature Review.....	64
4.2.2	A Nascent Framework for Multinational ERP Implementations	66
5	CONCLUSIONS	69
5.1	Conclusion	69
5.2	Limitations of the Study.....	71
5.3	Topics for Future Research.....	71
	REFERENCES	73
	APPENDIX 1 INTERVIEW QUESTIONS.....	79

1 INTRODUCTION

Many studies have been conducted in the area of ERP implementation projects and critical success factors (CSFs) within those projects (Ram & Corkindale, 2014). Still, only a few studies have focused on the multinational ERP implementation projects through the CSF theories. CSFs are "...the few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his goal" (Bullen & Rockart, 1981, 3).

Multinational projects and domestic projects have their own distinctive qualities and they should not be viewed as equal in the terms of management, that is not an exception in the case of ERP. This study focuses on identifying differentiating factors between global and local CSFs in multinational ERP implementation project context. By the term global, we mean the term 'everywhere' and 'general'. In other words, if a critical success factor is determined as a global CSF, it is found to be relevant generally in all contexts and geographical locations.

The current literature that contains local implications of CSFs (targeted to certain geographic locations or specific situations) in ERP implementation context is generally limited to a single country, or the comparison of two countries (e.g. Cheng, Deng & Li, 2006; Shanks et al., 2000). Some, but a limited amount of research has been conducted about multinational ERP implementation projects in general (e.g. Sheu, Chae & Yang, 2004), but these studies have not been done from the perspective of critical success factors.

When it comes to CSFs in general, only a few have been empirically tested, making their usefulness questionable. It is a huge loss for companies to direct resources to unprofitable/unnecessary entities; a clear distinction between absolutely critical CSFs and less relevant CSFs needs to be made.

To fill this gap, this study seeks to identify the most relevant global (general) CSFs and the local implications within them in the multinational ERP implementation context, and to identify relevant managerial implications that could be derived from these results. These results could help managers to prepare and execute the ERP implementation projects in a multinational context.

Also, only a few notions of connections between CSFs have been mentioned in the literature, even though many of them seem clear and obvious. As the research setting allows us to also fill this gap, the possible connections and their managerial implications will also be researched in the study. With these notes, a total of three research questions are defined:

1. What are the local implications within the CSFs that are found to have the most empirical proof in multinational ERP implementation context?
2. How are the identified CSFs connected to each other and what managerial implications do these connections have?
3. Looking through the connections and local implications of CSFs, how should the management/approach for multinational ERP projects differ from a domestic ERP implementation?

In order to answer to these research questions, a literature review is first conducted. The literature review covers the areas of the research questions in order to find the current standings in the ERP related CSF literature and to build a base to understand the phases of the ERP implementation (and how they are connected to the CSFs), and the peculiarity of the multinational ERP projects.

An empirical case study is then carried out in which we interview a consulting company that specializes in conducting ERP implementations across borders to Japanese companies' foreign offices. Most of the companies that consult ERP implementations only do it domestically within a target country, making the case company in this study an interesting and optimal unit for measurement. The empirical data is then analyzed in order to see if it confirms/conflicts former research and if there were new implications to the relevant research area (research questions).

The information for the literature review was collected using online archives for academic publications such as IEEE Xplore and ACM Digital Library. Google Scholar was also used extensively to screen the relevant literature. The main keywords for the searches that were conducted in this report were: ERP + implementation, ERP + critical success factors + CSF, global + ERP + implementation, and global + IT projects. When choosing the optimal academic articles, the following questions were considered:

- When was the study conducted?
- How relevant is the study to the topic?
- What is the amount of references in the article?

When it comes to defining the terms, articles that contained a widely used definition for the term were preferred. For example, the definition for critical success factors made by Bullen and Rockart (1981, 3) was chosen because it is the original definition (developed in their research) and that definition has been used in the relevant literature extensively.

The empirical part of the study was conducted as qualitative case study. Qualitative data was collected with interviews between Finland, and Japan and Malaysia, utilizing Skype as the instrument for the execution and recording. The case study follows the eight steps of theory building as defined by Eisen-

hardt (1989). Coding techniques were used in analyzing and simplifying the collected data.

The empirical data provided rich results for all the research questions. When it comes to the local implications of CSFs, all the analyzed CSFs provided at least some implications that separated domestic ERP projects and multinational ERP projects from each other. The most implications were found from the CSFs of project management and training & education. In general, cultural issues and taxation/government regulations were considered to contribute to most problems in the projects.

When it comes to connections between the CSFs, it was found that all the CSFs are connected to at least some other CSFs, meaning that CSFs should not be focused on separately; managing a CSF is extremely likely to affect other CSFs as well. The CSFs that had the most connections were found to be project management and project team competence.

The third research question combined the findings of the first two. As the result, a roadmap in a shape of a nascent framework was created to guide consultants and implementing companies through multinational ERP projects. The framework can also be used as a starting point for research, when extending the scarce literature of multinational ERP projects.

2 LITERATURE REVIEW

The literature review consists of reviewing academic sources of information related to the topics of this study. The topics of the literature review are broken down into sub-sections: ERP implementation process models, critical success factors in ERP implementation projects, and multinational IT projects. The purpose of the literature review is to achieve understanding of multinational ERP implementation projects and CSFs in general, and to filter information in order to find the most crucial components for this research. First, the main terminology is defined to create a general understanding of the material studied.

2.1 Term Definitions

The most important terminology is defined in length in order to give a general understanding of the topic. Because it is possible that some people may understand some of the terms in slightly different ways, the term definitions used in this section will be the ones that are used from the start to finish of this study.

2.1.1 ERP System

An ERP system, short for *Enterprise Resource Planning* system is "... an integrated software solution that spans the range of business processes that enables companies to gain a holistic view of the business enterprise" (Ehie & Madsen, 2005, 545). ERP is deemed as an important tool in creating competitive advantage, because it integrates multiple areas of business and enables utilizing these areas together in unison (Shaul & Tauber, 2013). There are multiple different ERP system vendors, currently the most popular ones being SAP, Oracle, and Microsoft Dynamics (Shaul & Tauber, 2013). Each vendor has some unique properties in their systems, meaning that choosing the correct ERP system can be critical in maximizing the benefits for the organization (Ehie & Madsen, 2005;

Umble, Haft & Umble, 2003; Remus, 2007; Wu & Wang, 2007; Somers & Nelson, 2001).

Modern ERP systems are usually divided into multiple modules, meaning that a company wishing to implement an ERP system does not necessarily need to get all the modules, but merely get the modules that are relevant to their business. Koh, Gunasekaran, and Goodman (2011) describe modularized ERP systems as systems that are web-based and provide supply chain management (SCM) related support, customer relationship management (CRM) support, as well as the more traditional resource management support. The most typical modules are the likes of; finance & accounting, management accounting, human resources, manufacturing, order processing, supply chain management, project management, customer relationship management, and data services.

Many organizations prefer to customize their ERP system in the pursuit of gaining maximum benefits. This however may cause issues, as the ERP vendors have built the systems to be deployed as ready packages/modules and the organizations may not properly understand what sort of functionalities are optimal for managing their business processes (Vilpola, 2008). On the other hand, cutting down the number of functionalities for the pursuit of cost savings may also cause the implementing organization to accidentally miss critical functionalities that are required to handle all the business flows and end up costing even more.

Another way to customize the ERP system is to use third-party software that is usually supplied by the corresponding ERP vendor (Bendoly & Jacobs, 2005). The extensions can also vary with the supplier. Some of the offered features are for example: product data management, product life cycle management, data mining, and e-procurement (Leon, 2008).

Lately, ERP systems have been evolving along with technology advancements and cloud-based ERP systems have also emerged. The difference with the traditional ERP system and a cloud-based system is that the cloud-based system is either fully or partly virtual, meaning that it can be provided as a Software as a Service (SaaS). This type solution can be advantageous in areas such as cutting costs, improve data security, and system availability (Johansson, Ruivo, 2013). As the case company is currently providing consulting services of the traditional software version of ERP systems, cloud-based ERP systems are out of the scope of this research.

2.1.2 ERP Implementation Process

ERP Implementation process refers to the act of introducing the ERP systems to an organization, planning how the system will be implemented, executing the implementation, deploying the system, and maintaining the system (Ehie & Madsen, 2005). According to Ehie and Madsen (2005), the Critical Success Factors are in a key role when it comes to the ERP implementation process (see the next sub-section).

ERP implementation process encompasses more dimensions than just the phases of planning and execution. Dimensions like change management, training, and business development are deemed as extremely important for the success of an ERP implementation process (Ehie & Madsen, 2005; Ram & Corkindale, 2014). These dimensions are also related to the theme of critical success factors and are reviewed in further detail in the following sections.

If the implementation is successful, it can reduce costs in various areas such as inventory, labor, and IT maintenance (Shaul & Tauber, 2013). Literature still reports continuously that majority of ERP implementation projects fail (Umble, Haft & Umble, 2003; Ram & Corkindale, 2014; Liu & Seddon, 2009; Ehie & Madsen, 2005). It is also reported that 90% of ERP system implementations are either delivered late or the budget is exceeded (Chang, 2004). Common reasons for failure can be divided into two categories: failing to achieve corporate goals and failing to properly implement the system. Corporate goals can encompass a wide variety of elements, for example but not limited to improving development speed, improving quality control, or improving customer service. Failing to properly implement the system could be a result of matters such as insufficient training, or users' resistance to use the system. (Chang, 2004; Shaul & Tauber, 2013.) To improve the chances of success, ERP implementation process models have been created in order to guide the implementing organization and the consulting company through the process and to improve the chances of success. These models are presented later in this literature review.

2.1.3 Critical Success Factors

Critical Success Factors, or CSFs for short, mean the areas of ERP implementation that are a crucial in order to achieve success in the implementation project. The general concept of a CSF is defined as "...the few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his goal" (Bullen & Rockart, 1981, 3). CSFs in ERP projects are widely studied, and they can be viewed as one of the biggest themes in ERP implementation related literature (Shaul & Tauber, 2013; Ehie & Madsen, 2005). The CSF concept encompasses every dimension in the process from the more technical perspective to the more abstract view.

2.1.4 Global

In this study's context, the term global refers to the meaning of "everywhere" and "general". In other words, if an object is of global nature, it means that it is relevant in any part of the world and in any type of ERP project, and that specific object is treated/can be treated similarly across the globe. The term global will be especially used with critical success factors (CSFs). For example, a global CSF is without any changes to it, crucial in all the ERP implementation projects no matter where it is conducted, regardless of the type of the implementing or consulting organization. To avoid confusion, the widely used term 'glob-

al project' (referring to projects that span multiple countries) is replaced with 'multinational project' in this study.

2.1.5 Local

The term local is the reverse of global. It will be used to describe specific elements related to a certain context, generally used together with the CSFs. One of the goals of this study is to identify local factors within global CSFs. An example of a local CSF could be for example organizational culture; it differs greatly in different countries and contexts, requiring specific knowledge and preparation regarding ERP implementation projects. A local factor within a global CSF could be to identify, that cultural aspects influence the way in which the training should be conducted in the ERP project in a specific geographical context.

2.2 ERP Implementation Process Models

In this sub-section, we will introduce the theoretical basis of ERP system implementation process models and present the popular models in order to reach an understanding of how the ERP implementation process is generally conducted. It is important to understand the process of ERP projects so that the critical success factors can be connected to the projects more concretely and in order to be able to view the utilization of critical success factors from less of an abstract view and more from a practical standpoint.

At first, academic ERP implementation process models will be reviewed and then some of the models created for the commercial use are presented. Finally, these models are compared in order to reach a conclusion of where the current practical usage of the models stands.

The models are viewed from the abstract standpoint as what are the stages of the project and what kind of tasks each stage contains. The detail on each task will not be discussed as the purpose of this sub-section is to simply acquire the basic knowledge in order to understand the process that ERP implementation projects go through.

2.2.1 Academic Models

To understand the ERP implementation process models, one should first understand the participating stakeholders and the holistic view of the parts of the process and how these parts are connected. Wu and Wang (2007) present a simple model that presents the context of ERP implementation projects. According to them, generally two different types of stakeholders take part in the process: an internal project team, and external contractors. Internal project team generally takes care of the requirements and needs, and the external contractors provide the system (Wu & Wang, 2007).

Figure 1 presents the stakeholders and their interactions in a simple manner. As it can be seen from this model, ERP external contractors usually consist of ERP vendors, third-party service providers, and consultants, which means that these three parties are often in close communication throughout the implementation project, and they treat the ERP system users as clients (Wu & Wang, 2007). According to the model, ERP internal project team and ERP external contractors are communication together, and the internal project team then communicates with the user groups. Key users are the users that take part in the implementation phase as a part of project team. Key user group usually consists of employees that have a higher than average knowledge and/or experience of the information systems and can give insights about the desired functionalities of the implemented ERP system. The internal project team consists of management (client side), MIS (Management Information Systems) staff, and key users. ERP external contractors implement the system, and users will test the functions, use the system, and give feedback and change requests. (Wu & Wang, 2007.)

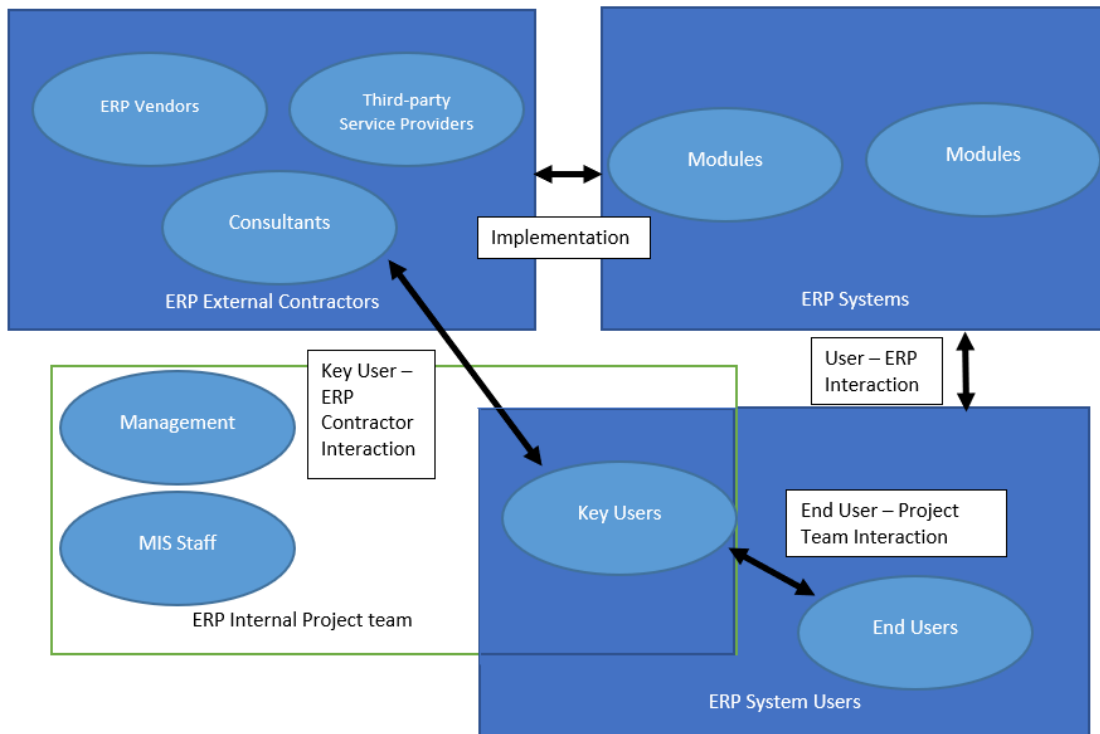


Figure 1: ERP implementation Context (Wu & Wang, 2007, 1585)

Looking at the academic models for ERP implementations, a corner stone for the studies has been a simplistic four-step model by Markus and Tanis (2000) (Vilpola, 2008). The model can be seen in Figure 2. This model consists of four phases: Project chartering, the project (configure & rollout), Shakedown, and Onward and upward. The model was created in order to give guidelines for the implementations while avoiding overemphasis on single elements such as methodologies. Goals are highlighted. The model is also created in order to be

able to trace problems to previous stages, as well as to be able to plan for the upcoming events and tasks. (Markus & Tanis, 2000.)

Chartering phase is about planning the project and choosing the ERP system, crafting a business case about it, choosing the project manager, and deciding the budget and schedule. This phase involves the largest amount of client-side decision making, thus making it crucial, as the client needs to have a clear business vision and they are under the risk of not understanding the needed changes in their business flows that come together with the ERP system or if there even is any need to implement an ERP system. The outcome of this phase can lead to either proceeding with the project or to disband it. (Markus & Tanis, 2000.)

The project phase focuses on physically implementing the system to unit(s) of the organization. The key tasks include everything from customizing the software according to the users' needs to data migration (moving the legacy data to the new system) and testing the system. (Markus & Tanis, 2000.)

The shakedown phase refers to the time when the ERP system has been implemented and the client organization is trying to utilize it in its processes. Activities during this phase include for example bug fixing, fine tuning the system, and retraining. This phase ends when the client organization reaches the stage in which it can continue its normal operations using the new system, or if the organization gives up on the system, thus failing the project. (Markus & Tanis, 2000.)

The last phase is called onward and upward phase. This phase spans the time when the implemented ERP system is used, until it is either upgraded or replaced with another system. The ERP external contractors may continue supporting the ERP service and the client organization may try to aim for continuous improvements in business and assess the benefits of the implementation. The latter two tasks are usually completely external from the consultants and other knowledgeable people, meaning that these tasks are not often conducted properly. (Markus & Tanis, 2000.)

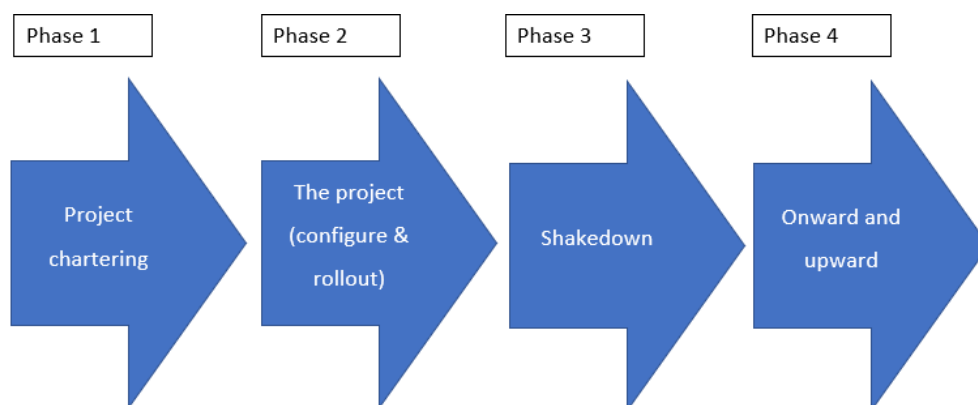


Figure 2: ERP system implementation phases (version 1) (Markus & Tanis, 2000, 189)

Two years later, a more extensive model was introduced by Rajagopal (2002). He used Kwon and Zmud's (1987) earlier model as a basis that was originally used as general means for IS implementation. This model consists of six steps instead of the original four. The steps are: Initiation, adoption, adaptation, acceptance, routinization, and infusion. The purpose of this model is to adapt the phases of general IS implementation to the ERP implementation, while pointing out the differences and idiosyncrasies of the ERP systems implementation.

Looking at the model from the perspective of the initial model by Markus and Tanis (2000), initiation step can be seen as very similar to project chartering as these both are about distinguishing requirements and needs of the company and the ERP system. However, the adoption step is separate, and it includes parts from the original project chartering phase. According to Rajagopal (2002), adoption phase includes investment decisions and initial cost-benefit analysis.

The following step, adaptation, is where the implementation itself begins and it can be viewed as similar to the project in the earlier model. The difference is that Rajagopal (2002) emphasizes the need for business process re-engineering (modifying business flows in order to utilize the new ERP system in full potential) and change management which were not paid much attention to in the initial model. Also, training phase is initiated in the adaption phase which was originally separately in the shakedown phase. (Rajagopal, 2002.)

In the acceptance step, customization is made to the ERP system according to the users' needs. According to Rajagopal (2002), benefits can already be measured here even though changes are still being made to the system. This is in conflict with the original model, as Markus and Tanis (2000) state that the measurements can only be made in the support phase (onward and upward phase). The acceptance step's main focus is to optimize the system to the users, but it also includes additional training (Rajagopal, 2002).

In the routinization step the system usage becomes a routine. What is left for the vendors and consultants to do is to correct bugs and give continuous support that are similar to the onward and upward phase of the original model. The benefit observations also continue. (Rajagopal, 2002.)

The final step is infusion. In this step the organization will already look forward to the next investment and continuously analyze if the current system is still feasible to the operational use. Infusion step can thus be connected again to the first step, initiation, making the implementation process a full cycle. The ERP implementation process model by Rajagopal (2002) can be seen in Figure 3.

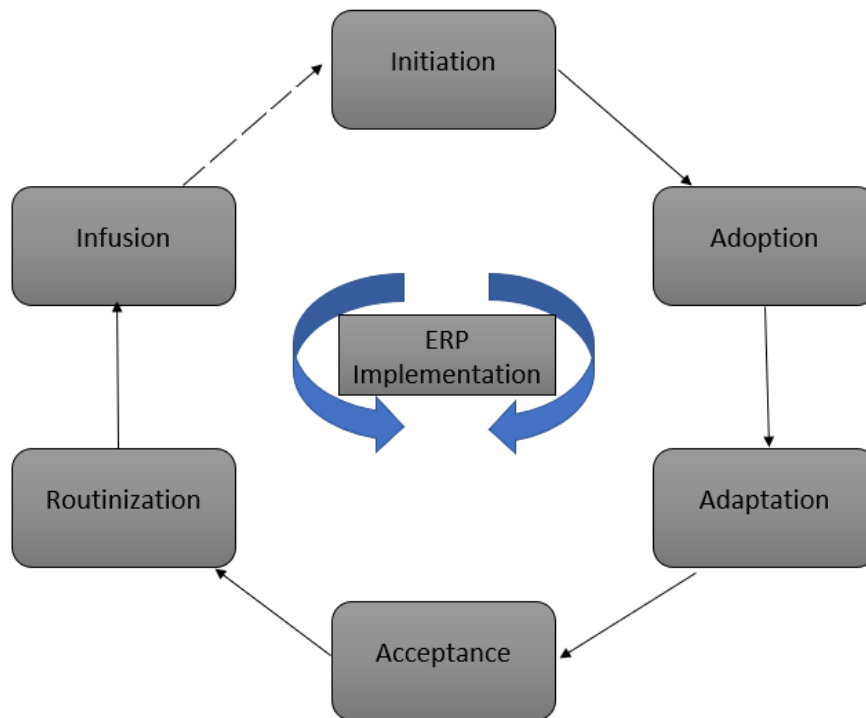


Figure 3: ERP system implementation phases (version 2) (Rajagopal, 2002, 92)

After these two models, the literature started focusing more concretely to the steps specific to the ERP implementation context. Looking at these two models, the steps appear as very abstract and that there was still yet to be standardized phases during the ERP projects at the time of these studies, even though these two reported similar tasks throughout the stages of the models.

Ehie and Madsen (2005) made a solid presentation of an ERP system implementation model that captures the stages and tasks that are mentioned in the literature and captured with extensive interviews of professionals. They divide ERP implementation into five stages, each stage containing sub-stages and tasks specific to the ERP implementation context. The five stages are: project preparation, business blueprint, realization, final preparation, and go live & support. The stages and sub-stages are presented in Figure 4. The model was created in order to handle CSFs, and to pinpoint them to specific areas of ERP implementation and to visualize the flows of these projects.

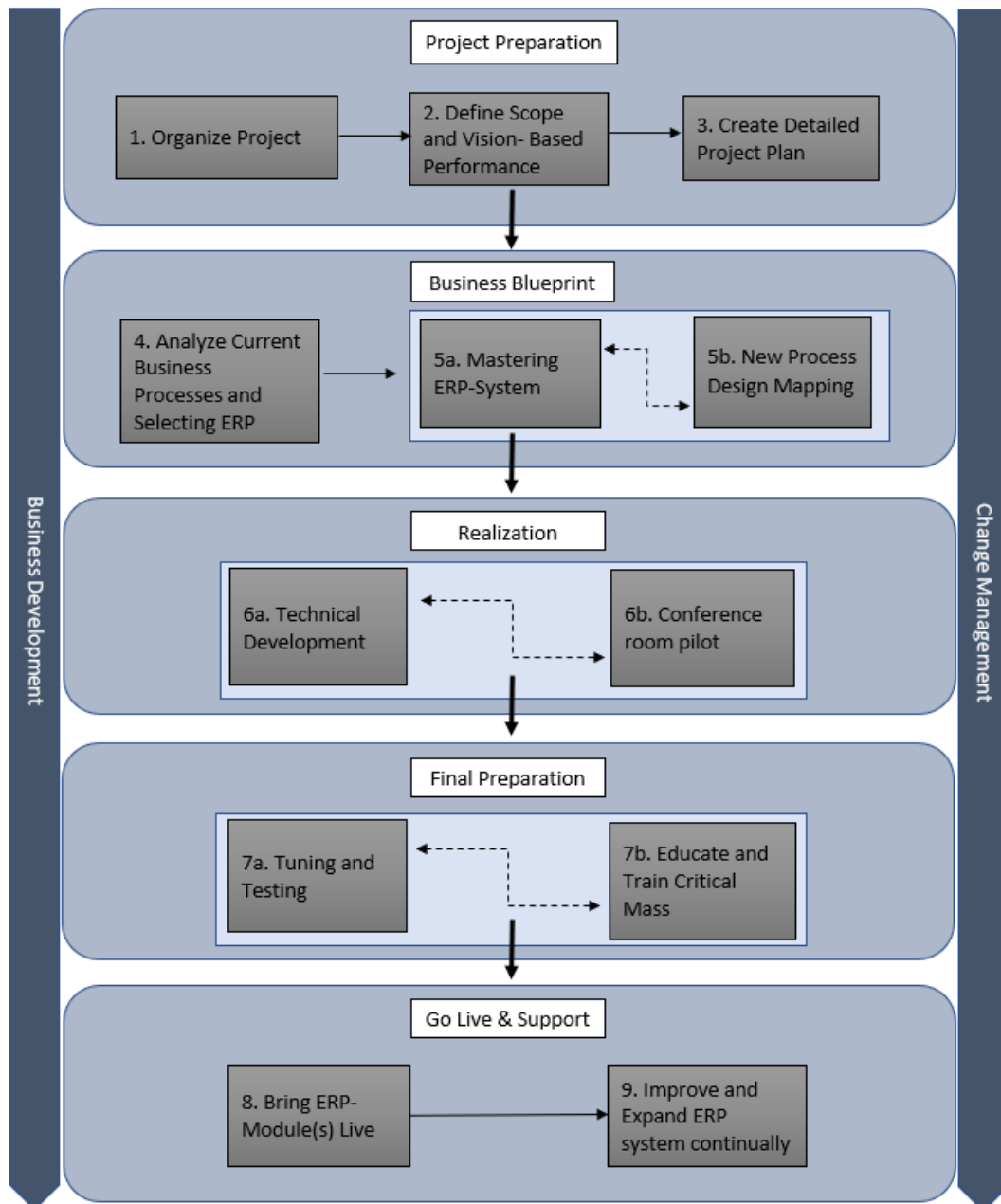


Figure 4: ERP system implementation phases (version 3) (Ehie & Madsen, 2005, 549)

Ehie and Madsen (2005, 548) stress that: “It is crucial that management conduct a review at the end of each stage to make sure everyone agrees on its outcome before moving on to the next stage”, which highlights the complex and sensitive nature of ERP implementation projects. As it can be seen from figure 4, each stage of implementation contains multiple sub-stages. Sub-stage pairs 5a & 5b, 6a & 6b, and 7a & 7b happen simultaneously, each sub-stage benefitting its pair (Ehie & Madsen, 2005). Regarding the stages and sub-stages, this model does present a clear roadmap when planning specifically ERP implementations. However, it is arguable if the creation of a detailed project plan is a feasible task before deciding on the ERP system that will be implemented, or should it be moved to the business blueprint phase, as the projects may have differences

depending on the system. Also, the partners may vary and require different type of planning.

Project preparation is dedicated to extensive planning and budget targets are created along with the project plan. The blueprint phase focuses on analyzing the business flows and processes to prepare for the implementation. Project management is highlighted to be an especially important factor during this phase. Technical foundation is developed during the realization phase. Testing is also conducted simultaneously. In final preparation, the new system is tested under normal and extreme working conditions, meaning that full data load and multiple risk scenarios are tested. Training is conducted during this phase. In go live & support phase the system is enabled for operational use and additional fixes and improvements are made to the system. (Ehie & Madsen, 2005.)

As it can be seen from the model, change management and business development can be viewed to encompass the entirety of the project from start to finish, which means that business development and change management should not be simply tied to specific stages like education, but to continuously drive them throughout the project.

As a general note to the implementation process models, even though it is not visible in the figures, there are two types of go-live: phased, and big bang. Phased implementation means that go-live either happens with a limited number of modules and/or in a limited amount of offices of the company. Big bang refers to a method in which all the modules are carried out in a limited number of offices/all offices at the same time. In the recent years, phased implementations have been the strong majority, as the large scale of projects has made big bang generally unfeasible (Nagpal, Khatri & Kumar, 2015.)

After this final presented model, there have not been any substantial changes in the academic literature regarding ERP implementation models, meaning that some level of maturity has been reached within the topic (Nagpal, Khatri & Kumar, 2015). Scholars keep researching issues in the ERP implementation projects but even though some of the stages receive revamping and new points of view are presented, the stages and sub-stages remain mostly the same. A question remains if the recent arrivals of cloud-based ERP systems will offset a change in the ERP implementation literature. Also, agile way of thinking has made its way to the modern ERP system literature and is one of the more recent topics in the area (Nagpal, Khatri & Kumar, 2015)

2.2.2 Commercial Models

Commercial models refer to the ERP implementation models that are marketed and are commonly used in organizations when implementing an ERP system. They are marketed as tools to make the implementation process go smoothly and in order to give a clear direction from the beginning to the end, just like the academic models.

There exists an abundancy of commercial models for ERP implementation, and in order to limit the scope accordingly, the most common ones are only

presented here. Also, the guidance given in the models varies greatly based on the ERP system. The processes are viewed here in the similar manner as they were viewed in the previous sub-section. What seems to be common within the commercial models is that there are rarely any academic references and the models are claimed to be combined from best practices surrounding the ERP implementation topic.

Microsoft Sure Step is a model that is created by Microsoft and is made to guide the implementation of Microsoft Dynamics ERP system family. It is a detailed guide that includes all the necessary roles for the project as well as all the steps and stages needed to take in the project. Microsoft Sure Step splits the project into six stages: diagnostic, analysis, design, development, deployment, and operation. The model also considers the possible steps after entering the support phase (operation) and adds two phases of optimization and upgrade (Dunaway, 2012). The model also gives alternative choices to the project steps depending on the type of the implementation. A simplified view (without the two extra steps) of the Sure Step method is presented in Figure 5.

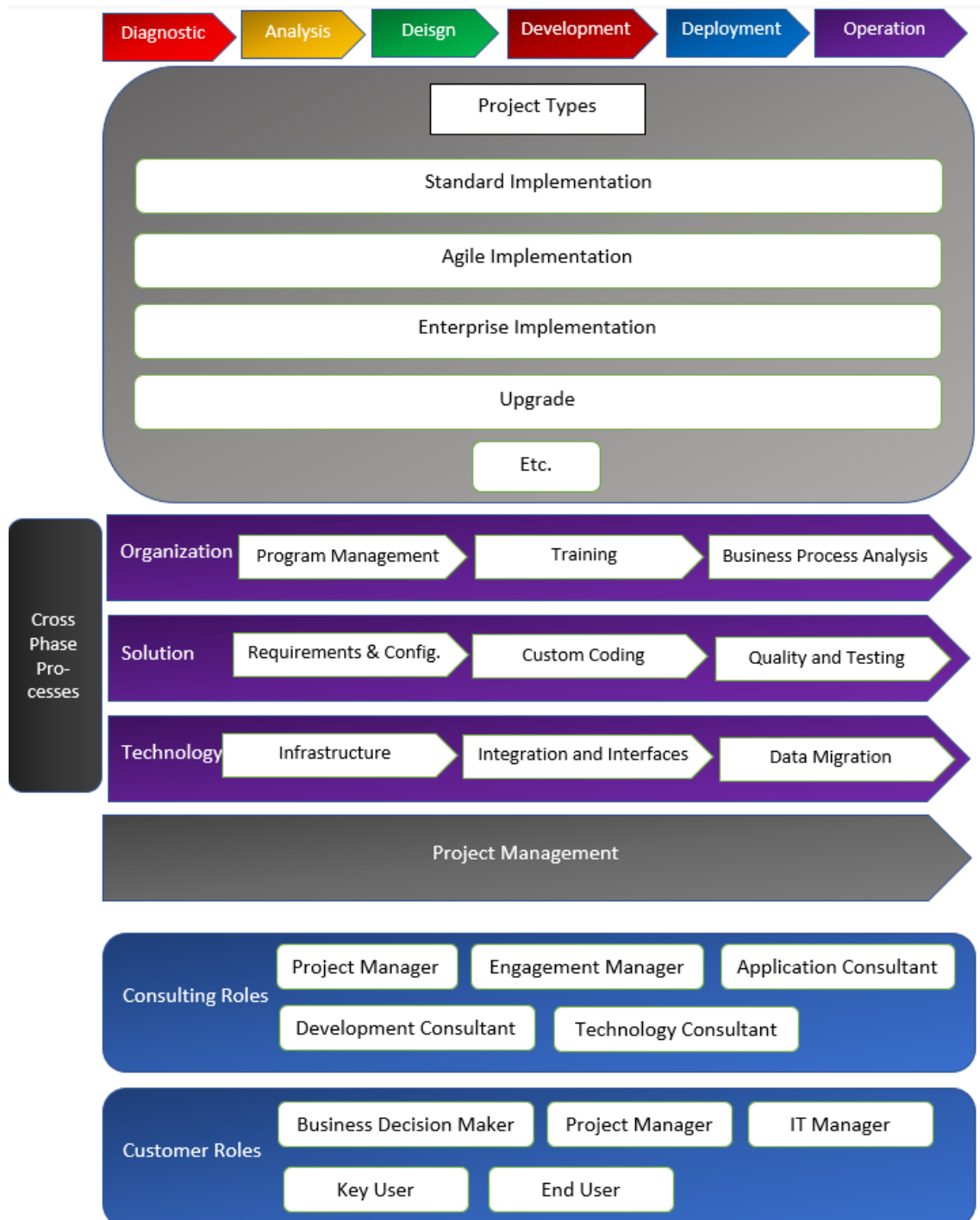


Figure 5: Microsoft Sure Step (Microsoft, 2018)

Just looking at a complex looking process model, it does not mean that the process would be planned in better detail than a simpler process model. However, looking at the documentation of Sure Step, it shows that a great amount of academic theory and best practices are considered throughout the process and that the model has indeed been written in detail (Microsoft, 2018).

Looking at the phases of Sure Step, diagnostic phase is the one that contains tasks like scoping the project, assessing the architecture, and understand-

ing the motives of the client. The phase usually finishes with the creation and acceptance of a project charter. (Microsoft, 2018.)

Analysis phase is where the actual implementation will begin. It begins with a project kick-off meeting which then followed by extensive requirements acquisition that encompasses everything from business flows and functional requirements to training requirements and data migration requirements. The phase ends with the client approving the collected requirements.

Design phase focuses on figuring out how the previously collected requirements will be implemented. It includes designing a set of documents that will work as a roadmap for the development phase and is equal to the new process design mapping pictured in Figure 4. (Microsoft, 2018.)

Development phase is simply building the system and doing the required customizations, integrations, interface adjustments as well as data migration. Training is also a part of the development phase. (Microsoft, 2018.)

Deployment phase is the 'go-live' phase in which the system will be used in the business processes for the first time. Testing activities and system assessments will continue along with possible additional customizations that are made in accordance with customer change requests. (Microsoft, 2018.)

The last phase, operation, consists of project closing activities such as final meetings and final knowledge transfers. The customer keeps using the implemented system for everyday operations, but the external project teams' commitment to the project ends, concluding the implementation as finished. (Microsoft, 2018.)

As mentioned earlier, Microsoft Sure Step offers many different project types depending on the customer type. One of the project types is 'agile project' that provides an iterative approach compared to the more standard waterfall methodology. However, the last two phases of the method, deployment and operation, are executed like the traditional waterfall approach. (Nagpal et al., 2015.)

ASAP methodology (Accelerated SAP) is an ERP implementation method that is designed for the currently most widely used ERP system, SAP. It was first introduced in 1996 by the SAP company with the goal of accelerating the speed of SAP implementation projects (Esteves & Pastor-Collado, 2001). The phases in ASAP methodology are project preparation, business blueprint, realization, final preparation, and go live & support. When comparing these to the Figure 4, it can be seen that the phases are equal. The tasks within the phases are also equal. The big difference between these models is that ASAP methodology utilizes iterative cycles within the steps and does continuous requirements validation with the users, meaning that it heavily incorporates agile way of thinking in order to speed up the projects (Nagpal, Khatri & Kumar, 2015). Sprints (short iterative development cycles) are used within ASAP (Nagpal, Khatri & Kumar, 2015). As with the Microsoft Sure Step, ASAP offers multiple roadmap types depending on the customers' needs (Dunaway, 2012).

OUM methodology (Oracle Unified Method, previously AIM (Applications Implementation Methodology)) is an implementation method created by

Oracle, another vendor of one of the most widely used ERP systems worldwide. This methodology uses the Unified Software Development Process (UP) as a basis and extends it to meet the requirements of an ERP implementation project. The phases of OUM are: Inception, Elaboration, Construction, Transition, and Production. (Nagpal, Khatri & Kumar, 2015.)

In inception phase, objectives of the ERP project are identified, and scope and risks are defined. High level requirements are also determined.

Elaboration phase focuses on defining detailed requirements and early prototyping may be done in order to improve the understanding of the client and the vendors.

During construction phase, the actual system will be compiled in accordance with the earlier collected requirements and models. Standard functionality is provided first, and customization follows along with testing and system integration.

Transition phase readies the customer and the system so that the system is ready to be used and the customer knows how to use it, meaning that further testing is done, and user training is conducted.

Production is identical to go-live. Here the client starts using the system in everyday processes and the system is monitored and support is provided to the users. Users may continue sending change requests and bug reports that will be then fixed accordingly.

OUM has principles of 'iterative and incremental', which encourages agile way of thinking. The methodology is use case driven and it is flexible and scalable, thus embedding agile methods. (Nagpal, Khatri & Kumar, 2015.)

It is important to note that all these three commercially created models are developed by companies that have their own ERP systems; the models are created specifically from and for the context of the company's ERP system. What this means is that some parts of the commercial models may not be word-to-word applicable to other ERP systems.

2.2.3 Comparison of the Models & Conclusion

Looking at the reviewed literature, the most crucial differences between the academic models and commercial models are the goals. Commercial models aim to promote the business and work as marketing tools as well as guidelines for the implementation. They also act as general frameworks, easing the communication and understanding between the implementing parties. Academic studies on the other hand usually have certain goals such as research questions that they wish to answer; models are created as end products based on academic theories and principles. The goals of academic models are also often not to provide direct economic value or extremely detailed step-to-step guidelines, thus differentiating in the level of detail when it comes to implementation processes and tasks.

It is interesting to see that originally ASAP methodology by SAP was introduced first, before the academic models made by scholars. The initial aca-

demical models were lagging behind by quite a lot when compared to the more well-defined ASAP (Nagpal, Khatri & Kumar, 2015). However, academic models did indeed catch up with commercial trends and it is highly likely that the commercially used models have been a great contributor to the latest academic suggestions. The relevance of commercial models also reflects to the academic world, as a great number of studies have been conducted with the focus on either a single commercial method, or multiple methods at once (e.g. Nagpal, Khatri & Kumar, 2015; Esteves & Pastor-Collado, 2001).

ERP implementation process models related research continues to move forward, but mostly in the commercial world. This is understandable because companies wish to achieve competitive advantage and keep on improving their processes. This change however requires more research on the topic, since the latest researches are getting outdated (Nagpal, Khatri & Kumar, 2015). Especially the recent appearance of lean thinking and agile methods in the ERP field require more case studies to understand the phenomena better.

Some sort of consolidation for the project phases would also be good for the academic literature, since it can be highly confusing to observe multiple models with basically same content but different names, which has also been recognized by scholars (Kraljic et al., 2014). This problem is also present in the commercial models, but it is unlikely that the consolidated models would change the current ones, since they already are so widely recognized.

The principles of ERP implementation seem to be similar to each other, with slight variation based on a scholar or a specific ERP system. The basic approach in all the reviewed models is to plan the steps with clear milestones; the next step cannot commence before a certain target has been reached. The presented models can often act as frameworks for communication for the implementing parties by simplifying the goals of each phase.

For now, it can be concluded that in current ERP system implementation projects there are five to six phases depending on how they are viewed, if the implementation is considered to end in go live & support.

The ERP implementation context (Figure 1) seems to apply well for all implementation process versions thus it can be viewed as a good standard starting point to all the ERP projects. Obviously, the roles included will vary depending on the approach and applied process model. For example, Microsoft Sure Step clearly defines the roles for the projects.

Now that a solid foundation has been laid to understand the process in which ERP implementation projects are usually conducted, we can look deeper into the possible pitfalls and success factors of these projects and understand these topics better. The following section will review the critical success factors to fully understand the planning and management processes that are relevant in the ERP implementation processes just reviewed.

2.3 Critical Success Factors in ERP Implementation Projects

In this sub-section, the topic of critical success factors (CSFs) is reviewed through past literature, and the results are presented with tables and explanations. The past literature is examined in order to distinguish 'the most critical CSFs'.

This sub-section sets the groundwork for the main research of this study by defining the list of CSFs, that will be then analyzed and compared with the outcomes of the empirical part of this study. First, literature is reviewed generally and then a list of global CSFs is presented and explained in detail. Local CSFs are reviewed only briefly, since this study does not seek to find purely local CSFs; the focus is to identify local implications within each of the global CSFs.

2.3.1 Past studies

The studies regarding CSFs in ERP implementation projects date back to 1990's, and within other contexts CSFs have been studied all the way from the 1960's (Ehie & Madsen, 2005; Shaul & Tauber, 2013; Ram & Corkindale, 2014). CSFs have been traditionally investigated through case studies and, but more recently some quantitative studies have also emerged in order to test the validity of the past CSF research (Ehie & Madsen, 2005; Ram & Corkindale, 2014).

The topic was found very interesting by scholars, as distinguishing the CSFs seems like a simple and effective way of creating value to the companies, giving managerial guidance and improving the success rate of the implementations. However, as much as there have been studies, there also exists so many distinguished CSFs, that it can be difficult to identify which of those are the most 'critical' ones or which are worth focusing on. Looking back at Bullen and Rockart's (1981, 3) definition of a CSF "...key areas of activity in which favorable results are *absolutely necessary*..." -also begs the question of if the mission of identifying CSFs has gone too far in the sense that many of the identified CSFs are most likely not *absolutely necessary* for the success of the implementation. Of course, many authors might be looking for generally important matters that will simply benefit the implementation process if paid attention to, without considering the actual meaning of a CSF. This can in theory be easily justifiable, as there is nothing wrong with creating aids for management. However, the great number of identified CSFs makes it impossible for an organization to be able to focus on all of them. For this reason, it is extremely important for the managers to be able to distinguish the most crucial CSFs so that they can target their management focus on the right areas. Regarding this matter, multiple studies have also criticized the variety of researches providing such wide arrays of CSFs (Ngai, Law & Wat, 2008).

According to Ram and Corkindale (2014), only few of the CSFs have been empirically tested, thus making positive assumptions of their usefulness can be

questioned. Ram and Corkindale (2014) also argue that the sheer identification of an CSF is not enough so that a company should focus managerial effort to it; there should be further research conducted to validate the criticalness of a CSF. However, it is arguable that some of the CSFs can be either difficult to test empirically, or a CSF could be only relevant in a specific context (Shanks, 2000). For example, According to Shanks et al. (2000), the CSFs can vary greatly depending on the country where the implementation is being conducted. According to Shaul and Tauber (2013), factors such as culture, whether the system is implemented multinationally or domestically, or the difference of a country being either developed or developing can also plays a critical role when planning the implementation process. Still, it does not automatically mean that the distinguished CSF is not useful. We argue that if a CSF has been identified repeatedly in academic literature, it can be a strong enough proof of it being relevant to at least part of the implementing organizations, depending on the context.

2.3.2 Global CSFs

Global CSFs are general CSFs that are relevant in any ERP implementation project no matter where it is conducted. Many of the past studies have focused on identifying CSFs in general, without categorizing their relevance to different environmental contexts, even though it has been mentioned that CSFs can vary greatly in different environments (Chang, 2004). As we wish to challenge the global CSFs in the sense that we seek to find the local factors within these global CSFs, we first need to present the identified global CSFs through relevant literature.

We investigated academic literature and gathered a general list of global CSFs that can be seen on Table 1. Because of the great number of identified CSFs in the academic literature, all of them will be not listed here. A justification for this is that it would be impossible to focus on all of the identified CSFs at once, since at least 94 different CSFs for ERP implementations have been identified and not nearly all of these identified CSFs have any proven empirical implications (Shaul & Tauber, 2013). To avoid drowning into a pile of CSFs, only the CSFs that have been mentioned in the literature continuously are listed in Table 1. If a CSF's appearance in literature is scarce, or the studies that provided it only has local implications (i.e. the studies focused on particular countries), it will not appear in this list, as it could mean that the particular CSF is only applicable in that particular context. To further make the CSF list more applicable for the research questions, we only listed the top 10 CSFs that have appeared in relevant literature continuously and which have proven empirical implications. The purpose of listing the CSFs is to (1) provide general understanding of the CSFs discussed in the literature, and to (2) have a clear limited list of relevant CSFs to be used in comparison with the results derived from the interviews conducted in this research.

Table 1 divides the CSFs into names of the CSFs and presents some of the authors whom have identified the CSF as crucial. The list is not written in any specific order, meaning that if a certain CSF is the first CSF on the list, it does not necessarily mean that it is the most prominent CSF, or that the last CSF on the list is the least relevant.

Table 1: Global CSFs in ERP implementation projects

<u>CSF NAME</u>	<u>AUTHORS</u>
1. Top Management Support	Žabjek, Kova & Štemberger, 2009; Young & Jordan, 2008; Ifinedo, 2008; Ehie & Madsen, 2005.
2. Training & Education	Sun, Yazdani & Overend, 2005; Xu & Cybulski, 2004; Lin et al., 2006; Zhang et al., 2003.
3. Project Management	Ehie & Madsen (2005); El Sawah et al., 2008; Zhang et al., 2003.
4. Business Process Re-engineering	Ettlie et al., 2005; Zhang et al., 2003; Ehie & Madsen (2005).
5. Change Management	Žabjek, Kova & Štemberger, 2009; Cheng, Deng & Li, 2006.
6. Cost/Budget Issues	Ehie & Madsen 2005; Mabert, Soni & Venkataramanan, 2001; King & Burgess, 2006; Dezdar & Sulaiman, 2009;
7. Choosing the Correct ERP System	Ehie & Madsen, 2005; Umble, Haft & Umble, 2003; Remus, 2007; Wu & Wang, 2007; Somers & Nelson, 2001.
8. User/Employee Satisfaction of the System	Almashaqba & Al-Jedaiah, 2010; Wu & Wang, 2007.
9. Strategic Planning/Business Vision	Cheng, Deng & Li, 2006; Ifinedo, 2008; Shi & Lu, 2009.
10. Project Team Competence	Akkermans & Van Helden, 2002; Rothenberger, Srite & Jones-Graham, 2010; Wickramasinghe & Gunawardena, 2010.

Next, the items in the Table 1 are explained in order to create an understanding regarding the CSFs that will be further analyzed during the empirical part of this study.

Top management support "...refers to the extent to which top managers in the organization provide direction, authority, and resources during and after the acquisitions of IT systems, including ERP systems" (Ifinedo, 2008, 5). It has been shown multiple times to have a strong correlation with ERP implementation success (Ehie & Madsen, 2005; Žabjek, Kova & Štemberger, 2009). Young and Jordan (2008) even argue that it would be the single most important success factor in any IS projects in general; IS projects tend to fail more because of managerial and organizational issues rather than technical issues. The reason why top management support is so valued, is because it must be present strongly in every phase of the implementation process in all parts of the organization (Žabjek, Kova & Štemberger, 2009; Ifinedo, 2008). Top management support's tasks include providing leadership and resources to the project, thus enhancing the general success rate of the project (Zhang et al., 2003). It has been reported that some organizations entrust the implementation process with the technical departments, thinking that it is fully their job thus failing the project (Harrison, 2004). It is deemed very important that the technical departments and top management work together and form an active relationship during the implementation. According to Thong, Yap and Raman (1996), top management support and external IS expertise together form effective IS. Top management support can also be an extremely important factor when trying to overcome change resistance (which is strongly connected to change management, another CSF). (Žabjek, Kova & Štemberger, 2009.)

Training & education refer to teaching the employees about the ERP system, how it should be used, and why it should be used. "The main reason of education and training is to increase the expertise and knowledge level of the people within the company" (Zhang et al., 2003, 6). Training and education have emerged as important CSFs in almost all the CSF related studies (Xu & Cybulski, 2004). Sun, Yazdani and Overend (2005) argue that it is the single most important CSF in ERP implementation projects and it should receive the highest priority. It is worth noting, that even though training and education are valued highly. there are some studies that did not find it strongly correlated with ERP implementation success (Ehie & Madsen, 2005; Cheng, Deng & Li, 2006). One of the reasons training and education have been found important especially in ERP implementation context is the deep and complex nature of the system. Employees also fail to understand how and why the system is supposed to change the business processes and the ways of how the employees will be required to work after the implementation of the ERP system. (Xu & Cybulski, 2004.) According to Lin et al. (2006), insufficient training can even result in the ERP project failing. According to Zhang et al. (2003), the importance of training and education is often underestimated because of the poor understand of cross-functional business processes, that are vital in the case of an ERP system.

Project management, and utilization of a proper project management framework are deemed as crucial conditions to achieve ERP implementation success. Project management can be viewed as the driving force that keeps all the pieces together; it is a fundamental piece in the process. (Ehie & Madsen, 2005; Zhang et al., 2003; El Sawah et al., 2008.) Project management's responsibility is to not only use a proper framework, but also have a clear plan with a realistic time frame (El Sawah, 2008). Effective project management is also found to be crucial in preventing escalated budget issues (Zhang, 2003).

Business process re-engineering & Change management are tied together here because of the many connecting factors that will be explained next. Business process re-engineering (BPR) is the act of redesigning and rethinking organization's business processes in a fundamental way in order to improve performance, quality, and to gain competitive advantage (Hammer & Champy, 2001). As ERP systems generally require radical business process re-engineering measures from the implementing organization, many projects fail due to the lack of understanding of how much the processes need to be changed in order to accommodate the new system (Zhang, 2003). BPR is generally closely tied with change management, which is supported by dimensions of re-engineering: "(1) Company's willingness to re-engineering; (2) Company's readiness for change; (3) Company's capability of re-engineering; and (4) Communication", which shows that company's willingness and readiness may need to be manipulated throughout the implementation process in order to achieve sufficient results (Zhang, 2003, 5). Huq, Huq & Cutright (2006) even define a BPR process to be in fact a change management process; ERP is leading the direction of the change.

Žabjek, Kova and Štemberger (2009) define change management as the most important CSF along with top management support. Change management encompasses the areas of human resource (HR) management and social changes required when implementing the system (Žabjek, Kova & Štemberger, 2009). The reason why change management is often mentioned as an important CSF, is that people, processes, departments, and the whole organization needs to change along with the implementing of an ERP system (Umble & Umble, 2002). As with BPR, communication is deemed as a key factor, since it is crucial that all the employees understand the reasons of change and how the change will be conducted. In accordance with this, training and education of employees can also be connected to change management, even though it being of a more 'hands on' nature, than the abstract change management. (Žabjek, Kova & Štemberger, 2009.)

Cost/budget issues in ERP implementation projects are very common (Ehie & Madsen, 2005). The projects can take even multiple years to complete and organizations often fail to understand that the initial sum for the ERP software is just the tip of the iceberg when it comes to the costs of the whole implementation project. According to Mabert, Soni and Venkataramanan (2001), the cost of ERP implementation can be up to 6% of annual income of the organization. With this estimate, it is worth noting that it is possible that the numbers

in recent years are vastly different, especially considering that more and more companies are implementing cloud-based ERP systems instead of the traditional model. The fact remains that ERP systems tend to be huge money sucking holes; according to one report, ERP implementations cost on average 178% of the original budget, the implementation taking two and half times more than intended (Zhang, 2005). According to Ehie & Madsen (2005), the cost for the software is often merely 15% of the whole implementation cost. With this information it is easy to say that companies can run into serious problems not just with the implementation project, but the cost overruns can also cause issues with other sectors of business.

Choosing the correct ERP system is critical for the implementation success as also stated at the beginning of the literature review. Shaul and Tauber (2013) explain how it is necessary to have made a detailed requirement acquisition to be able to choose the correct ERP package, and how choosing the right vendor and consultation partner can be equally important and are strongly tied to the ERP package selection process. According to Ehie and Madsen (2005), analyzing existing business processes prior to the implementation gives proper insights for the ERP package selection; companies should realize how the fit of the system can vary with the size of the organization along with the industry, and the processes it performs.

User/employee satisfaction is one way to measure IS system success (Rai, Lang & Welker, 2002). It has been researched, that satisfied users will be more productive, especially in the case of mandatory usage, which connects strongly to projects like ERP implementation from which the outcome should be mandatory usage of the system (Calisir & Calisir, 2004). Generally, user satisfaction is deemed to be a significant factor in evaluating ERP implementation success (Almashaqba & Al-Jedaiah, 2010). Even though it is important that all the users using the ERP system are satisfied, key-user satisfaction is especially deemed of high value (Wu & Wang, 2007). Key-users are the users who are familiar with the business processes and have broad knowledge of the domain areas; they are chosen to create requirements for the system, and they will be the ones guiding other users (end-users) on how to use the system (Wu & Wang, 2007). User satisfaction is widely accepted to closely relate to perceived system success and it has also been empirically verified for the case of ERP systems (Rai, Lang, Welker, 2002; Wu & Wang, 2007).

Strategic planning and business vision refer to the ability of planning and aligning business strategy with the changing markets and having a clear vision of company's business goals. Strategic planning and business vision have been researched to have a significant impact on ERP implementation success; they give the background for the planning phase of the ERP project (Cheng, Deng & Li, 2006; Shi & Lu, 2009). According to Cheng, Deng and Li (2006), future oriented strategic planning should be conducted before engaging ERP implementation in order to achieve maximum benefits. This idea connects with business vision, as ERP should be acquired in order to meet organizational ob-

jectives (business vision) (Ifinedo, 2008). The problem that often arises is that companies fail to define and articulate their business vision (Ifinedo, 2008).

Project team competence is a CSF that tends to be valued highly especially by managers (Akkermans & Van Helden, 2002). It has been empirically proven to have a significant impact on the project success (Rothenberger, Srite & Jones-Graham, 2010; Wickramasinghe & Gunawardena, 2010). Rothenberger, Srite and Jones-Graham (2010, 102) state that "...an experienced, "multiskilled" team is crucial for the success of an ERP adoption project. Organizations should dedicate their resources to assembling a team that is knowledgeable in both organizational and technical aspects." Project team competence is one of the more general building blocks that are relevant throughout the ERP implementation process along with CSFs like project management and change management, when some other CSFs are strongly tied to certain implementation phases, like choosing the correct ERP system (Ehie & Madsen, 2005).

2.3.3 Conclusion for Global CSFs

After going through a wide array of literature, we found out there is a vast number of identified CSFs regarding ERP implementation projects. To make this study more feasible and keep a controlled scope, we analyzed the literature to find out ten CSFs that are empirically proven valid and that are continuously mentioned in the relevant literature (see Table 1). The reason of settling down to these ten global CSFs was that the number of empirically conducted studies was relatively high in these ten cases; the amount of studies soon dropped in the case of lesser recognized CSFs. The ten identified CSFs are listed in the Table 1. We then reviewed the basic concepts of each selected CSF and presented these findings.

Authors often agreed on the importance of each of the listed CSFs. However, the level of priority of each CSF seems to vary greatly to the point that it is difficult to generalize about what CSF is the most important; the results show how much the opinions of managers vary across the companies.

As mentioned earlier, the number of identified CSFs in the relevant literature is vast and this likely represents the fact that managers have different opinions on what are the most important areas to focus on the ERP projects. The list of the chosen ten CSFs brings together the most mentioned and researched CSFs that are most certainly apparent in all ERP projects; other CSFs may be equally important or even more important, but these ten currently provide the most empirical evidence for being highly evident.

Regarding our second research question (How are the identified CSFs connected to each other and what managerial implications do these connections have?), we already could make some basic notions, such as that change management, BPR, and training have strong connections throughout the implementation process. Top management support was also found to be connected with change management as well as project management and cost/budget issues.

The research question is further addressed with the inclusion of the empirical data in the sub-section 4.1.2 (Connections between the CSFs).

As the review for the CSF through the global (general) context has been laid out, we will next look at the localized implementation contexts (implementing in specific areas/countries that are different from the current location) in which some of the CSFs may be especially relevant and/or provide differentiating implications when compared to the global context. This way we are likely to understand the multinational ERP implementation context better and may be able to identify some relevant managerial implications in the comparison of the generalized (global) contexts.

2.3.4 Local CSFs

As mentioned before, there are not many studies that focus on the local nature of the ERP implementation projects and the CSFs in those contexts. The few studies that exist tend to be focused on a single country or comparing two countries and their differences in CSFs. These studies do not often directly try to contribute to finding generalizable local implications in CSFs, but some can still be derived from the results obtained.

According to Shanks et al. (2000), the presence of a project champion was deemed as important in an Australian ERP implementation project but not important in a Chinese implementation. They explain the reason to be that that the Chinese perceive the top manager to be a champion already as he possesses the highest authority, that is important in the hierarchical nature of Chinese culture; in the case of Australia the champion can often be a subordinate. The issues of organizational hierarchy have also been observed in Egypt; the stiff structure of the organizations and the culture hinders the ERP project success (Rasmy, Tharwat & Ashraf, 2005).

Shanks et al. (2000), observe that in the same China-Australia context, the CSF of change management was clearly more important in Australia than in China. Because of the hierarchical nature of Chinese culture, changes determined by the top management are not questioned, they are accepted when demanded. In the case of Australia, change management required more resources and manipulating the existing organizational culture.

The importance of project management was also deemed differently in China and Australia; Chinese appreciate high levels of certainty, that can be improved through holistic planning practices and project management (Shanks, 2000).

The results obtained by Shanks et al. (2002) are however in conflict with another study by Cheng, Deng, and Li (2006), who state that change management is highly important when implementing ERP in China. Project management was also in contrast to Shanks (2000) deemed as unimportant.

Moohebat, Asemi, and Jazi (2010) compared the differences of CSFs in developed and developing countries. They found that the CSFs in itself do not vary greatly in developed and developing countries but according to them, ef-

fects of culture are stronger in developing countries and the countries are more dependent on the vendors, meaning that project management is likely to be more important in developing countries as well. Cost & budget are also viewed as highly important in developing countries as they can be the deciding factor if the implementation can even be conducted (Rajapakse & Seddon, 2005).

According to Olson, Chae, and Sheu (2005), when a company implements ERP to their foreign offices, multiple issues arise: these localized implementations face the issues that are related to the country's culture and language, and also to different regulation related issues. Often the change resistance can be a lot stronger in a foreign office as the idea of the main office forcing them new systems and business processes is disliked (Olson, Chae & Sheu, 2005). This basically implies that more effort may be needed in regards of CSFs of BPR and change management, which is also backed by Holland and Light (1999). Trust related issues highly correlated with the issues in BPR and change management; the foreign office may resort to information hiding because of the mistrust between the host and subsidiaries who conduct the implementation. The new business flows brought by the new system may also play as a threat for the employees as they may be laid off, which increases the change resistance even more (Al-Mashairi & Zairi, 2000).

The CSF of training & education may be highlighted in certain countries as it is reported that the education and skill levels of employees can vary greatly from country to country, requiring different amounts of resources spent in the training phase of the implementation based on the country and the offices employees (Sheu, Yen & Krumwiede, 2003; Sheu, Chae & Yang, 2004).

2.3.5 Conclusion for Local CSFs

After looking at various studies that focus in ERP implementations in a variety of countries, we can conclude that especially the CSFs of change management and BPR are more strongly apparent when a multinational company doing a local implementation. The factors affecting this are strongly connected to the local (organizational) culture and a high possibility of strong change resistance.

The CSF of project management had mixed results of especially relevant in a local implementation context, likely still requiring specified attention based on the country and the culture. Cost & budget were found to play a comparably high role when conducting an implementation in developing countries.

The importance of training & education was found to differ from country to country; based on the education and skills level of the employees, more or less resources were required to conduct the training.

Looking at the results, one CSF should be named that is mostly relevant only in local implementation contexts: *cultural management*. This CSF is not new, as it has been mentioned in multiple CSF studies in the past (Ram & Corkindale, 2014). However, it cannot be said to be of much relevance globally in any context, because it is mostly non-existent if an implementation is conducted in mul-

tiple offices in the same country. Other than that, the CSFs of change management, business process re-engineering, training & education, project management, and cost & budget issues were found to contain local implications meaning that these CSFs should be paid special attention to when conducting a localized ERP implementation. These CSFs are presented in table 2.

After looking at the ERP process models, and global and local CSFs, we can mostly understand the ERP implementation process through the lens of CSF theories. What still remains is to understand other general issues that may emerge when conducting a multinational ERP project related to matters such as legislation, and issues created by time zones. The following section will fill this gap and thus complete the literature review.

Table 2: CSFs with local implications

<u>CSF NAME</u>	<u>IMPLICATIONS</u>
1. Cultural Management	Culture (organizational & non-organizational) affect the whole project flow and management of it; consultants should adapt their working ways based on the culture and try to understand the client in that specific setting.
2. Change Management	There is a high chance of strong change resistance when conducting an ERP implementation in a foreign country because of the differences in the working processes and the possible lack of understanding and trust between parties, thus requiring stronger change management, than in a non-foreign country.
3. Business Process Re-engineering	The possible differences in business flows between the offices of multinational companies may require a lot of attention when conducting the implementation in a localized context thus requiring a lot of resources spent in BPR.
4. Training & Education	The education and skill levels of employees may vary between countries, especially if a foreign office is located in a developing country, thus requiring different approaches/a large amount of resources depending on the context.

-
- | | |
|-----------------------|---|
| 5. Cost/Budget Issues | Cost/budget issues may be highlighted especially when conducting the implementation in developing countries. If the implementation is purely funded by the head office, the impact of this CSF is likely to decrease considerably. |
| 6. Project Management | The importance of project management is likely emphasized in localized implementations, because an understanding of the implementation environment (geographical & cultural) is needed. Perceived value of planning may vary between countries, which then affects the resources needed for project management. |
-

2.4 Multinational IT Projects

Because the topic of this study is highly related to globality of ERP projects, it is important to look at the issues that are present in multinational IT projects in general. This way we can understand the multinational ERP projects better in a deeper way. In this sub-section, the dimensions of multinational IT projects are briefly reviewed through literature and then compared to multinational ERP projects in order to identify their similarities and idiosyncrasies. It is important to note that ERP projects are one type of IT projects with unique settings. Binder's (2016) theory of multinational project dimensions is used as a base in this sub-section.

2.4.1 Multinational IT Project Dimensions

Binder (2016) presents five dimensions that are present in multinational projects: locations, languages, time zones, cultures, and organizations. This means that each of the dimensions plays a role in multinational projects and each of them adds a layer of complexity to the projects.

Locations refer to the geographical locations that are relevant to the project. For example, a project could include vendors from Germany, customers from China, and consultants from the United States of America. Locations can also include multiple offices within a same country. A good example of this is an ERP implementation project; the ERP system is usually implemented throughout the organization in all the offices, including all the domestic offices and foreign offices. Locations are often closely tied to the culture dimension, as the location of the office can often reflect the culture that is apparent within that

area (Hofstede, Hofstede & Minkov, 2010). In the similar fashion, locations can have connections to the dimensions of languages and time zones.

A multinational project can have multiple **languages** as well. For example, multiple different languages may be spoken in different offices of an organization all over the world. The differentiation in documentation can be problematic and therefore many companies adapt a single corporate language and language policies (Dhir & Gòkè-Paríolá, 2002). The most common example of this is that English would be spoken in every office within the company, which may seem like an easy and solid solution. However, English skills can be a lot lower in some offices, causing distortion in the communication. Also, it is not guaranteed that even after accepting to a policy, everything would be done with the agreed language; meeting might still be held in a local (non-corporate) language, and the adaption of a corporate language does not remove the fact that the vendors, governments, customers, and international agencies are not affected by the language policy and need to be dealt with in local languages (Feely & Harzing, 2003).

Another option is to either use language nodes that will do all the translation work, or to educate (or hire) people who will then possess the required language skills required for the work (Feely & Harzing, 2003).

Time zones in multinational projects refer to the fact that the project may need to be adjusted to the different working hours in different locations. This can be used as an advantage, as in many software projects the programming is done in different location that the testing; the idea is to pass on the work to the next time zone, causing the work to be able to be conducted around the clock, in theory (Taweel & Bereton, 2006). The problems arise when communication is needed between distant offices and the meetings are difficult to fit within the normal working hours. An example of time zone -based work distribution is presented in Figure 6.

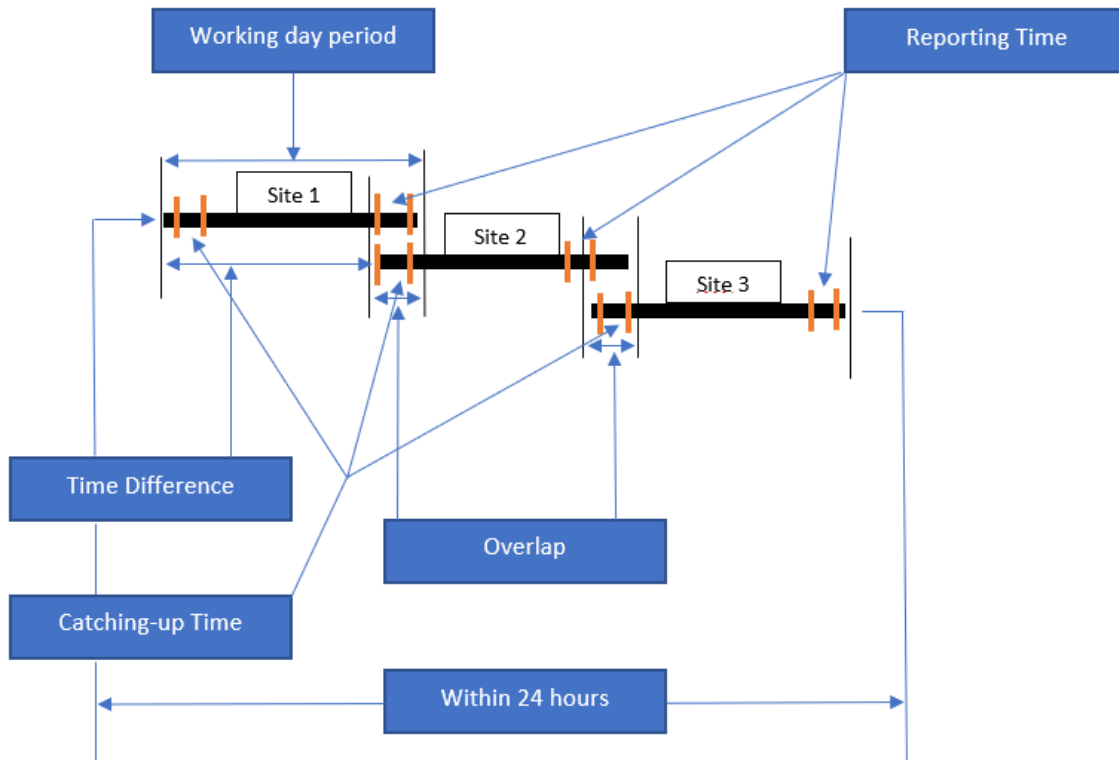


Figure 6: Software development across multiple time zones (Taweel & Bereton, 2006, 2)

As it can be seen from Figure 6, each site continues the work from where the previous site left it. A catching-up time is required in which the next site in order is informed about recent progress, meaning that the site likely cannot continue immediately with the development when the working day starts, and that there is overlap within the sites.

Cultures can mean two different things; organizational cultures, or cultures outside of work. These two should not be fully separated, because the non-organizational culture can strongly affect the organizational culture that is common to the regional area. The differentiation of men's and woman's culture should also be recognized. (Hofstede, Hofstede & Minkov, 2010.)

Ignoring cultures has been recognized in the literature to cause issues with communication and project flow. Misunderstandings may also happen; for example, a person from a culture that tends to communicate directly such as the USA may not understand Japanese partner's intentions correctly, as the Japanese way of communication tends to be reading more from the context than communicating some matters directly. (Chevrier, 2003.) Proposed solutions to deal with the cultural problems include having a mediator to be a problem solver within the team(s) (Chevrier, 2003), and the education and training of cultural awareness and cultural skill-building (Cox & Blake, 1991). Cox and Blake (1991) also recognize that top management support is important in cultural management in projects.

Organizations refers to all the different companies and other parties that take part in the project. In the case of an ERP system implementation project,

participating organizations could be for example system vendor, consulting companies for the implementation, third-party vendors, and the client organization (see Figure 1). In general, the more participating companies, the more complex and difficult to handle the project becomes. Multiple participating organizations do however make many projects possible that a project with limited participants would otherwise be impossible.

According to Binder (2016), this model is applicable to all types of multinational projects; the level of impact of each dimension just varies between projects. For example, a software development project may have a huge impact from the time zone dimension, because the programming is often done in cycles with the time zones across the globe (e.g. programming is done in Japan and then the testing starts in Germany, based on the time difference of these two countries). A different type of example could be a project that aims to do organizational change within Asian countries. In this case the language dimension and locations are most likely going to increase the complexity of the project.

Hartio (2017) extends the Binder's model by making it more applicable to IT project context. He adds the dimensions of knowledge and data (management), and information security. He justifies the addition of these by the fact that they are they are identified in academic literature to be crucial to project success and the amount of their impact to the project complexity increases/decreases when their amount changes, or the impact of other dimension(s) increases/decreases. For example, the more cultures and languages are relevant in a project, the management of information security and knowledge and data becomes increasingly difficult. It is still noteworthy that with the extended model, the measurement of the dimensions and complexity is a lot more difficult than in the original model; in the Binder's model, one can simply count the cultures and organizations participating in the project and thus come up with a certain 'level of complexity'. Knowledge & data and information security are more abstract thus cannot be counted as easily. However, it is arguable if there is any worth in calculating the complexity of a project with the models, since every project is unique, and the actual level of complexity cannot be determined merely by looking at the number of languages or other matters.

2.4.2 Comparison to Multinational ERP Projects

As mentioned before, ERP projects are also IS implementation projects in a sense that a system will be created/customized based on the client organization's needs, and the system implementation also includes heavy business process re-engineering and organizational change; the presented dimensions equally play a role in multinational ERP projects as they do in other IT projects.

What is peculiar to ERP implementation is that all the organization's sites are likely to implement the same ERP system, meaning that all the sites also need to adapt to similar business processes. This is likely the case already before the implementation, but the differentiating factor is that all the sites need to change their processes to adapt to the changing business flows that are brought

with the new system. Also, it is likely that some customizations need to be made to the system based on office/location of the office. What makes the situation even more complex is that different sites likely use different languages (requiring different language for the system in each country) and the employees present a variety of cultures, meaning that a multitude of professionals may be required to be distributed across the globe simultaneously to tackle the complex implementation process. From this perspective, issues related to change management and business process engineering are likely to matter for the client side heavily when it comes to project success.

The problems of culture and language in multinational ERP projects were also recognized by Sheu, Yen, and Krumwiede (2003), who report cases in which it was confusing for the employees with different writing systems to enter information such as names to the system. Especially the older ERP systems may also have limitations with the bites used; ERP system might only support one single bite or double bite system at once, which might then force all the offices for example to use English and thus requires all the system users to be able to do reports in English language (Sheu, Yen & Krumwiede, 2003; Sheu, Chae & Yang, 2004). Also, if the separate offices decentralize the ERP acquisition, the result could a completely different ERP system/completely different system variables; the communication between the offices and the systems may become extremely limited (Sheu, Yen & Krumwiede, 2003; Sheu, Chae & Yang, 2004). Cultural differences have proven to cause trouble especially when it comes to normal ways of working. For example, Taiwanese companies have been reported to schedule production and order materials simply based on a conversation on phone, which highly differs from the US for example (Sheu, Yen & Krumwiede, 2003; Sheu, Chae & Yang, 2004; Lin et al., 2006).

Regulatory compliances between countries have also been recognized to play a factor in the ERP implementation projects; the ways in which businesses are conducted between countries that are using ERP systems may not be allowed by the law. Another government related issue that has been recognized is that the taxation systems and import/export policies may vary between countries greatly, thus forcing large amounts of customization to the system in order to handle the different tax rates. (Sheu, Yen & Krumwiede, 2003 Sheu, Chae & Yang, 2004.)

The dimension of knowledge & data is also extremely important in ERP implementation projects as every organization and their site has their own set of valuable data, information and knowledge that they wish to maintain and grow. What ERP systems do is that they often completely replace old legacy systems. Those old legacy systems are most often filled with critical data that should be maintained when moving to the new system. For this reason, data migration is conducted as a part of the implementation process in all the sites that implement the system. Obviously, the more data and knowledge an organization possesses, the more sensitive it is to risks of losing parts of it.

Time zones are not likely to directly cause issues with the implementation, but a time difference may affect the exchange rates of different currencies, that

can then cause issues in international trading (Sheu, Yen & Krumwiede, 2003; Sheu, Chae & Yang, 2004).

Techniques for software development as presented in the previous subsection offer interesting implications for approaching the customization of an ERP system, but the fact that ERP systems are mostly ready packages and not applications that are still under development, it is hard to view the around-the-clock development cycle (figure 6) fitting for ERP system context. Also, the fact that the change requests are reported separately for each office/location makes it feasible to conduct the system customization in a smaller scale setting (e.g. within the target country).

This sub-section concludes the literature review. We have acquired a solid understanding of the multinational ERP implementation context in general, and through the CSFs. Next, empirical part of the study is presented, and the results derived from the literature review will be addressed again after laying out the analysis of the empirical data in order to combine the results between the literature and empirical results.

3 RESEARCH SETTING

In this section, the choice for research method is explained and justified. The case company and its traits are introduced. The reasoning, formation, and execution of interviews is also explained and the methods that were used to collect information are listed. The methods used to analyze the materials are also introduced.

3.1 Chosen Methods & The Case Company

Qualitative research methodology is utilized in the empirical part of this study. The study is conducted as a case study. The reason for choosing a qualitative methodology over quantitative is that the study focuses on creating new theory rather than testing old ones. CSFs are also rather abstract, as the definitions in the academic literature tend to vary by some degree. As we have not found there to be existing theory regarding the localization of CSFs and the studies about the nature of multinational ERP projects are scarce and usually not related to CSFs, can the qualitative case study method be justified (Eisenhardt & Graebner, 2007; Benbasat, Goldstein & Mead, 1987; Darke, Shanks, Broadbent, 1998).

The empirical study is based on scholarly literature on ERP, CSF and organizational management, presented in this report as a literature review. Some of the main academic sources for the CSFs and ERP implementations that serve as the basis, are large literature reviews (e.g. Ram and Corkindale, 2013), implementation focused studies (e.g. Ehie & Madsen, 2004, and Nagpal, Khatri & Kumar, 2015), and multinational/country-based ERP related studies (e.g. Sheu, Chae & Yang, 2004). The base for the multinational project setting is a management theory by Binder (2016). The relevant literature was collected by using academic online archives such as IEEE Xplore and ACM Digital Library.

The empirical study follows the theory building steps identified by Eisenhardt (1989). The steps are:

1. Getting started
2. Selecting cases
3. Crafting instruments and protocols
4. Entering the field
5. Analyzing data
6. Shaping hypothesis
7. Enfolding literature
8. Reaching closure

Getting started refers to defining the research question(s). The process for defining the questions started in the autumn of 2018 along with the mandatory pro gradu seminar for information systems science, that is held for university students beginning to write their master's thesis. During this time, it was not clear yet if it was possible to acquire a case company for the study. Negotiations were still ongoing with the possible case company. During this time the topic of the study changed multiple times before finally being able to reach closure with the company and the study. The research questions can be seen in the introduction of this study.

According to Eisenhardt (1989), **selecting cases** should be theoretical, and not random. The case company was chosen for the study, since it is a rare case of a company that purely does ERP implementations focusing on countries that are outside of their based country, Japan. The case company is a Japanese ERP implementation agency with a handful of employees. The company focuses on providing consulting services for Japanese companies that wish to implement an ERP system to their foreign offices. The countries of the implementations are usually located, but not limited to Asia. Examples of countries include Malaysia, Singapore, India, and Columbia. The case company mainly consults Microsoft's Dynamics AX 2012 system. The case company focuses mainly on the functional consulting and project leading/management; the other project members (e.g. technical consultants) mostly come from different parties. The fact that the employees of the case company are highly experienced in the managerial side of the ERP projects strongly supports the purpose of the study. It would have been beneficial to be able to acquire multiple similar companies to participate in the study but locating and acquiring similar case companies with specific multinational focus proved to be difficult. However, the acquired case company can be regarded as an extreme example and it provides an unusual research access, which justifies the study to focus merely on a single case company (Eisenhardt & Graebner, 2007).

The unit of analysis for the study is a single interview, meaning that each interview is reviewed separately. The interviewed employees were mainly chosen because of their extensive managerial experience. Because having opinions from multiple levels of hierarchy can prevent bias in opinions, a non-managerial level interview was also decided to be conducted. A total of three (3) interviews were conducted.

Crafting instruments and protocols means defining the data collection methods and how qualitative and quantitative data will be combined in order to build theory. The data collection methods that were chosen are literature review, and case interviews. The reasoning for choosing interviews over other data collection methods such as observing, is that the access to conduct observing sessions was in this case impossible, and the interview setting made it possible to easily inquire about relevant insights related to the research questions. The quantitative data for the analysis is derived through the literature review. The **data analysis** is explained thoroughly in the corresponding sub-section, and the results presented in the results & findings section.

Shaping hypothesis refers to providing evidence for each derived construct and will be presented in detail in results & findings. **Enfolding literature** means the comparison of empirical results to existing literature that is either conflicting or similar with the study. This is also presented in the results & findings section. Finally, **reaching closure** will introduce the limitations of the study and possible future research topics. This information is presented in the conclusions, at the end of this report.

3.2 Interview Structure & Execution

Here the structure and execution of the interviews is explained and justified. Interviewee backgrounds are also presented in order to create an understanding of the whole research setting.

3.2.1 Interview Setting

The academic qualitative interview types are: structured interview, semi-structured interview, group interview, theme interview, and unstructured interview (Myers & Newman, 2007). The interviews in this study were conducted as semi-structured interviews. Semi-structured interviews are interviews for which a base of questions is constructed but the point is not to limit the conversation flow to those questions; additional questions can be asked based on the conversation and the interviewee, and a more open conversation is possible than in a structured interview. The benefit of semi-structured interviews is that the scope of the conversation is clearly defined, but not limited in a way that it affects the interviewees answers negatively. (Myers & Newman, 2007.)

The reason for choosing semi-structured interview over structured interview was that structured interview was considered to likely limit the highly desired new insights surrounding the topic of the study. Theme interviews in the other hand were not suitable since we wanted to limit the scope of the interview to the discussion surrounding the 10 identified CSFs. Unstructured interview type possesses similar issues; thus, it was not used. Group interviews were not used because of the low number of cases used in this study; if there

was a higher case count, conducting group interviews would have likely been a successful method, because some of the questions may have sparked interesting group discussions and new insights.

In order to limit the conversation around the research questions, a frame of questions was built that would give direction to the interviews. The questions were structured in a way that would give the interviewer a chance to adjust the questions based on the interviewee. The questions are listed in the appendix of this study.

At first, literature was analyzed, which then led to the creation of the ten global CSFs (see Table 1). This set of CSFs was then used as the base for the questions. After creating the CSF list, the questions were formed.

In the beginning of the interview, basic information such as the professional experience and the countries the person had been conducting implementations were inquired. If the interviewee had had additional relevant experience outside of the current company, it was advised to also utilize that experience during the interview.

After collecting the basic information about the interviewee, questions about the list of CSFs commenced. The following questions focused on finding out what the interviewees viewed as the most important factors in the list for the implementations and what was not deemed as important and why.

The given answers were then used in the following questions, that targeted the geographical and cultural nature of the multinational ERP projects. The goal here was to identify local implications within the listed ten CSFs and possible managerial suggestions that are especially apparent in the multinational projects.

The final questions were about the connections between the CSFs of the list. With the connections it is meant that when considering the management of a CSF, is there a possibility that one should also consider a set of other CSFs simultaneously. For example, one could assume that business process re-engineering would cause change resistance and also multiple mandatory changes in the operations and processes of the company, thus requiring extensive change management efforts; BPR and change management could be viewed to be connected to each other.

Because of the geographical distance, interviews were conducted through Skype software between Finland, and Japan and Malaysia. Skype's recording function was used to record the interviews, and a physical backup recorder was used to minimize the chances of the recordings being lost or getting corrupted. The interviews took approximately one hour each.

Even though there were some problems with connection quality in all the interviews, the issues were not bad enough to cause critical misunderstandings or missing of information. Another factor that may have played a low to moderate role in creating misunderstandings or miss of information was the difference of native languages and the interview language. The interviews were conducted in English. However, the interviewer's native language was Finnish, and the native language of the interviewees was Japanese. Luckily, all the par-

ticipants could speak in adequate English, and even though some degree of information loss was possible, the chances of it being critical was deemed as unlikely.

After the interviews had been conducted, the recordings were transcribed, and the transcribed versions were then sent to the corresponding interviewees. The interviewees were then provided with a chance of adding additional information regarding the questions and the topics of the interview. This additional provision of information was not treated as a required task for the interviewees. After concluding the derived information as final, data analysis was commenced.

3.2.2 Interviewee Backgrounds

In the beginning of the interviews, detailed ERP project related backgrounds of the interviewees were inquired. The inquired information included the experience in relevant roles in years, the number of projects participated, the roles the employee has attended, the ERP systems the employee is familiar with, and the countries in which the employee has participated the implementation of an ERP system.

Because the size of the case company is so small, only three interviews (units of measurement) could be conducted, which accounts around 50% of the total number of the case company's employees. Even though the count of case units is rather small, it should be accounted that the professionals with such a targeted proficiency of multinational ERP projects is quite limited, thus making the study unique and interesting.

All the interviewees had the highest amount of experience with the Microsoft Dynamics AX system and when viewing the results, it should be accounted that these results are mostly derived from the implementation projects of the Microsoft Dynamics AX.

Two of the interviewees had a high amount of implementation experience and they both had worked as the project manager in multiple projects. The third interviewee was working as a functional consultant and was also specialized in bringing language proficiency to the table as language barriers were often found to be problematic in multinational implementations.

The countries in which the implementations were conducted were mostly located in Asia. A few cases of Europe, South America, and North America were also mentioned. The high concentration of projects in Asia should also be accounted for when estimating the validity of the study and in practical implementation of the results. The interviewee backgrounds are listed in Table 3.

Table 3: Interviewee backgrounds

<u>Interviewee (number)</u>	<u>Experience (years)</u>	<u>ERP Systems Proficiency</u>	<u>Roles</u>	<u>Countries</u>	<u>Number of Implementation Projects Participated</u>
1	12	Dynamics AX, other Dynamics based products, SAP business ONE	Manager, Project Manager	USA, Canada, Singapore, Malaysia, Thailand, Indonesia, Hong Kong, Colombia, Chile, Philippines	10
2	7	Dynamics AX 2009, Dynamics AX 2012, Dynamics D365	Project Manager, Functional Consultant, User support	Singapore, Hong Kong, Spain, Thailand, Indonesia, Italy, India	8
3	2	Dynamics AX 2012	Functional Consultant, Language Proficiency & Support	Malaysia, Singapore, Macao	3

3.3 Data Analysis Methodology

Before the interviews were held, the questions were formed based on the theories and literature surrounding the critical success factors. This was done in order to thematize the material, reduce irrelevant data, and structure a clear scope around the topic of the study.

In the beginning of the data analysis, recorded interviews were transcribed into a text form. After all the interviews were transcribed, coding techniques were used in order to filter the data further and to divide the comments of the interviewees in a way that they were broken down into relevant groups regarding the research questions.

When dividing the comments, color-based coding was applied to the texts so that the topics would be easy to distinguish and that there would be a clear separation of comments that focus on a certain research question. Each research question was assigned a specific color and combinations of colors were used in

the case a comment touched multiple research questions at once. The colors used were the same for each unit of measurement. One more color was used for coding the comments that gave valuable insights but did not directly answer to any of the research questions.

Relevant information was then picked based on the earlier coding and grouped into a form that could be easily and clearly displayed. These displays are shown in the results & findings section of this study.

After the grouping, conclusions were drawn and verified through the empirical data. Empirical results were then compared with the results derived through the literature review and the results were combined. The results of the data analysis are presented in the following section.

4 RESULTS & FINDINGS

In this section, the empirical results and findings derived from the interviews are presented. These results are then compared with the literature review and holistic answers are drawn for the research questions. Finally, a new framework is presented regarding how to approach multinational ERP implementation projects through the management of critical success factors.

4.1 Interview Results

The background of the interviewees and each of the research questions are treated here in separate sub-sections. The comments of the interviewees are broken down and analyzed in detail. The literature review is not yet included in the analysis; the empirical data is treated separately at first. Each of the ten identified CSFs is analyzed one by one regarding the research questions. Some of the comments made by the interviewees are highlighted to show how the data was analyzed. However, many of the results were derived indirectly from multiple comments, thus a single comment cannot always be highlighted. In this case, the interviewees comments are simply explained within the text.

4.1.1 Local Implications in Global CSFs

The interviews provided a wide array of local implications throughout the list of ten identified global CSFs (see Table 1). Multinational context clearly requires viewing each success factor in a new light. Results proved to be richer than it was initially expected. Some interviewee comments are highlighted here, but usually the full results are derived from multiple interviews and not from single comments.

Top management support was found to be effective if the decision making in the organization was centralized. The interviewees reported that the initial project planning and budget discussions were always conducted in the Jap-

anese head office; the top management offered their support to the foreign office from the beginning of the project to the end:

The end user is providing the requirements only and we will fill the gaps regarding the requirements and the system. If we find that the product requires customization, we take it to the Japanese headquarters.

The centralized decision making gives the head office a chance to observe what the other offices are exactly implementing and realize the different needs of the foreign offices. It was reported that multinational ERP projects require especially high amount of top management support as the foreign offices may have difficulties providing appropriate resources especially in the case of smaller /developing countries.

Decentralized multinational implementations would likely cause many issues in the sense that the systems would not likely be fully compatible across nations. It could be argued that centralized decision making would hinder the flexibility of the systems in the foreign offices which may be true in a sense, but in the case of ERP, compatibility across offices is extremely important.

Training & education was reported to be planned in similar fashion regardless of the country/culture. However, cultural tendencies were said to affect the approach in which the face-to-face communication in the training may be wanted to be conducted. It was commented that the people from the US preferred a more distant, professional presentation style approach. Asian countries on the other hand were said to prefer a closer family like approach, meaning that the consultants may find it better to sit next to the users in the training sessions:

When I provide the training in USA or Canada, I try to learn the professional way to present the training. On the other hand, when I provide the training to Asian people, I try to sit next to the client. I try to provide a family like feeling to the users.

The need for language nodes was also found to be extremely important in the case of training sessions and the educational material provided. Interviewees reported a case in which the client in Colombian office did not possess appropriate English or Japanese skills, requiring a translator/interpreter to join the project team and conduct the training sessions. It was required for the managers to first educate the interpreter about the system before the sessions could be commenced.

...they didn't speak English, so we needed to use a translator to translate our English to Spanish. We didn't need to worry about the training because the training was provided by that translator.

Even if the case would not be this extreme, it is highly likely that the personnel in the foreign offices have a different native language, requiring to communicate and provide the materials in English/office's native language.

Other cultural issues may also cause problems in the education: it was reported that Indian employees tend to want to learn more functionalities than it is taught in the material/training sessions. Interviewees commented that in a case like this it is extremely important to communicate about the functionalities and possible risks if the users wish to keep using the self-taught functionalities:

...they wanted to learn more than we educated them. When we open a testing environment for the users, first, they start the training based on the manual but after this they practice other functionalities that we have never introduced to them. When we conduct a project, we always think about what kind of characters each country consists of.

User's skill level was also reported to affect the way in which the training should be conducted. The difference is likely to be the greatest in less educated developing countries and highly developed countries but cannot be generalized to such context:

An important part is how skillful or clever the end user is. It can have a very big impact on how you should approach them and what kind of training you should give and how deep you should explain.

Project management was one of the most prominent CSFs regarding the amount of local implications. In general, the most mentioned attribute was that project managers should pay increased focus on understanding the culture and characteristics of the clients and the users. Especially communication skills were highlighted. For example, as mentioned before, in the case of training in India, it was commented that project managers should ensure that there exists an understanding with the users about the correct usage of the functionalities that the Indians wanted to learn, that were outside of the scope of the original training.

The differences in the corporate cultures across nations were found sometimes problematic, thus requiring different approaches based on the country. A case was reported about Colombia in which the willingness to overwork was considerably lower than in Asian countries. The scenario required the consultants to do extra work and support the client more than usual in multiple processes such as data migration:

When you look at the Japanese people, they tend to do overwork, but the clients from South America did not like to do overwork. So, we supported the user so that the data was migrated to the new system for example. So, the approach was a little bit different from another countries. In the cases of other countries, we provide tasks to the user in order to provide the data to the new system. That is enough for them. However, when we were dealing with the South American people, they did not want to work much so we needed to support them.

Regarding the same project, understanding the personalities of the client/users were also highlighted; requirements were not able to be collected in a normal fashion and an auditor was required to join the process. The auditor

provided the minimum requirements that could be then used to come up with the appropriate system.

Understanding the taxation system of the target country was highlighted multiple times by the interviewees to be of extreme importance. The taxation systems are subject to change, and it was reported that the interviewees had encountered cases that even the users did not know the details of the new taxation system well. The requirements of the local government and other local installations should also be accounted with high level of importance. The taxation systems and other governmental requirements were agreed to be of extremely high importance and was concluded to be prioritized over cultural/organizational differences in multinational ERP projects.

According to the interviewees, the project management often requires being in contact with multiple third-party organizations in the country in which the implementation is conducted. These organizations may not have any ties with the client company, and the likelihood of them understanding the culture characteristics of the consultants is considerably low. The head office of the client companies itself in this case are from the same country as the consultants, which is likely to increase the understanding between the foreign offices and the consultants, as the foreign offices are likely used to deal with Japanese people. Along with the cultural differences between the consultants and third-party organizations, issues with poor work quality were reported, thus requiring the project managers to push their standards in order to acquire the outputs desired. Possible language barriers may equally cause problems in this sector

Business process re-engineering and **Change management** related local implications were surprisingly scarce. The reason for this may be connected to the fact that in the case of the case company the hierarchical structure of the Japanese companies is likely well understood and approved across the offices, especially Asian based ones. It is possible that the change resistance would be higher in different cultures (e.g. the Colombian case).

It was reported, that as with the training, user's skill levels should be considered when conducting business process re-engineering. Also, possible differences in operations between offices/countries were reported to be important, and that consultants should not only understand the country's characteristics but also the characteristics of the specific office.

Regarding change management, the previously mentioned case of Colombia applies strongly. Unusual amount of effort and a variety of methods may be needed to address the change in offices that are highly distant (continentally or culturally) from the head office. The interviewees continuously highlighted the importance of trying to understand the characteristics of the client of the foreign office.

Cost/budget issues were found to be a CSF that is likely to provide differentiating results based on the decision-making structure of the head office and/or the consulting company. In the case of the case company, the budget discussions were conducted purely with the head office without exceptions; the foreign offices did not take part in these meetings and they merely provided the

requirements for the system. This means that the head office provides the required funds and resources to the consultants including the possibly required customizations for the system. A scenario like this is likely to be very useful for offices that may not have appropriate funds to provide sufficient resources/support for the implementation (e.g. in the case of developing countries). The above scenario is an example of centralized decision making which may also eliminate the need for language nodes (for the budget discussions).

It was also reported that if the consultants are from the same culture as the head offices representatives, cultural clashes and misunderstandings in communication may be minimized, thus contributing to decreased costs.

The communication between the parties may not always be enough and budget related issues may appear from sources that are not dependent of the implementing parties. Problems with the local taxation were reported to contribute to problems with costs. An Indian case was reported in which the local taxation changes caused many issues in the project and required a great amount of customization that caused the budget to be exceeded by great numbers.

If the implementation is undertaken in a developing country and the decision making is decentralized, budget and cost related issues are likely. The interviewees reported that smaller and/or developing countries are less likely to have sufficient support from the ERP vendor (e.g. language packages and taxation related support) and causing great amounts of customization, that then leads to elevated costs:

ERP like Dynamics AX supports the major developed countries, for example: all the Europe based companies, USA, Japan, and China. However, if we go to countries like Brazil, India, Indonesia, Vietnam, local package does not exist. If the finance system of the country does not follow the standardized finance system, we will need many customizations, or we need to ask the users to do their operation outside of the ERP system. So, if we provide the ERP system to a minor country, cost and budget issues will be prioritized highly.

Finally, it was reported that consultants should possess sufficient knowledge about the implementation context; unnecessary customization and other extra costs may become apparent depending on the project, client company, and the context.

Choosing the correct ERP system was a CSF that the interviewees in general disregarded. The reason for this was that the interviewees were not taking part in the discussions with the clients regarding the choice for the ERP system; clients had decided the system beforehand and chosen the case company to conduct the implementation. However, interviews still provided implications to this CSF indirectly.

First, it was reported that the ERP system sometimes caused issues in offices regarding customization; the ERP system was not able to execute some desired functionalities. One reason for this is likely to be the centralization of the decision making; the foreign offices did not participate in the ERP choosing process. Obviously, if there is an abundance of offices that would be conducting

the implementation, having employees from each to take part in the ERP choosing process might be impossible.

As mentioned before, the lack of language and tax support may cause a lot of problems and the need for extensive customization for the system. This also relates to the possibility that the chosen system may have not been optimal for the company in the first place.

The interviewees also reported that sometimes when the ERP system is not capable to handle certain business scenarios, the users are forced to do these scenarios outside of the ERP system.

The interviewees all commented that **user/employee satisfaction of the system** is something that is more of a result of managing other CSFs properly, than a factor that should be targeted directly. It was reported that change resistance is often quite high in foreign offices which is understandable in the cases that head office has ordered the implementation of a system; the implementation was likely not discussed in detail with the foreign office itself.

One indirect implication was still captured from the interviews related to centralized decision making. A case was reported in which the head office of a client had finished an ERP implementation and then wanted to expand the system to other offices. In this case the head office had required a lot of customizations and similar package without further changes was requested to be implemented in another (foreign) office as well. What resulted is that the office did not require many of the overcomplicated functionalities that were necessary in the head office. The unnecessary customizations caused the foreign office's users to use the system through these customizations, slowing their work speed and causing irritation and decrease in satisfaction regarding the system:

...the system got super complicated, and when they wanted to get the system to overseas offices as well, many of the functions that were required in the headquarters were not necessary in the foreign office at all, but they needed to be included because the functions are built in the very core of how the system works. Now the foreign office needs to do extra things just so that they can follow their headquarters.

Strategic planning/business vision was considered similarly as the user satisfaction by the interviewees; it was viewed as a factor that the client had considered before deciding to implement an ERP system. Nonetheless, it was generally viewed as an important factor to the project.

Regarding the local implications of strategic planning/business vision, an example could be found in the already mentioned topic of different offices requiring different sets of functionalities. If the implementing company and the consultants could do some internal research about the differentiating business flows/processes of foreign offices and analyze the results through the lens of company's business vision, some implementation related difficulties might be able to be avoided.

The importance of **project team competence** was perceived highly by all the interviewees. The simplest critical matter regarding the project team and multinational ERP implementation mentioned by the interviewees was the lan-

guage capabilities. The project team must possess enough language skills to be able to fluently communicate with the clients in the head office, as well as in the foreign offices. A good example of this is the Colombian implementation project mentioned earlier.

It was also reported by the interviewees that the importance of project team competence may differ from country to country. Interviewees commented that perceived project team competence in the US was highly important and a case was reported in which a project member did not possess sufficient skills and was terminated from the project. In the case of Colombia, perceived skill levels were not viewed as equally important.

The interviewees commented that different skillsets and skill levels may be required based on the location and the context of the implementation. It was reported that finance related consultants need to understand the target country and its financial system. Other consultants may as well be required unique skillsets depending on the country of the implementation.

In order to filter the information and to present the results in an easy to digest form, the local implications of each CSF are listed in Table 4. The table lists all the global CSFs and the corresponding local implications collected from the interviews. Next, we will look at the connections between these CSFs.

Table 4: Local implications in global CSFs

<u>CSF NAME</u>	<u>LOCAL IMPLICATIONS</u>
1. Top Management Support	Elevated amount of support generally required, especially in the case of developing countries. At least partially centralized decision making is required to avoid system mismatches. Existence of cultural and language barriers between consultants and the client may cause distrust among parties.
2. Training & Education	Applying an appropriate presentation style and physical distance with the users in the training sessions may require cultural knowledge. The use of language nodes/consultants who possess relevant language skills is extremely important. Communication is highlighted when dealing with a distant culture. The education and skill levels of users may vary greatly from country to country, thus requiring

different levels of approach.

3. Project Management
Managers should pay increased focus on understanding the culture and characteristics of the clients and the users. Differences in corporate culture across foreign offices may require unconventional managerial decisions. Local taxation and governmental regulations extremely important regarding the ERP system. Communication with foreign third-party organizations may require increased amount of managerial effort.
 4. Business Process Re-engineering
It is important to understand the processes/business flows in the target country and target office.
 5. Change Management
Unusual amount of effort and methods may be needed in culturally distant offices. A strong likelihood of relatively strong change resistance when compared to domestic implementations.
 6. Cost/Budget Issues
Language/cultural barrier may cause issues in the planning phase. Taxation related issues may affect the costs. The budget/costs are likely to be relatively high in small/developing countries when compared to developed countries because of the general nature of needing more than average amount of customization.
 7. Choosing the Correct ERP System
Foreign offices may have different requirements for the system (functionalities, taxes etc.). Language support needs to be available for all the implementing offices.
 8. User/Employee Satisfaction of the System
If an identical ERP package is implemented across foreign offices, the unnecessary functionalities may cause extra work for the users and decrease the satisfaction for the system.
-

9. Strategic Planning/Business Vision	The implementing organization should consider the needs of all the offices equally to avoid mismatches of the system and to be ready to provide sufficient support for the implementing office
10. Project Team Competence	Language skills highly relevant. The importance of perceived project team competence may differ between countries. Different skillsets and skill levels may be required based on the location and the context of the implementation (e.g. financial consultants need to understand the financial system of the target country).

4.1.2 Connections Between the CSFs

Connections between CSFs were identified in two ways: through directly inquiring the interviewees about how they thought the CSFs were connected, and by analyzing their other comments and deriving the connections from those contexts. The CSFs that were analyzed are the ones that are listed in Table 1 and Table 4. Some interviewee comments are highlighted here as well as they were on the previous sub-section. The full list of found connections is presented in Figure 7. Next, those connections and how they were derived are explained in detail.

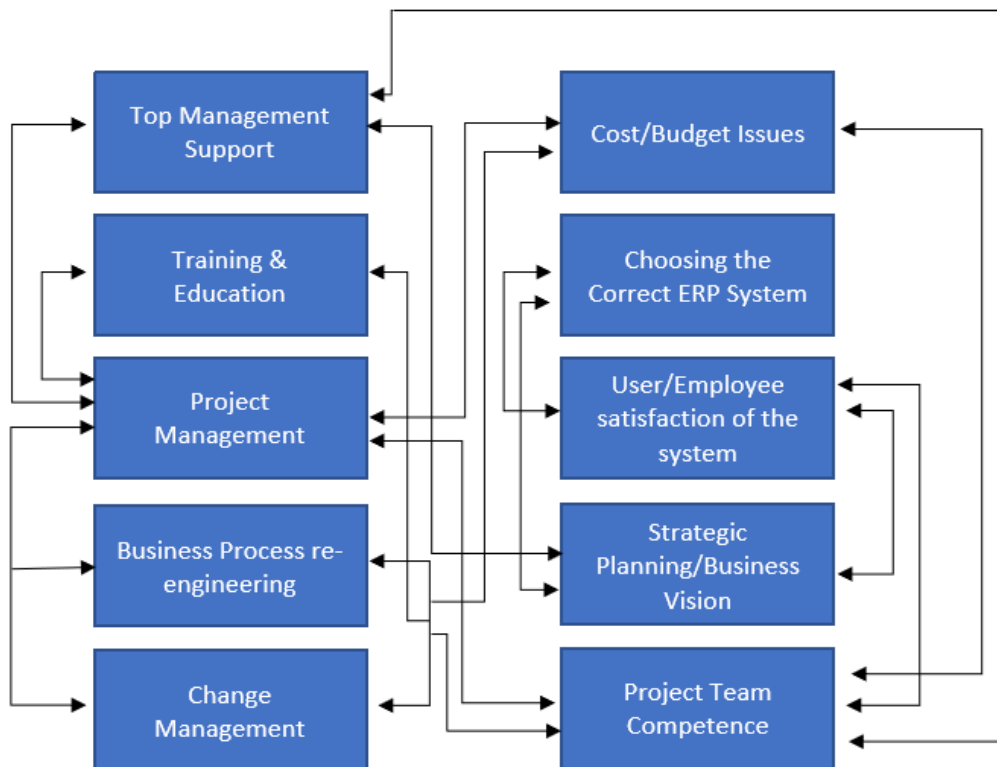


Figure 7: Connections between the CSFs

First looking at direct questions, **user/employee satisfaction** and **project team competence** were found to connect. Interviewees commented that when the consultants are talking about internal matters with the client, the client will evaluate the consultants, which can affect their satisfaction. This type of user/employee satisfaction is more related to the beginning/middle phases of the project rather than the outcome.

Project team competence and **cost/budget issues** were found to connect in a sense that if internal training could be skipped/minimized, it will also cost the clients less:

...this is because we need to train the team members who do not have the skills. If we can skip the internal training, we can save time and money. So, this is how it is connected to cost and budget.

Another point is that a more skilled team is likelier to provide a sound decision without the need of unnecessary customization.

Top management support and **project management** were said to connect. Interviewees commented that without proper project management, client status will stay unknown and there is unlikely to be any proper top management support either. It is also deducible that a properly managed project is likelier to attract a **stronger support from the management**.

Change management and **project management** were found to connect simply because project management needs to ensure that the changes are deliv-

ered properly. According to the interviewees, change management is one area of project management and they travel hand in hand throughout the implementation:

I think change management is part of the project management. Project management needs to ensure that changes are delivered properly.

Cost/budget issues and **project management** were also found to connect. An interviewee commented that:

Without proper project management it cannot be seen what factors affect the budget. Project management can either accept a lot of customization, thus needing more budget, or if the customization is simplified/unnecessary customization is eliminated in terms of project management, costs will also decrease.

Project team competence and **project management** were said to connect in a sense that project management is responsible for the project team to be adequate; if the project management sees that a teammate does not possess enough skills the project needs to be reorganized. The interviewees reported of a project in which they found that one of the project team member's skills were not adequate, so they needed to replace the member.

Choosing the correct ERP system and **user/employee satisfaction** were also found to connect. This connection seems rather obvious, since if the system is not right, the satisfaction of the employees will surely be low. The case might also be that the ERP system fits well to some offices but poorly to others, causing satisfaction only in some.

Business re-engineering and **change management** were considered to be strongly tied together by the interviewees and they commented that both of them are connected to cost/budget issues. The interviewees reported that sometimes when there is a new business scenario, the project needs to be postponed in order to learn about the new scenario and possibly get new licenses for new functions or do additional development, that obviously affects the costs.

Change management and **BPR** were also found to connect to **project team competence**. It was commented that a consultant needs to have enough knowledge about business scenarios, operations, manufacturing and technical matters in order to give good solutions when there is a new change scenario; otherwise the consultant may need to be replaced.

The last directly mentioned connection was **top management support** and **strategic planning/business vision**. According to the interviewees experience, clients were always found to give good support for the project if they had a clear vision of their project. The interviewees also commented that:

...If the client is not thinking about the future of the ERP system, enough support is often not given.

Which strongly implies that poor planning has a negative effect on top management support.

When it comes to indirectly derived connections, we analyzed the comments and narratives of the interviewees and tried to identify how the CSFs were affecting each other in each context.

Training & education and **project management** were seen to be tied together because the interviewees reported of cases in which project management needed to communicate clearly with the client's managers about the possible negative consequences and risks of using functionalities that were not taught during the training. Project management should also ensure that the training is conducted effectively and within given time constraints.

User/employee satisfaction and **strategic planning/business vision** are connected in a similar way that the satisfaction and choosing the correct ERP system are. In fact, all these three are closely connected. If the business processes are different from office to office, top management should have a clear vision about the system and how it will be utilized or the system may end up being overly complex to use in some offices (or not adequate), reducing user satisfaction. In the similar fashion, strategic planning/business vision can also be argued to be connected with **choosing the correct ERP system**; planning should be done so that the business vision would be aligned with the ERP system.

Training & education were found to be connected with **BPR** and **change management**. The reason for this is that the users need to be educated about the need for the business flow reformations and not just how to use the new system. In a sense the education part is also part of change management. The interviewees also reported that the users are often told to study how to use the new system on their own and there are often cases in which the users are not doing the self-training properly (change resistance). This means that some control strategies need to be used for example making schedules for the self-training or weekly managerial checkups to ensure that the results are adequate.

Training & education were also found to be connected with **user/employee satisfaction**. The interviewees commented that if the training is poorly executed, the project cannot be deemed as successful and it is obvious that the user satisfaction will be very low if they cannot use the new system properly.

As already mentioned, **BPR** is closely tied to **change management**. Change management was found to be part of project management and as BPR related tasks are closely tied with change management, can the BPR also be strongly connected with project management.

The interviewees mentioned that **project team competence** and **user/employee satisfaction** are connected because the clients will evaluate the consultants during the project. It can also be deduced that the same effect would affect the quality and amount of **top management support**; it is likelier to get quality support if the clients are pleased with the consultants.

In general, most of the CSFs can be seen to connect to each other in some way or another. Managers should be aware that managing/neglecting a success factor could have possible consequences to other success factors as well, making

the management of ERP implementation projects the management of holistic wholes rather than single entities.

Looking merely at the number of connections, project management and project team competence seem to be in the most vital role when it comes to ERP projects in a sense that their influence spans the widest area across all the CSFs.

The next sub-section will combine the empirical results presented so far to a more practical view while still excluding the literature. After the practical implications are presented, those will be compared with the literature and final results will be derived.

4.1.3 Multinational ERP Implementations Through CSF Management

Some managerial implications can directly be derived from the Table 4 and the presented connections between CSFs in the previous sub-section. Those results and additional comments from the interviewees will be combined here in order to identify how multinational ERP projects should be managed in contrast to domestic implementations. The matters will be discussed in order of the implementation steps. The implications will be viewed from the perspective of CSFs.

When a company is considering organizing a multinational ERP project and they have designed a scope, they should map their business processes across all their offices that would implement the system and most importantly observe if there are any critical differences in operations that could affect the suitability of certain ERP systems. The implementing company can already set a positive direction for the project by choosing the correct ERP system. By doing considerable effort towards choosing the correct system, it ensures that the company would form a clear business vision around regarding the system. As mentioned before, if the company has a clear business vision, it is very likely to offer adequate top management support to the project team, which already gives a good setting to commence the project.

Regarding the formation of the project team, according to the interviewees, the experience and knowledge of the consultants is highlighted in multinational ERP projects. The reason why experience was deemed so highly was said to be because understanding the characteristics and culture was considered vital, especially if the implementation was conducted in a distant culture. For example, interviewees commented that in the US the consultants should focus on listening to the clients rather than being too proactive, which was deemed as opposite from Thailand:

For example, in the case of USA, they speak a lot. So, I try not to interrupt their talking until they finish what they were saying. After that I provide my feedback. In the case of Thailand, they are really quiet, they don't talk a lot. So, I try to provide them questions in order to receive the necessary information.

As it was presented in Table 4 and Figure 7, project team competence was found to strongly correlate with multiple elements in multinational ERP projects and likely also project success. Managers should commit considerable effort on building a solid project team that is suitable for the project; language abilities should be highlighted based on context and previous experience with the local culture and financial system/taxation would likely make the process much easier and possibly reduce the amount of planning needed beforehand.

Especially the managers should be able to easily communicate with the top management. The language abilities for the technical consultants are likely not as critical, because the amount of communication they need with the clients is minimal. Obviously, technical consultants should at least be knowledgeable in same language as with other team members, so that functional consultants can properly communicate the collected system requirements to them.

When conducting the meetings with the client about the scope and execution of the ERP project, if it is possible, consultants should encourage at least partly centralized decision making for the systems across the offices of the client to avoid mismatches with the system. Some sort of flexibility may still be possible to maintain, and it may be even desirable in the case that the operations in foreign offices differ strongly from the head office. To ensure strong top management support for the project, meetings with the head office should be conducted with the presence of consultants who are knowledgeable with the language of the client and most preferably the culture as well. This matter is the most crucial in cases in which there is lack of English skills from either side of the parties.

Even if the decision making is centralized, it would be beneficial to include employees from the target office to join in the meetings regarding the planning. This would (1) increase the communication and enrich the information passed through the head office and implementing office. (2) By making the foreign office part of the planning, it is likelier that office would take a positive stand regarding the new system increasing the support and decreasing resistance. (3) Possible risks could be identified earlier, and sudden costs could possibly be prevented.

The most important preparation for the consultants is to educate themselves about the local taxation system and financial system. Also, the government regulations and requirements should be researched and accounted for. This information is absolutely critical and if it is disregarded, it could lead to the whole project failing. Researching about the possible cultural differences that may cause issues if disregarded should also be done as additional preparation.

As soon the project is kicked off in an office, all the employees should be informed about the project being conducted. This should not just be a general notification; the importance of the implementation and how it will affect the working of the employees positively should be highlighted. The users should be made to realize that it is likely that they need to change the ways they have been working so far to accommodate the new system. If this is done correctly,

change resistance can be decreased, that can then ease the process of BPR and education.

Throughout the implementation process, both parties should aim to understand the representatives of other cultures. If only the one of the parties focuses on this, cultural misunderstandings may cause dissension, or some discussed matters could be completely misunderstood. Project and change management should continuously ensure that cultural matters are accounted for, especially if the project team consists of representatives of multiple cultures.

Change requests are almost certain, and the consultants should clearly communicate with the users about why a certain customization is possible or not, in order to decrease the change resistance. Handling the language barrier with the users is equally important than the one between the managers, because the users will be the ones using the system in the end.

When it comes to technical development, the interviewees mentioned that there have been projects in which there existed a language barrier between the users and the technical consultants. In this case functional consultants were in key role to communicate the requirements and approved change requests clearly to them:

...there is someone else who is more technically knowledgeable, but they often don't speak good English, so I'll be assisting that person. I will be the one talking to the end users directly and kind of interpreting for this client.

Other than that, technical matters were not mentioned during the interviews. The reason for this is probably that the interviewed consultants had not worked as technical consultants; more studies are needed to address the technical standpoint.

As the project moves to the fine-tuning and user training in multinational ERP projects, managers should pay extra attention to multiple matters. Most importantly, there should be no language barrier. As mentioned about the Colombia case, it may even be required to hire external language support for the project, which then makes the whole process a lot more complex. Consultants should also listen to the users carefully and assess their base technical skill levels. The skill levels of the users dictate the level of abstraction in which the training is conducted. The skill levels can vary greatly based on the basic education quality and organizational cultures across the globe, meaning that consultants should always try to adapt to the situation rather than forcing the same approach for all the clients. Finally, cultural tendencies and characteristics should be noted, and the consultants should approach the users with respect and by trying to understand what the most natural style is to communicate with them during the training. These matters are likely to contribute to the overall effectiveness of training & education. If the users feel like they are treated fairly, the change resistance is also likely to decrease.

As there still is a likelihood of poor self-training, managers should establish methods to ensure that the users will be knowledgeable before the final us-

er skill tests. Techniques mentioned by the interviews include scheduling and weekly managerial checkups:

...sometimes they will practice the ERP during overtime and generally they are very busy. Even if we ask them, usually they won't do it. So, in order to complete the training, we need to manage users' practice for example by making a schedule for the practice.

This matter is likely to be equally important in domestic ERP projects as well. However, the likelihood of stronger change resistance in multinational ERP projects remains.

When entering the go live & support phase, the consultants reported that it is normal to switch to a separate support team and finish the implementation. As there are possibly multiple customizations made and problems identified during the project, the consultants should communicate about these issues with the support team before the switch happens. Users should also understand that the support team's information could be partly lagging and make sure to communicate about their issues in detail.

To conclude, there are multiple matters that should be accounted for in multinational ERP projects when compared to domestic implementations. Cultural differences, language barriers, and differences in taxation and governmental requirements were found to contribute to the most problems. Change resistance and other problems were found to be the biggest in countries that were the most culturally and geographically distant from the head office of the client (Japan). Centralized decision making was found to be beneficial, but the lack of flexibility was found to contribute negatively to user/employee satisfaction. Clients were found to be able to strongly contribute towards a positive outcome of the project by carefully planning the business vision and choosing the fitting ERP system. It was also found that by managing a CSF, it often affects other CSFs as well. Project management and project team competence were found to be the most influential CSFs when it comes to the amount of connections between other identified CSFs.

Now that the empirical results have been presented, they need to be put in contrast with the previous studies. The following section compares the results to the existing literature (literature review), fills any gaps that were not identified during the interviews, and combines the collected empirical data and past research into final results.

4.2 Enfolding Literature

This section compares the empirical results of this study to the results found in existing literature. Any possible mismatches/matches are pointed out and analyzed. The empirical results are complimented with the results of past researches in order to create a holistic view of the idiosyncrasies of multinational ERP

projects. Finally, the combined information is presented as a framework that shows the processes included in the multinational ERP implementation preparation and execution.

4.2.1 Comparison to Literature Review

When it comes to multinational ERP projects, the academic literature has been scarce. Studies by Sheu, Yen & Krumwiede (2003), and Sheu, Chae & Yang (2004) have given important nascent views about the idiosyncrasies of multinational ERP projects that serve as one of the foundations for this study as well. However, these studies have focused on the general aspects of ERP implementation and they have not observed the multinational ERP projects through the lens of CSFs.

The studies regarding CSFs in ERP projects are abundant to the extent that scholars should pay heightened attention in evaluating the relevance of some articles. Still, studies regarding CSFs and multinational contexts are generally limited to either study of a single country or comparison of two countries (e.g. Cheng, Deng & Li, 2006; Shanks et al., 2000); there is no comprehensive set of literature about CSFs in multinational ERP projects even though the circumstances are greatly different between multinational and domestic implementations.

The lack of relevant literature makes it more difficult to evaluate the empirical results of this study, but at the same time it opened the chance to create a nascent theory that can serve as a foundation for future research.

When it comes to comparing the empirical results and previous literature, some matches, mismatches, and gaps could still be found. All but one connection that was identified in the literature review also came up in the empirical part of the study. The connection of top management support and change management did not appear during the interviews. This is likely due to the rather free nature of the interviews in which the conversation is not strongly directed to connections of certain CSFs. The connection is still logically deductible, as high level of top management support equals more resources and better acceptance for the system from the client side, thus easing the change management process.

Looking at the local implications of global CSFs, literature offered some that were not identified from the empirical data, even though the general amount of local implications of CSFs mentioned in the literature was limited (see Table 2). It was found in the literature that possible lack of understanding and trust between parties, and differences of business processes could be the causes of strong change resistance in multinational ERP projects. The reason why this implication did not come up during the interviews is likely because the interviewees may have not been able to deduct the exact reasoning behind the stronger change resistance. There could also be other contributing reasons that were not found in the literature nor the empirical data.

The empirical results matched and confirmed the implications regarding BPR and training & education. The implications regarding training & education proved to be richer when compared to the past studies; multiple implications were identified that did not appear in the previous literature (see Table 2 and Table 4). The implications regarding cost/budget issues were also confirmable with the empirical data regarding how budget/cost differs in the case of developing countries and developed countries. Additional implications were also found that were caused by language barriers.

The literature regarding project management on the other hand provided an implication that was not identified during the interviews. It was found that perceived value of planning could be different from country to country, which then could have an effect on the resources needed for project management and the approach that should be taken. As this implication was not identified from the collected empirical data, it suggests that there likely exist more local implications than those that were found in this study. No other direct local implications regarding the listed CSFs were found from the literature.

Indirectly some implications can still be derived from literature that is not CSF related, but tied to multinational ERP projects. The possible problems with language and culture has been widely recognized in previous literature. Sheu, Yen, and Krumwiede (2003) recognized that sometimes different writing systems may cause issues with the system when writing names for example. This was an implication that was not found in the empirical data, and one of the reasons may be the time the study was published; the systems were a lot less advanced. It is still possible that other writing systems could cause some issues across the office and companies should strive to use one standard writing system especially for the names, and if it would be possible to enter all the data in a standardized language, the knowledge gaps between offices would diminish. The risks of decentralized decision making were identified by Sheu, Yen, and Krumwiede (2003), and they were also found from the empirical data.

Sheu, Yen, and Krumwiede (2003) reported cases in which the decision-making protocols and corporate cultures differed greatly between countries/cultures, which suggests that project management should ensure that there are clear guidelines about how to proceed with decision making during the project. This matter was also not identified from the empirical data.

Taxation and government regulation related issues were identified from literature (Sheu, Chae & Yang, 2004) and confirmed by the empirical data. Sheu, Chae, and Yang (2004) specified that some ERP system's functionalities may not be allowed to be used by law, and import/export policies may cause restrictions in the usage. These specifications did not appear in the empirical data. The reason for this may be that the interviewees answered overly generally regarding the taxation and regulation related topic.

Finally, Sheu, Chae, and Yang (2004) reported cases in which a time difference had caused issues in currency rate handling and international trade. This is a matter that should in theory be handled by proper system customization. However,

it does not remove the fact that the issue needs to be accounted for. These issues were not reported by the interviewees of the empirical part of this study.

Overall, most of the previously published implications about multinational ERP projects were also identifiable from the empirical data of this study, thus they were confirmed to be relevant issues. The empirical data provided many implications that were not identified before, at least in ERP related literature. There were still some implications that were found in the past literature that complimented the results of this study well. Clear conflicts with the past literature were not found. However, many of the found implications in this study and other studies are reported only in single studies, which implies that more research is needed to confirm the validity of these implications. Multinational ERP projects require more research in general in order to form a sound theoretical basis about the subject.

Combining the empirical results and the complimenting implications from previous literature, the next sub-section presents a nascent theoretical framework for multinational ERP project preparation and execution.

4.2.2 A Nascent Framework for Multinational ERP Implementations

The framework sets more of a set of guidelines than it forms an implementation process model. It follows the process model by Ehie and Madsen (2005) that was presented earlier in this study (see Figure 4). The reason for choosing this model is that it was made in order to observe the CSFs. However, the purpose of this framework is not to create the theoretical steps of the implementation; the purpose is to look through the implications presented in this study and form a picture about what should be accounted for in the multinational project from the perspective of the implementing company as well as the participating consultants.

The framework ignores factors that are not related to the local implications/connections of CSFs in multinational ERP projects. Some of the steps still overlap with domestic implementations. If a step is included, it is because it contains implications to multinational ERP projects. Each step is set in a way that it maximizes the potential of the CSF management. The connections are also accounted for, but not pictured in the same figure for the purposes of clarity (see Figure 7 for reference). The framework is presented in Figure 8.

The phases are the same as in the model by Ehie and Madsen (2005), but the process is split into two paths: *Implementing Company*, and *Consultants*. Each path shows the corresponding tasks for each party and in order to maximize the benefits, both paths should be followed simultaneously.

All the elements in the framework are based on the results derived from the empirical data and literature review. The framework merely combines the results of the research into a holistic view that could be used for practical purposes when conducting a multinational ERP project. Some of the elements need to still be explained for clarity.

Notifying the employees/users about the project should have an emphasis on highlighting the benefits of the system in order to decrease the change resistance. This effort should come from the both parties in order create a stronger effect and to form trust between the parties. *Trying to understand the need for change* has similar implications as the latter one; the change should be equally addressed by the users as they will be the ones using the system.

Communication with the head office refers to informing the head office about the requirements/resources needed for the project and about required customization. This has two effects: (1) the head office will understand the foreign office better regarding the differences with business processes and needs, and (2) The head office can provide required resources and other support to the implementation site more efficiently and likely also more willingly, as there is a better communication throughout. This communication can be conducted by either the consultants or the top management of the implementing office, thus it has been listed in both paths.

(Head office) flexibility means that the head office should be flexible enough with the changes in the system to ensure it will be optimal for usage. At the same time users should understand that not all the change requests simply can be made, or they would take too many resources.

Forming the optimal project team consists of ensuring that all the members possess the required language capabilities, context related experience/knowledge, and tendencies for cultural sensitivities. Cultural differences between the team members should also be accounted for, and the general fit for a team should be observed.

Country based preparations consist of everything that is related to the context of the implementation: taxation, government regulations (law, trading policies), financial systems, and perceived value of detailed planning as it may differ from country to country (Shanks, 2000).

The need for *external language support* in the training may or may be not required depending on the implementation context. The project management should aim to form a project team that is capable enough to conduct the implementation without external support.

Throughout the implementation, both parties should focus on understanding the culture and characteristics of the other party as the ERP implementation projects are in the essence about understanding the other party and creating an optimal system for the needs of the customer as well as understanding that the implementing company should likely change the business processes in order to accommodate to the new system. The whole implementation is a balancing act that requires continuous effort and understanding from both parties from the preparation to the go live & support.

As all the results and findings have now been presented, the next section will present the conclusion, limitations of the study, and topics for future research, concluding the study.



Figure 8: A nascent framework for multinational ERP project preparation and execution

5 CONCLUSIONS

Overview of what has been studied and the most important results are collected here into a conclusion. Based on the research setting and analysis, limitations of the study are presented and through the outcomes of these matters, fitting topics for the future research are also suggested and justified.

5.1 Conclusion

The topic of the study was to observe multinational ERP implementation projects through the lens of critical success factors (CSFs). The study was decided to be conducted as a qualitative case study. The case company was based in Japan and it only worked with multinational ERP implementations. At first, relevant literature was reviewed and a total of three research questions were formed based on the research setting and the lack of relevant studies. The research questions were:

1. What are the local implications within the CSFs that are found to have the most empirical proof in multinational ERP implementation context?
2. How are the identified CSFs connected to each other and what managerial implications do these connections have?
3. Looking through the connections and local implications of CSFs, how should the management/approach for multinational ERP projects differ from a domestic ERP implementation?

The literature was analyzed in order to better understand the CSFs and general ERP implementation process, and to limit down the list of CSFs that would be used in the empirical part of the study.

It was found that only few local implications were identifiable from the current literature and that the general topic of multinational ERP projects had not been studied enough. Only a few connections between CSFs were also directly mentioned by scholars even though many of them seemed clear and obvious.

The empirical part of the study was conducted as semi-structured interviews and they provided rich results in general. Regarding the first research

question, all the identified CSFs (see Table 1) provided at least some local implications the most important being the difficulties that were caused by differences in culture, characteristics, language, and taxation/governmental regulations (see the full list in Table 4). Centralized decision making was also found to play an important role in this kind of implementation projects. Most of the identified implications were not mentioned in the ERP literature beforehand. Still, few implications were found to be similar to previous studies' results and some implications were also found that did not come up during the interviews.

The second research question also provided multiple connections that were not found from previous literature. The most important findings were that project management and project team competence seemed to have the most connections to other CSFs making them "the most critical CSFs" when it comes to affecting the other CSFs either positively or negatively. The full list is presented in Figure 7.

Regarding the third research question, we combined the results of the first two questions and literature review and formed a holistic whole to be used practically for multinational ERP project management. The outcome was a nascent framework that followed the implementation steps defined by Ehie and Madsen (2005) and formed two managerial paths: one for the implementing company and one for the consultants. The framework focused on the idiosyncrasies of multinational ERP projects and works as a set of guidelines for each of the implementation phases rather than a step-by-step process guide to the implementation. The framework is presented in Figure 8.

No clear conflicts were identified with the previous literature and this likely due to the reason that multinational ERP projects have only a limited set of literature especially when combined with CSF related content.

Overall, the results of this study give a solid foundation for the consultants and the companies that are planning to engage in a multinational ERP implementation. The created framework and the derived local implications should be viewed as tools to utilize with other more detailed general ERP roadmaps. The reason for this is that even though the created framework does offer steps to follow, it purely focuses on the multinational side of the implementation; the general steps are handled in greater detail in other ERP implementation process models. The most important 'hard' matter that should be addressed was found to be the differences in taxation, government regulations, and financial systems. The most important 'soft' matter that should be understood when looking at the practical usage of the framework was found to be that multinational ERP projects are in essence about both implementing parties understanding each other's characteristics and culture; if a consensus can be reached throughout the project, the success rate is likely to be high.

In general, this study opened a new way of viewing CSFs by introducing a global-local setting, that was found to be highly required, since the management style for the CSFs was found to greatly differ between domestic and multinational implementations.

Scholars can use the results as collection that forms a foundation for new studies as there exists only a limited set of literature regarding multinational ERP projects. This study's results should be evaluated by testing to see if they match with the future studies that are much needed regarding the topic. The topics for future studies are discussed deeper in the corresponding sub-section.

5.2 Limitations of the Study

Even though the results of the study were rich, multiple limitations were identified. First, only three interviews were conducted because of the small size of the case company and the lack of professionals that are specialized in multinational ERP projects. All the interviewees were also from the same nation, Japan. The client companies were also always based in Japan except in the case of previous work experience of one interviewee.

The fact that the consultants are from the same culture as the clients (head office) and speak the same language are extremely likely to cause a positive effect regarding the outcome of the top management support and project in general. However, the interviewees were never of the same culture as the representatives of the implementing office. Also, a reverse scenario that would possibly create different results could be that the head office of the client would be of a different culture than the consultants, and the implementing office would be the same as the one of consultants.

The projects were mostly focused on Southeast Asian countries that were not extremely different regarding the cultures of the interviewees. This is also likely the reason why the strongest identified issues regarding the projects were in cases in which the implementing office was in a culturally distant country.

The fact that all the interviewees were mostly working with Microsoft Dynamics AX and utilizing the Microsoft Sure Step methodology (see Figure 5) could be affecting the opinions regarding the steps of the implementation process.

It is also possible that some parts of the interviews could have been misunderstood because of cultural differences or because the interviews were conducted in English that is not the native language of either the interviewer or the interviewees.

5.3 Topics for Future Research

This study's output was a collection of results that unboxed the general research area of CSFs in connection with multinational ERP projects. As the previous literature regarding the topic is very scarce, a foundation could be laid out that can be used as a basis for future research. However, because of the lim-

its of the study and the limited set of literature, many types of future research are required.

Most importantly, quantitative studies are needed to confirm the validity of the results of this study. Similar style of studies as this also need to be conducted with similar and different cultural settings in order to identify a comprehensive list of local implications in CSFs and to be able to analyze opinions from multiple perspectives. Also, studies that are similar as this, but look at from the perspective of technical consultants, would likely offer results that would compliment the current results well.

More studies that focus on single countries/comparison of two countries, conducted preferably by same set of consultants, would allow us to understand the specific difficulties that may be faced when conducting an implementation in certain context.

The fit of different ERP implementation methodologies/process models should be researched regarding multinational ERP projects in order to further unbox the research area.

Overall, more studies are needed in general to understand the differences of domestic and multinational implementations. Multiple approaches could be taken and using CSFs is only one way to do it. Other approaches such as analyzing the user satisfaction or change management in these projects and comparing them to domestic implementations could offer interesting insights.

REFERENCES

- Akkermans, H. & van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: A case study of interrelations between critical success factors. *European Journal of Information Systems*, 11(1), 35-46.
- Al-Mashari, M. & Zairi, M. (2000). Supply-chain re-engineering using enterprise resource planning (ERP) systems: An analysis of a SAP R/3 implementation case. *International Journal of Physical Distribution & Logistics Management*, 30(3/4), 296-313.
- Benbasat, I., Goldstein, D. K. & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, , 369-386.
- Bendoly, E. & Jacobs, F. R. (2005). Strategic ERP extension and use. *Stanford University Press*.
- Binder, J. (2016). *Global project management: Communication, collaboration and management across borders*. Routledge.
- Bullen, C. V. & Rockart, J. F. (1981). A primer on critical success factors.
- Calisir, F. & Calisir, F. (2004). The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems. *Computers in Human Behavior*, 20(4), 505-515.
- Chang, S. (2004). ERP life cycle implementation, management and support: Implications for practice and research. (s. 10 pp.) IEEE.
- Cheng, D., Deng, F. & Li, H. (2006). Critical factors for successful implementation of ERP in China. (s. 358-365) IEEE.
- Chevrier, S. (2003). Cross-cultural management in multinational project groups. *Journal of World Business*, 38(2), 141-149.
- Cox, T. H. & Blake, S. (1991). Managing cultural diversity: Implications for organizational competitiveness. *Academy of Management Perspectives*, 5(3), 45-56.
- Darke, P., Shanks, G. & Broadbent, M. (1998). Successfully completing case study research: Combining rigour, relevance and pragmatism. *Information Systems Journal*, 8(4), 273-289.

- Dezdar, S. & Sulaiman, A. (2009). Successful enterprise resource planning implementation: Taxonomy of critical factors. *Industrial Management & Data Systems*, 109(8), 1037-1052.
- Dhir, K. S. & Gökè-Paríolá, A. (2002). The case for language policies in multinational corporations. *Corporate Communications: An International Journal*, 7(4), 241-251.
- Dunaway, M. M. (2012). ERP implementation methodologies and strategies. *V Readings on Enterprise Resource Planning*, , 46-58.
- Ehie, I. C. & Madsen, M. (2005). Identifying critical issues in enterprise resource planning (ERP) implementation. *Computers in Industry*, 56(6), 545-557.
- Eisenhardt, K. M. & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *The Academy of Management Journal*, 50(1), 25-32.
- El Sawah, S., Abd El Fattah Tharwat, Assem & Hassan Rasmy, M. (2008). A quantitative model to predict the Egyptian ERP implementation success index. *Business Process Management Journal*, 14(3), 288-306.
- Esteves, J. & Pastor-Collado, J. (2001). Analysis of critical success factors relevance along SAP implementation phases. *AMCIS 2001 Proceedings*, , 197.
- Ettlie, J. E., Perotti, V. J., Joseph, D. A. & Cotteleer, M. J. (2005). Strategic predictors of successful enterprise system deployment. *International Journal of Operations & Production Management*, 25(10), 953-972.
- Feely, A. J. & Harzing, A. (2003). Language management in multinational companies. *Cross Cultural Management: An International Journal*, 10(2), 37-52.
- Hammer, M. & Champy, J. (2009). *Reengineering the corporation: Manifesto for business revolution*, A Zondervan.
- Harrison, J. L. (2004). Motivations for enterprise resource planning (ERP) system implementation in public versus private sector organizations.
- Hartio, M. (2017). *Managing complexity in global IT projects* (bachelor's thesis). University of Jyväskylä.
- Hofstede, G. H., Gert Jan. Hofstede Hofstede, Gert Jan. & Michael. Minkov Minkov, M. (2010). *Cultures and organizations : Software for the mind, third edition* (Rev. and expanded 3rd ed.). US: McGraw-Hill USA.
- Holland, C. P. & Light, B. (1999). Global enterprise resource planning implementation. (s. 10 pp.) IEEE.

- Huq, Z., Huq, F. & Cutright, K. (2006). BPR through ERP: Avoiding change management pitfalls. *Journal of Change Management*, 6(1), 67-85.
- Ifinedo, P. (2008). Impacts of business vision, top management support, and external expertise on ERP success. *Business Process Management Journal*, 14(4), 551-568.
- Johansson, B. & Ruivo, P. (2013). Exploring factors for adopting ERP as SaaS. *Procedia Technology*, 9, 94-99.
- Koh, S. L., Gunasekaran, A. & Goodman, T. (2011). Drivers, barriers and critical success factors for ERP implementation in supply chains: A critical analysis. *The Journal of Strategic Information Systems*, 20(4), 385-402.
- Kraljic, A., Kraljic, T., Poels, G. & Devos, J. (2014). ERP implementation methodologies and frameworks: A literature review. (s. 309-316) *Academic Conferences and Publishing International Limited*.
- Kwon, T. H. & Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. (s. 227-251) John Wiley & Sons, Inc.
- Leon, A. (2008). *ERP demystified* Tata McGraw-Hill Education.
- Lin, W. T., Chen, S. C., Lin, M. Y. & Wu, H. H. (2006). A study on performance of introducing ERP to semiconductor related industries in Taiwan. *The International Journal of Advanced Manufacturing Technology*, 29(1-2), 89-98.
- Mabert, V. A., Soni, A. & Venkataramanan, M. A. (2001). Enterprise resource planning: Common myths versus evolving reality. *Business Horizons*, 44(3), 69.
- Markus, M. L. & Tanis, C. (2000). The enterprise systems experience-from adoption to success. *Framing the Domains of IT Research: Glimpsing the Future through the Past*, 173, 207-173.
- Microsoft, 2018. Microsoft Dynamics Sure Step Methodology, [Online], Available: <http://msdn.microsoft.com>
- Moohebat, M. R., Asemi, A. & Jazi, M. D. (2010). A comparative study of critical success factors (CSFs) in implementation of ERP in developed and developing countries. *International Journal*, 2(5), 99-110.
- Myers, M. D. & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization*, 17(1), 2-26.
- Nagpal, S., Khatri, S. K. & Kumar, A. (2015). Comparative study of ERP implementation strategies. (s. 1-9) IEEE.

- Ngai, E. W., Law, C. C. & Wat, F. K. (2008). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in Industry*, 59(6), 548-564.
- Olson, D. L., Chae, B. & Sheu, C. (2005). Issues in multinational ERP implementation. *International Journal of Services and Operations Management*, 1(1), 7-21.
- Rai, A., Lang, S. S. & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information Systems Research*, 13(1), 50-69.
- Rajagopal, P. (2002). An innovation – diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model. *Information & Management*, 40(2), 87-114.
- Rajapakse, J. & Seddon, P. B. (2005). Why ERP may not be suitable for organizations in developing countries in Asia. *Proceedings of PACIS*, , 1382-1388.
- Ram, J. & Corkindale, D. (2014). How “critical” are the critical success factors (CSFs)? examining the role of CSFs for ERP. *Business Process Management Journal*, 20(1), 151-174.
- Rasmy, M. H., Tharwat, A. & Ashraf, S. (2005). Enterprise resource planning (ERP) implementation in the Egyptian organizational context.
- Remus, U. (2007). Critical success factors for implementing enterprise portals: A comparison with ERP implementations. *Business Process Management Journal*, 13(4), 538-552.
- Rothenberger, M. A., Srite, M. & Jones-Graham, K. (2010). The impact of project team attributes on ERP system implementations: A positivist field investigation. *Information Technology & People*, 23(1), 80-109.
- Shanks, G., Parr, A., Hu, B., Corbitt, B., Thanasankit, T. & Seddon, P. (2000). Differences in critical success factors in ERP systems implementation in Australia and China: A cultural analysis. *ECIS 2000 Proceedings*, , 53.
- Shaul, L. & Tauber, D. (2013). Critical success factors in enterprise resource planning systems: Review of the last decade. *ACM Computing Surveys (CSUR)*, 45(4), 55.
- Sheu, C., Chae, B. & Yang, C. (2004). National differences and ERP implementation: Issues and challenges. *Omega*, 32(5), 361-371.

- Sheu, C., Yen, H. R. & Krumwiede, D. (2003). The effect of national differences on multinational ERP implementation: An exploratory study. *Total Quality Management & Business Excellence*, 14(6), 641-657.
- Somers, T. M. & Nelson, K. G. (2003). The impact of strategy and integration mechanisms on enterprise system value: Empirical evidence from manufacturing firms. *European Journal of Operational Research*, 146(2), 315-338.
- Sun, A. Y., Yazdani, A. & Overend, J. D. (2005). Achievement assessment for enterprise resource planning (ERP) system implementations based on critical success factors (CSFs). *International Journal of Production Economics*, 98(2), 189-203.
- Taweel, A. & Brereton, P. (2006). Modelling software development across time zones. *Information and Software Technology*, 48(1), 1-11.
- Thong, J. Y., Yap, C. & Raman, K. S. (1996). Top management support, external expertise and information systems implementation in small businesses. *Information Systems Research*, 7(2), 248-267.
- Umble, E. J., Haft, R. R. & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, 146(2), 241-257.
- Umble, E. J. & Umble, M. M. (2002). Avoiding ERP implementation failure. *Industrial Management*, 44(1), 25.
- Vilpola, I. H. (2008). A method for improving ERP implementation success by the principles and process of user-centred design. *Enterprise Information Systems*, 2(1), 47-76.
- Wickramasinghe, V. & Gunawardena, V. (2010). Effects of people-centred factors on enterprise resource planning implementation project success: Empirical evidence from Sri Lanka. *Enterprise Information Systems*, 4(3), 311-328.
- Wu, J. & Wang, Y. (2007). *Measuring ERP success: The key-users' viewpoint of the ERP to produce a viable IS in the organization*
doi://doi.org/10.1016/j.chb.2005.07.005
- Xu, B. & Cybulski, J. (2004). ERP implementation: A technological diffusion and knowledge transfer perspective. *PACIS 2004 Proceedings*, , 92.
- Young, R. & Jordan, E. (2008). Top management support: Mantra or necessity? *International Journal of Project Management*, 26(7), 713-725.

- Žabjek, D., Kovačič, A. & Indihar Štemberger, M. (2009). The influence of business process management and some other CSFs on successful ERP implementation. *Business Process Management Journal*, 15(4), 588-608.
- Zhang, L., Lee, M. K., Zhang, Z. & Banerjee, P. (2003). Critical success factors of enterprise resource planning systems implementation success in china. (s. 10 pp.) IEEE.
- Zhang, Z., Lee, M. K., Huang, P., Zhang, L. & Huang, X. (2005). A framework of ERP systems implementation success in China: An empirical study. *International Journal of Production Economics*, 98(1), 56-80.
- Zhong Liu, A. & Seddon, P. B. (2009). Understanding how project critical success factors affect organizational benefits from enterprise systems. *Business Process Management Journal*, 15(5), 716-743.

APPENDIX 1 INTERVIEW QUESTIONS

0. Self-introductions, reviewing the schedule and basic information for the interview
1. Basic questions of experience (How many years in the field/company, current role in the company, how many projects have you attended, in what roles have you worked during the projects, what ERP systems you have experience with. in what countries have you worked in during the projects, how have the projects differed)
2. Defining the most crucial success factors from the success factor list (e.g. three to four), clarifying why those are the most important ones in your opinion and why the rest are less important (which ones of the CSFs contribute the most to project success/failure)
 - if you find multiple/all the lists items to be of equal importance, clarification of the reasons
3. How have certain critical success factors (CSFs) caused issues in phases of project(s) (e.g. lack of training has caused a project to struggle/fail)? Do you think the struggle was connected to a certain geographical area(/culture)? Why?
4. How has a proper management of a certain CSF/group of CSFs helped in a particular phase of the project/the project succeeding? What do you think are the reasons?
5. How does the management of CSFs differ between countries (and cultures)? What has worked and what has not? (e.g. how is the management of training different in certain countries/areas) What special considerations should be made regarding the management of a CSF in a certain geographical area/culture?
6. How should the CSFs be prioritized in general? Why?
7. Should a certain CSF be prioritized over some other when conducting the implementation in a certain country. Why?
8. How are CSFs connected/dependent on each other (e.g. change management and business process re-engineering, or top management support and cost/budget issues)? In practical terms, should multiple CSFs management be combined? If yes, which CSFs and in which ways?