Critical Success Factors in ERP Implementation

The Perspective of the Procurement System User
Acknowledgements

This thesis marks the last step in our master studies at Jönköping International Business School. We owe gratitude to a number of people who have made this thesis possible. First of all, we want to thank our supervisor Alain Vaillancourt, PhD, who always provided quick and guiding feedback when needed. His feedback sessions gave great insight and extended knowledge, which helped us improve this thesis.

Furthermore, we would like to thank the groups who attended the thesis seminars for their valuable comments and input.

Lastly, we are grateful to the contact persons at Consolis, who helped us with the distribution of the survey. We also thank the employees at Consolis who completed the survey. Without them, this thesis would not have been possible to complete.

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1 of June 2017
Abstract

Background: As worldwide globalisation increases, the need for fluent information transitions is intensified. The modern company utilizes an enterprise resource planning (ERP) system to coordinate the information flows both internally and externally, but implementing an ERP system is complex and costly. Understanding the critical success factors (CSFs) when implementing such a system is hence vital. Prior research has focused on the management perspective of the implementation, but the perspective of the system user has been lacking. This study adds to research by focusing on the system user, and to be sure that an information demanding section of the supply chain is targeted, system users within procurement are focused.

Purpose: The purpose of this study is to identify critical success factors in ERP implementation from a procurement system user perspective.

Method: 14 CSFs are derived from prior research: (1) Top management commitment, (2) Implementation strategy, (3) Communication, (4) Training and education, (5) Implementation team, (6) Change management, (7) User involvement, (8) Business process reengineering, (9) Use of consultants, (10) Project support, (11) ERP selection, (12) Project management, (13) Quality management and (14) Risk management. From these CSFs, hypotheses are formed which are tested through a survey including 15 Likert-style rating scale questions. The hypothesis is analysed with the use of Spearman’s simple rank correlation and descriptive statistics.

Conclusion: The results show that the system users regard the following four CSFs as critical to the success of an ERP implementation: (1) Training and education, (2) Change management, (3) ERP selection and (4) Risk management. The CSFs are not ranked in a particular order of importance. The results furthermore show that more in-depth research can be made with the focus on the perceptions and preferences of the system user.
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<tr>
<td>α</td>
<td>Cronbach’s Alpha</td>
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<td>BPR</td>
<td>Business Process Reengineering</td>
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<td>CSF</td>
<td>Critical Success Factor</td>
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<td>CIO</td>
<td>Chief Information Officer</td>
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<td>CPO</td>
<td>Chief Procurement Officer</td>
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<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<td>IS</td>
<td>Information System</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>MNC</td>
<td>Multinational Corporation</td>
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<td>RQ</td>
<td>Research Question</td>
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<td>ρ</td>
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<td>SCM</td>
<td>Supply Chain Management</td>
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1. Introduction

In this introductory chapter, we will provide the background to the research, present our problem statement followed by the purpose of the study. We will then care for the scope and delimitations of the study and finally give the reader a broad outline of the thesis as a whole.

1.1 Background

Enterprises of the 21st century have recognised the importance of having an Enterprise Resource System (ERP) implemented successfully in the organisation (Holland & Light, 1999). Through a consolidation of an enterprise's supply chain management (SCM) and ERP, the company can facilitate the opportunity to build effective practices with suppliers they trust, leading to a maximum return on the relationships with their suppliers (Koh, Saad & Arunachalam, 2006). According to Coyle, Langley, Gibson and Novack (2013), SCM is the art and science of integrating material, information and financial flow through the entire pipeline from the point of origin to the end of consumption. In these flows, products and services are supplied, manufactured and distributed to the right locations, in the right quantity, and at the right time, in the most cost-efficient way, while satisfying customer demands (Gibson, Mentzer & Cook, 2005). In essence, supply chain management concerns the collection and analysis of data to provide a foundation for decision-making (Hilletofth & Lättilä, 2012). Moreover, the globalisation and increased competition have further increased the complexity of achieving an efficient supply of the three flows as mentioned above (Zabjek, Kovacic & Stemberger, 2009). Factories, suppliers and subsidiaries in multinational enterprises now tend to be geographically separated which can create obstacles between them. A supply chain operating in a dynamic and complex environment that spans across firms on many levels makes the aligning of support systems of high importance. The information systems and especially ERP systems must facilitate decision-makers with suitable and accurate information, as well as be able to foresee the outcome of their decisions and how these affect the whole supply chain (Hilletofth & Lättilä, 2012).
Information technology (IT) is therefore considered to be the strategic tools used to achieve competitive capabilities and long term success (Hilletofth & Lättïä, 2012). Nah et al., (2001) define the ERP system as a business software system with which a company can manage the effective and efficient use of resources (materials, human resources, finance, etc.). The ERP system presents a total integrated solution for the company’s information-processing requests, through a process-oriented view consistent across the company (Nah et al., 2001). An ERP system facilitates the information flow both within, as well as across the entire organisation (Gibson, Mentzer & Cook, 2005; Hilletofth & Lättïä, 2012). It is also associated with improving firm performance by redesigning business processes, enhancing reporting cycles and widening information capabilities (Hwang, Yang & Hong, 2015). In theory, ERP systems provide seamless integration of processes across functional areas, which means breaking up the organisational silos with improved workflow and standardisation and in addition to that access to real-time and up-to-date data (Mabert, Soni & Venkantaramanan, 2003). This is particularly the case from a procurement perspective; every possible instance of time reduction is vital for the procurement process to run as smoothly as possible (Lambert & Cooper, 2000). Using ERP systems and other electronic software to hasten the communication results in both less time spent but also less cost devoted to the transaction itself which leaves more resources to spend on managing the suppliers (Lambert & Cooper, 2000). Organisations not only deem it necessary to have an ERP system in place but also put great importance into the question regarding how to effectively establish one (Yu, 2005). To remain competitive organisations have to be able to respond towards the markets’ fast changing environments quickly. Since the mid-1990s, thousands of companies worldwide have installed ERP systems, and several authors (Piturro, 1999; Zuckerman, 1999) have emphasised that the ERP system is one of the key ingredients for gaining competitive advantage, streamline operations, and having “lean” manufacturing (Mabert et al., 2003). However, without top management support, having a developed business plan and vision, re-engineering business processes, effective project management, education and/or training and involvement, organisations are at risk to be unable to reap the full benefits of such complex systems and the probability of implementation failure are at a high level (Addo-Tenkorang & Helo, 2011). As a matter of fact, despite the popularity of ERP systems, 51% of all implementations conducted in a wide range of industries were considered failures (Chen, Law & Yang, 2009).
The reasons behind these failures are clearly important for organisations venturing into the process of ERP implementation to understand. To make the implementation as smooth and efficient as possible, it is vital for top management to understand what actually contributes to an implementation rather free of complications (Chen et al., 2009). Indeed, even if each ERP package has its own downfalls and weaknesses, most ERP implementations fail due to the actual implementation not being handled with proper knowledge and care (Barker & Frolick, 2003). The implementation of an ERP system is a complex and arduous task and can take many years to complete, and can cost hundreds of millions of dollars for moderate and large international organisations. Hence, it puts pressure for a firm to be successful when deciding to implement a new system (Mabert et al., 2003). For instance, in 2015, the average ERP implementation cost was $3.5 million while the typical timeframe for the implementation was approximately 21.3 months (Kimberling, 2015). Despite the ERP system's position as a fundamental tool in many industries, the rate of failure in the implementation phase is consistently high and devastatingly costly (Aloini, Dulmin & Mininno, 2007). This fact puts great strain on the supply chain functions. Trying to implement a new ERP system poorly pulls an organisation apart; communication is destroyed and information silos, which are to be avoided at any cost, are created (Chen et al., 2009). Without the integrative function of a successful ERP system, supply chain activities are aggravated even externally. Making the right decisions regarding what supplier portfolio to choose, understanding which suppliers offer what goods and services or analysing buyer behaviour is made inefficient without a well-functioning ERP system (Bendoly & Schoenherr, 2005). Making sure that an ERP system is implemented effectively and efficiently, with the consent and understanding of the whole organisation - from top management, down to the actual users of the system - is hence to be considered of great importance for the entire supply chain to work effectively (Coady, 2017).

The concept of identifying the reasons behind the failures occurs in previous literature where many authors are concentrating on deciding which conditions that are believed to increase the success of an implementation project (Haines & Goodhue, 2003). The conditions are commonly referred to as critical success factors (CSFs). Daniel (1961) is considered to be the pioneer of the introduction of CSFs. These are the fundamental elements of an organisation or project to be successful and thus, vital to the achievement of one's mission and vision for the project. According to Daniel (1961), there are three to
six key factors that determine the success of a company and its information systems. Identifying and understanding existing factors and how they influence the project outcome can help organisations to mitigate or prevent the risk of failure (Huang, Chang, Li & Lin, 2012).

In this study, the case company Consolis will be used to extract the empirical data. Consolis is a leading European industrial group specialising in the design and manufacturing of high-performance precast concrete products (Consolis Group Website, 2017). With 10,000 employees in 30 countries around the world, the need for fluid information transitions is apparent. The company provides solutions within construction, both for residential and non-residential projects (Consolis Group Website, 2017). They also provide solutions for urban and rural planning, transportation infrastructure such as roads, railways, airports, bridges and tunnels, fresh and wastewater distribution and drainage as well as specific industrial needs such as power stations (Consolis Group Website, 2017). As parts of the company have gone through recent ERP implementations, they are eligible for us to study.

1.2  Problem Statement

The importance and functionality of ERP systems within any given supply chain have been thoroughly discussed. Akkermans et al. (2003) described ERP as having three major functions: a transaction processing engine, allowing integrated data management in the organisation; a workflow management function controlling the numerous flows that exist in the organisation; and a decision support function, deciding which suppliers to use and dealing with other externally driven queries. Utilising the capacity of an ERP system can hence help a company increase their flow control both internally and externally. Ketikidis, Koh, Dimitriadis, Gunasekaran, and Kehajova (2008) also push the importance of having a well-functioning ERP system for a supply chain to be able to manage the various flows; an ERP system can soothe the complexity of the information flow. It is not only the flows of the organisation itself that can be managed with an ERP system but the flows of an organisation’s suppliers and customers; it can optimise production plans and delivery schedules and save both time and resources (Kelle & Akbulut, 2005; Gattiker & Goodhue, 2005). How to plan the spending of resources has been necessary, and the importance is ever growing when striving to increase competitive advantage. Li et al. (2006) state that price/cost, delivery, quality and flexibility together with timeliness are important
competitive capabilities. For an organisation to become and remain competitive, knowing what gives them an edge is crucial; this is where the information consolidation functions of an ERP system are used.

The pool of research regarding CSFs in ERP implementation is consequently significant; however, the majority of the academical effort has been put into understanding the critical success factors from a management perspective (Daniel, 1961; Davenport, 1998; Nah, Zuckweiler & Lee-Shang Lau, 2003; Somers & Nelson, 2001, 2004). Preventing an ERP implementation project’s failure has been heavily focused on the decision-making process of the top management and how senior executives rank the importance of CSFs, rather than looking at the perceptions of the people actually working with the ERP system; the users (Amoako-Gyampah, 2004). When an organisation decides to implement an ERP system, it typically involves an extensive reconstruction of business processes and the dispersion of the new software to support these new business processes (Robey, Ross & Boudreau, 2002). Furthermore, an implementation primarily impacts the employee in changing the nature of tasks, workflows and the job itself (Morris & Venkatesh, 2010; Bala & Venkatesh, 2013). It should hence be vital for any company to understand the perceptions of the actual users of the ERP systems before initiating an implementation of a new system (Aladwani, 2001; Eby et al., 2000; Nah et al., 2003; Umble, Haft & Umble, 2003).

As previously mentioned, the consolidation of information together with making the information flow move smoothly are two of the most important tasks for an ERP system (Akkermans et al., 2003; Dimitriaidis, Gunasekaran & Kehajova, 2008). This fact is true in the entirety of the supply chain, however, there are vital parts in which the information flow cannot be disrupted without the whole chain falling apart. One of these parts is the procurement, where both the internal and the external flows of information must be upheld in order for organisations to indulge in purchasing (Lambert, Cooper & Pagh, 1998). Being able to utilise an ERP system to its full extent is hence paramount for a company to do business and essentially exist; Dekhne, Huang and Sarkar (2012) describe procurement as separated from the supply chain if certain elements within the chain are not active. These include demand planning, inventory planning and lead-time optimisation, all of which can be controlled by a well-functioning ERP system (Dekhne, Huang & Sarkar, 2012). An ERP implementation is, as mentioned before, a complex process and should the
ERP system not be implemented efficiently and effectively, the organisation’s procurement activities would not be possible. Looking at an organisational area in which information flow through the efficient use of ERP systems means life or death, such as procurement, and understanding what critical factors that go into an ERP implementation in that organisational area should hence give a company a good indication what to pay particular attention to during an implementation.

1.3 Purpose of the paper

Due to prior research focusing primarily on the top management perspective and the CSFs that are most important for ranking members of the organisation as previously discussed, there is a gap in existing academia. This paper will research the perspective of the user of the ERP system to distinguish whether the CSFs that consistently occurs in previous research are in line with the perception of the system users. Research has been done within this niche before, however, it is scarce and in need of further attention.

The purpose of this paper is to harmonise existing literature regarding CSFs in ERP implementation, which is quite fragmented, and sharpen it by focusing on the perspective of the system users. Since this particular niche of research is only tentatively explored, prior research suggests that a paper within this field will be of value in further determining if the CSFs mentioned in research also are critical from the system user perspective. The purpose is sharpened further by applying existing knowledge to the heavily information demanding SCM function procurement. This will not only build deeper academic understanding in the field but also be of use for companies searching to endeavour an ERP implementation with a full understanding of the different perspectives and CSFs that have to be taken into account.

The broad purpose of this paper is hence:

‘To identify critical success factors in ERP implementation from a procurement system user perspective.’

To fulfil the purpose, the concept of general CSFs within ERP implementation has to be understood and explored. Through a thorough exploration of existing literature reviews,
fourteen separate critical success factors will be developed and serve as hypotheses that are to be tested through our survey.

When the CSFs are explored, the outcome will be used in order to formulate the research question. Listing the most frequently used CSFs will present a framework that is to be used to understand the perceptions of the system users within procurement and how it differs from previous research. Our research question will deal with this issue:

**RQ: What factors derived from prior research does a system user regard as critical to a successful ERP system implementation in the context of procurement management?**

RQ will be answered through a survey study conducted on Consolis - a large, multinational company (MNC) within the concrete industry. This company can be considered viable for the study since it is the largest, most successful company in its market and also since they are active across the world. This fact puts a high demand on a well-functioning ERP system, especially in the context of procurement management; dealing with suppliers and customers spread over the entire globe. The survey will focus on the procurement sections of three head offices and retrieve enough information to answer RQ properly.

### 1.4 Scope and Delimitation

This study is limited to testing the correlation between CSFs frequently used in research and the perception of ERP system users within procurement management. An ERP system user is defined as an employee within procurement management working actively within an ERP system on a day-to-day basis. For a system user to be viable for this study, he/she must have experienced a recent ERP implementation. The three headquarters within Consolis chosen for this survey have done just that. Furthermore, the system user must be a part of the procurement department of the office. Other departments will not be researched.
1.5 Outline of the Thesis

This first chapter outlines the overall introduction to the research topic, a background narrative leading to the research gap, purpose and corresponding research questions, together with the study’s delimitations.

![Figure 1: Structure of the thesis](image)

The second chapter contains a detailed frame of reference, in which relevant literature reviews regarding CSFs for ERP system implementation are gathered with the purpose of consolidating the fragmented research within the field. The CSFs found in the literature reviews and corresponding to the research question and purpose are then briefly described. We then form hypotheses in relation to each CSF, keeping the system user in focus. These hypotheses will serve as a basis for our survey questions.

The third chapter is dedicated to the methodology. In the fourth chapter, we discuss and analyse our empirical findings. We then conclude our research in the fifth chapter and follow up with a discussion regarding the entire thesis writing process in the final chapter.
2. Frame of Reference

In this section of the paper, we will present a framework on which 14 hypotheses can be formed. These hypotheses will then be used as grounds for the questions that will be posed in the survey. This section starts with an explanation of the connection between ERP systems and supply chain management, and a particular focus will be placed on the procurement activities and how they relate to ERP systems. After that, a traditional implementation process of an ERP system is covered. Lastly, prior research regarding CSFs in ERP system implementation is presented. This part will be based on five literature reviews conducted on the subject.

2.1 Supply Chain Management and ERP

Supply Chain Management (SCM) could be considered the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole (Christopher, 2016). Hence, a network of connected and interdependent organisations mutually and cooperatively working together to control, manage and improve the flow of materials, services, information and financials from suppliers to system users (Coyle et al., 2013; Christopher, 2016). Moreover, the conception of logistics has been defined as the process of strategically managing the procurement (planning), movement and storage of materials, parts and finished inventory (and the related information flows) through the organisation and its marketing channels in such a way that current and future profitability are maximised through the cost-effective fulfilment of orders for the purpose of conforming to customer requirements (Ratliff & Nulty, 1996; Christopher, 2016). Hence, it could be argued that the definitions of both SCM and logistics flows are essentially intertwined.

Supply chain integration is considered by researchers and practitioners to be a vital contributor to supply chain performance. Most concepts of supply chain integration have recognised the existence of two flows throughout the chain, namely the flow of goods and the equally important flow of information (Prajogo & Olhager, 2012). These two flows could, therefore, be seen as the key elements in the integration, and thus, related as goods being purchased, ordered, delivered and paid for. The logistics integration specifically involves the coordination of logistical practices, the flow of materials from suppliers to
customers through the value stream, the provision of time and space utilities, and the required quantity of goods at the right time in the right place (Prajogo & Olhager, 2012; Coyle et al., 2013). Information integration means the sharing of key information along the supply chain network that is enabled through information technology. The primary purpose of such an integration is to transmit real-time data and process information that is required for supply chain decision making to run fluently (Prajogo & Olhager, 2012; Hilletofth & Lättlä, 2012).

Supply chain management involves the material and information flow in the entire value chain. For the business processes to be optimised and hence improved, the value-added chain is to be complemented by up-to-date information, i.e. through an Enterprise Resource Planning system (Mabert et al., 2003). To stay competitive and efficient, the logistics processes require an effective IT support system that can enable an effective coordination of logistics operations which is essential for the overall performance (Yu, 2005). Relating this to the procurement department, it is important to understand that ERP systems have helped both buyers and suppliers moving from traditional paper-based business processes to the nowadays basic paperless procurement transaction functions (Majdalawieh & Bateman, 2008). Procurement refers to all activities included when obtaining items from suppliers, purchasing both inbound logistics such as transportation and warehousing before the item is used. Hence, an ERP system supports the procurement staff to easily monitor levels both for inbound and outbound activities, to be able to quickly react with less uncertainty of how a transaction will be executed (Bendoly & Schoenherr, 2005).

Despite the fact that the supply chain design is becoming a core competency, and the ERP systems are expected to be integral components of the modern supply chain management, installing an ERP system is considered expensive and risky (Su & Yang, 2010). These risks can be well described with the use of the procurement process, which the next part will entail.

2.1.1 Procurement and ERP

The procurement process in a given organisation is not similar to the process in any other organisation; indeed, the complexity of the activities carried out within the process makes the procurement management a convoluted affair (Coyle et al., 2013). Coyle et al. (2013)
provide a framework in which the major activities involved in the procurement process are presented. This framework is chosen since it is frequently used in research regarding procurement and can hence be accepted as a legit model (Bäckstrand, Tiedemann & Hedén, 2015; Prentice & Lau, 2016; Van Jaarsveld, Heyns & Kilbourn, 2013). The procurement activities will be given relevance by relating them to the ERP process.

Starting off with determining the type of purchase; identifying which kind of investment that is to be made, is often the most time-consuming and complicated activity in the procurement process. Depending on the type of purchase, be it a straight rebuy, a modified rebuy or a new buy, the complexity differs with the straight rebuy being the least complex and a new buy the most. All three kinds of purchases place a high demand on a well-functioning ERP system; without the continuous flow of information between the involved parties, even the routine straight rebuy would not be possible, not to mention the new buy situation.

Next step is determining the necessary levels of investment. The procurement process requires two main types of investments by the firm: time and information. The amount of time needed to be invested is determined by the complexity of the purchase; the more complex the purchase, the more time needs to be spent. Relating this to the first step, a new buy would be an example of a purchase in need of a large amount of invested time. Information can be both internal and external to the firm; internal information can be collected concerning user requirements and the implications that the purchase might have on the firm. This flow of information is dependent on a continuous link between the different parts of the organisation which in turn puts a great demand on the functionality of the ERP system. The external information flow is similarly dependent on the ERP system; other supply chain members, potential suppliers and customers who all take part of the information flow can do so with the help of the ERP system. The more complex the purchase, the more information has to flow between the different parties, and the more strain is put on the ERP system, which if it then should shut down, would result in significant losses.

When the necessary levels of investment are determined, the procurement process can take place. This step is relatively easy to carry out in theory, but quite complex in practice depending on the situation. This step includes performing the activities necessary for the
purchase to take place and to meet the user’s requirements. This involves collecting data on time and the information actually used in making a certain purchase; this data can then help the organisation determine how satisfied the user’s needs were. A well-functioning ERP system will help the organisation to streamline the flows of information and minimise the required amount of time necessary for the purchase to take place.

The last step is evaluating the effectiveness of the procurement process. The organisation has to ask itself two questions: were the user’s needs satisfied, and was the investment necessary? The goal for the organisation should be to invest only enough time and information to precisely match the user’s needs. If the evaluation would show that the purchase was not effective, the sources of the ineffectiveness must be traced. Using an ERP system to clearly map out what activities have been carried out and how much time and information have been invested in each step of the way helps the company to increase their efficiency and in the long run become more profitable.

To conclude this section on procurement practices in relation to ERP systems, it can be stated that the need for a well-functioning ERP system is apparent for a company when striving to increase efficiency in their procurement process. Understanding the ERP concept is hence important from this standpoint, but it can also be seen that it is important to understand what makes an ERP implementation successful; the procurement process would take a severe hit if an ERP implementation would fail. Being aware of what critical success factors that are most important for the organisation’s system users within procurement should thus be of great importance.
2.1.2 ERP Implementation

There is an immediate need for any company to assess whether an ERP implementation will be successful or not and if a specific ERP system will justify the costs that have to be poured into the project along with the risks that will be taken; indeed, the decision to invest in an ERP system can make or break an organisation (Ehie & Madsen, 2005; Mandal & Gunasekaran, 2003). In addition to that, the importance of the human factor while implementing an ERP system is not to be underestimated (Legare, 2002). Legare (2002) found that individual-, group-, and organisational characteristics could influence the success of ERP implementation; individual characteristics being knowledge, cognitive abilities and motivation, group characteristics goals, roles, norms, diversity and problem solving, and organisational characteristics strategy, resources, rewards, culture and structure. There are many reasons that could result in an ERP implementations’ failure. Kumar and Gupta (2012) outline nine reasons; changes, coordination issues, budget issues, customization issue, lack of experience, unfriendly user interface, poor ERP selection and absence of consultant. Umble & Umble (2001) also considered poor top management involvement, poor project management, lack of education and training, people not wanting a new system to succeed, unrealistic expectations about the implementation project, inaccurate data and mismatch between the business and ERP system selected to be reasons of failure.

2.1.2.1 ERP Implementation Stages

The process of choosing to utilise, carrying out and following up an ERP system implementation is a complex endeavour. This segment will explain the different stages of an ERP implementation to build a general understanding of the process’ complexity, motivating why the need for exploring the critical success factors is important.

Motiwalla and Thompson (2012) provide a clear framework for a traditional implementation strategy of an ERP system. The authors divide the implementation into five stages. In the first stage called the scope and commitment stage, necessary requirements are gathered, and what gaps that are to be filled with the ERP system is figured out. During this stage, analysing and comparing the current business practices with the new is vital in order to avoid significant system modifications after the implementation takes place. After this, the vendor is selected based on the needs of the company, together with factors such as total cost of ownership, consulting and training services and customer
service and help desk support. These criteria, together with the budgetary restrictions, help
the company narrow down the selection of vendors to the one with the best fit.

During the next stage, called the analysis and design stage, the number and what kind of
modules that are to be used is decided. A company can either choose to take a vanilla
approach, in which the ERP software package is selected “as is” without any major
modifications, or a chocolate approach in which the package is customised to the very
needs of the company. The chocolate approach might, because of the customization to
user requirements, increase the implementation risk and the investment. During this stage,
a change management plan is formed and plans for data conversions, system conversion
and training are created.

The third stage is called the acquisition and development stage. This is when the license for
the production version of the software is purchased, and the production version of the
system is built. The tasks formed to fill the gaps identified in the first stage are carried out.
The technical team installs the software and the change management team works with the
system users; changing business processes and training on the sandbox version of the
software.

Stage four is called the implementation stage. This is the most crucial of the stages since the
new ERP system goes live for the first time; often there are mishaps that have to be tended
to which costs time and money if not dealt with swiftly. There are four basic conversion
approaches used when going live; the phased, the pilot, the parallel and the big bang. The
phased approach is a tentative movement from the existing ERP system to the new. This
approach can be time-consuming, but it is also the least disruptive to the company. The
pilot approach involves implementing a smaller version of the final system prior releasing
the full version. This approach is used in order to ensure that the final system is
appropriate. The parallel approach is the costliest of the four because the new ERP system
is implemented and used while the existing system is still online. This approach is best used
when the company is not sure that the implementation will be successful. The final
approach, the big bang, is the approach with the highest risk but it is the most straight-
forward and clean. In this approach, the company simply shuts the existing ERP system
down and powers up the new one. This is, of course, risky, but it is also the least costly
since there is no duplication of information.
The last stage of the implementation is called the operation stage. In this stage, ongoing
training for the users is conducted as the ERP modules are released, user feedback from
training and actual system practice is controlled in order to make the necessary adjustments
to the change management approach. During this stage, new versions of the software are
continually released, patches are installed, and the system is upgraded together with the
ERP vendor.

2.1.2.2 ERP Success

To be able to accurately answer the research question of this study as well as to fulfil its
purpose, ERP success needs to be defined. This is in order to build a consensus regarding
the construct, both for the authors to align behind but also for the respondents of the
survey to understand what is asked about. To define the term, we use the framework
presented by Ifinedo (2006); this framework is a reworked version of Gable et al.’s (2003)
framework for ERP success. Ifinedo (2006) is chosen partly due to it being a newer version
of the framework, but partly also due to it focusing more on private organisations instead
of the public organisations that were the focus of Gable et al.’s (2003) study. We then
connect the findings from Ifinedo (2006) with what Wu and Wang (2006) discuss about
ERP success from a user perspective. By doing so, we can define ERP success in a way that
helps us fulfil our purpose.

Ifinedo (2006) explains ERP success through six dimensions: system quality, information
quality, vendor/consultant quality, individual impact, workgroup impact and organisational
impact. Examining the factors going into each of these dimensions, only system quality,
information quality and individual impact can be seen as directly connected to the system
user. Vendor/consultant quality deals with the relationship between the organisation as a
whole and the vendor; workgroup impact deals with improving “workers’” participation
within the organisation and organisational impact deals with cost reductions and customer
satisfaction. These dimensions do not affect all system users, but rather focus on
management. System quality, on the other hand, deals with the ease of ERP use and
reliability, information quality deals with how understandable, and relevant the information
on the ERP is, and the individual impact deals with improving individual productivity.
These dimensions are more readily available to all system users and hence better suited for
our study. Connecting these three dimensions with the discussion held by Wu and Wang (2006), we can narrow our definition down to the explicit perception of the system user. Wu and Wang (2006) use user satisfaction as an evaluation mechanism for determining ERP success and include ERP project team and service satisfaction, ERP product satisfaction, and knowledge and involvement satisfaction. ERP project team and service satisfaction are similar to Ifinedo’s (2006) individual impact dimension; how well the project team helped the system user to improve productivity. Wu and Wang’s (2006) ERP product satisfaction can be compared to Ifinedo’s (2006) information quality dimension; how timely, accurate and reliable the information derived from the ERP system is. Knowledge and involvement satisfaction (Wu & Wang, 2006) is similar to the system quality dimension discussed by Ifinedo (2006); how easy it is the ERP system to understand and how easy it is to comprehend the business functionalities and the information provided by the ERP system.

By defining ERP success using the dimensions presented above, we can identify the results deemed necessary for an ERP implementation to be successful. We also understand how success is perceived by the system users; this helps us create a common ground when further researching which success factors that are considered critical to ERP implementation by the system users within a procurement setting.

2.2 Literature Reviews

In this section, the existing literature review studies until 2015 will be presented. The purpose of this section is to collect data about CSFs and to position our literature review with regards to existing knowledge about the field of ERP and critical success factors for a proper implementation. Additionally, the use of literature reviews will help us answer the research question (RQ) and furthermore enable us to use pre-existing CSFs when producing the questionnaires. After an individual presentation of the five ERP literature review publications we have been able to find, the aim is to identify the CSFs that are most frequently discussed. This is for us to understand which CSFs that are to be considered as essential from a management perspective. We will then briefly describe each CSF and subsequently pose hypotheses connected to them, keeping the perspective of the system user in focus. These hypotheses will then be tested through the questions in our survey.
The reviews that we are using were found through the Web of Science database and were accessed through Jönköping University's online library.

In order to collect data about CSFs and build our theoretical grounding, the articles from Dezdar and Sulaiman (2009), Shaul and Tauber (2013), Saade and Nijher (2015), Moon (2007) and Finney and Corbett (2007) serve as a foundation of identifying the most used factors in the literature and are chosen as secondary data.

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Papers</th>
<th>Span</th>
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Table 1: Earlier literature reviews

The first review that we have chosen was published in 2007 by Finney and Corbett. This paper presents a compilation of critical success factors published during the period of 1999-2004. A total of 70 publications are included but only 45 were considered to provide “success factors” that applied to the research. The compilation resulted in 26 categories of critical success factors that they present in abstract concepts; the strategic critical success factors and the tactical critical success factors. It provides a foundation of the range of success factors that are cited in the literature, and further, the frequency linked with each of them. According to Finney and Corbett (2007), the strategic factors are those that address the larger picture; breaking down goals into feasible elements. The tactical factors, on the
other hand, examines skilful methods and details, especially in connection to accomplish the various strategic elements. The category names chosen were in some instances from a pool of concepts; others came from the technical terminology that was frequently used in the literature, in order to name diffuse concepts and making them clear. They go on to describe each and every identified CSF to compare different authors and their perception of each article to distinguish a common ground for the specific CSF. They conclude in their analysis, the gap from that time, appearance of the lack of depth in the coverage of the CSFs. Meaning the success factors suggested was presented with no explanation behind whose perspective was represented and the reasons behind it.

Additionally, the lack of stakeholder perspective in the success factors that was cited was another significant observation made by the authors. Either the stakeholder perspective was provided but mainly for one single success factor, or it was absent. A critical view of the concept of change management was also presented where the authors stress that the concept was one of the most cited success factors; however, there was little explanation of the particular tactics that could be used to mitigate an implementation failure. Overall, the conclusions are that previous researchers have attempted to identify CSFs through their own empirical research; however, the focus has been only on a specific aspect of the implementation or a specific type of CSF, and no deeper considerations of other CSF than the specific ones have been alerted. Despite that, Finney and Corbett (2007) illustrate a table with a rank of the 26 critical success factors with the premises of how frequent they are cited in the literature, providing: (1) Top management commitment and support, (2) Change management, (3) business process reengineering (BPR) and software configuration, (4) Training and job redesign, (5) Project team: The best and brightest, (6) Implementation strategy and timeframe, (7) Consultant selection and relationship, (8) Visioning and planning, (9) Balanced team and, (10) Project champion, (11) communication plan, (12) IT infrastructure, (13) Managing cultural change, (14) Post-implementation evaluation, (15) Selection of ERP, (16) Team morale and motivation, (17) Vanilla ERP, (18) Project management, (19) Troubleshooting/crisis management, (20) Legacy system consideration, (21) Data conversion and integrity, (22) System testing, (23) Client consulting, (24) Project cost planning and management, (25) Build a business case, (26) Empowered decision makers.
The second review of our choice is the one written by Moon (2007). The author presents a compilation of articles written in the timespan 2000-2006 and covers a total of 313 articles from 79 journals. Moon (2007) poses several criteria that the articles chosen for the review have to fit; the article must be published in a peer-reviewed, archival journal. Furthermore, the article cannot have been published after 31 of May 2006. Also, only articles with the annotation “ERP” in the name of the article were chosen, and no restriction was imposed on the field of the surveyed journal; this to allow a comprehensive set of conceptions regarding ERP by different fields.

The author aims to cover three themes with the review; understanding what kind of questions that can arise in connection to the area of ERP systems, providing a solid base from which further research can be conducted, and serving as a comprehensive bibliography of the published articles during the time period.

Moon (2007) categorises the ERP literature in six main themes: (1) Implementation of ERP, (2) Optimisation of ERP, (3) Management through ERP, (4) The ERP software, (5) ERP for supply chain management and (6) Case studies. A sub-theme to the first main theme of implementation is critical success factors. The author shows that 15 of the 313 articles explored, clearly deal with CSFs in relation to ERP system implementation. After exploring these 15 articles, 13 CSFs can be identified. These are (1) Implementation team, (2) Top management involvement, (3) Strategic decision-making, (4) Communication, (5) Project management, (6) Project support, (7) Stable and successful business setting, (8) Organisational change management, (9) Business process alignment, (10) Software implementation process, (11) Performance measurement, (12) Education and training and (13) Technical possibilities.

The third review is by Dezdar and Sulaiman (2009). The authors compile the literature on the topic between 1999 until early 2010 by reviewing 95 articles within the field of ERP implementation CSFs. A taxonomy of the subject is made and a ranking of the 17 most commonly used CSFs is shown. One must bear in mind that the CSFs used in this review are mainly focused from the management point of view. Although there are more articles in the field of ERP system implementation, the comprehensiveness that Dezdar and Sulaiman (2009) present is the reason behind choosing the article.
The keywords they chose were selected from keywords recognised in previous literature reviews (Holland & Light, 1999; Nah et al., 2001; Akkermans & van Helden, 2002; Al-Mashari, Al-Mudimigh & Zairi, 2003; Somers & Nelson, 2001). Based on that, they use several combinations of keywords that were utilised in the search, for instance: CSF (and) ERP (and) implementation; critical factor (and) ERP system (and) success; critical success factor (and) enterprise resource planning. From the above-mentioned keywords, their search resulted in 117 articles, which were downloaded based on their titles and abstracts. The authors, however, opted for 95 of those articles, as the rest did not contain information that would have been indicative of ERP implementation success factors (Dezdar & Sulaiman, 2009).

From a comprehensive analysis of the articles they categorise and rank the CSFs into three parts: high, medium and low. A high priority is determined as two-thirds of prior studies identifying the CSFs as critical. The medium priority means that more than one-third and less than two-thirds of prior research identified the CSF as critical. CSFs mentioned in below one-third as being critical are considered as having a low priority. The CSFs considered as having high priority in prior research are (1) Top management support and commitment and (2) Project management and evaluation. The medium tier consists of nine CSFs; (3) Business process reengineering and minimum customization, (4) ERP team composition, competence and compensation, (5) Change management programme, (6) User training and education, (7) Business plan and vision, (8) Enterprise-wide communication and cooperation, (9) Organizational culture, (10) Vendor support and (11) Software analysis, testing and troubleshooting. The CSFs with a low priority from prior researchers are (12) Project champion, (13) Careful selection of ERP software, (14) Use of consultant, (15) Appropriate business and IT legacy systems, (16) System quality and (17) User involvement.

Shaul and Tauber published the fourth review in August 2013 conducting a comprehensive bibliography of the literature on CSFs in the context of ERP system implementation. The main information system (IS) journals and conferences were scanned during the period 1999 until early 2010, yielding 341 articles that were in relation to the topic. From that, and avoiding duplication, the authors selected articles with the help of articles examined in the light of common success factor construct in extensively cited studies, such as (Al-Mashari et al., 2003; Nah et al. 2001; Somers & Nelson, 2004; Umble et al., 2003). Additionally, that
examination harvested 94 CSFs whereas the authors categorise them under 16 head-categories. Although the CSFs identified by the authors were used during an ERP life cycle to point them out during an implementation process from pre-study until the point of going live, their research serves as a bibliography and taxonomy of CSFs in the area of ERP to assist both researchers and practitioners. The 16 categorised critical success factors they provide are not ranked as in the previous three reviews, and as a matter of fact not even listed in alphabetical order. They are provided in an order as follows: Implementation strategy, Support of top management, Enterprise system, Software maintenance, Data management, Project management, Project tracking, Enterprise system selection process, Change management, Project team competence, Organizational experience of major change, Acceptance control, Education and training, Vendor, Environment, User involvement.

Notwithstanding, Shaul and Tauber (2013) emphasise some CSFs to be particularly challenging in the ERP implementation. One of them is the selection process of an ERP system, meaning companies often suffer poor fit between the ERP system and the organisation. The project management is another, for which the argument is that organisations that underestimate the complexity, size and scope of ERP implementation throughout the life cycle often experience a failed project. Senior leadership is the third factor, stressing the importance of top management being fully committed to the entire process of the ERP implementation. Data management is the fourth CSF, which is a technology driven CSF, stressing that the existence of inaccurate, incomplete, inconsistent, inaccessible or doubtful data can harm the implementation since the ERP system aims to be widely deployed throughout the organisation. The fifth factor is a sufficient training program where all stakeholders must be well-trained and informed on how the business processes are migrated into the ERP system to fully reap the benefits of the system functionalities. Lastly, Shaul and Tauber (2013) discuss user involvement and exemplify with organisations facing failures in the implementation phase due to the resistance of the system user. Companies can cope with user resistance by establishing a change management team, and a program made up of top and project management (Shaul & Tauber, 2013).

The fifth and final literature review chosen for our frame of reference is written by Saade and Nijher (2015). This review differs from the previous in that it is based on case studies;
37 different cases are explored, using an eight-step category coding system to deduce which CSFs that are seemingly most important in order to reach success. The authors first extract 64 CSFs from prior literature and then test them through the case studies; only 22 of those 64 prior CSFs are found to be distinct. The process of determining whether a CSF is distinct or not is described as having three steps; (1) establish linkages between articles vis-à-vis the CSFs identified, (2) synthesis of meanings (same or different), and (3) interpretation of factors. These 22 CSFs are grouped into five categories, representing the different stages in an ERP implementation; organisational state, business requirements, technical solutions, project implementation and post-implementation use. Consequently, the research question of the review is aimed at finding out what practical CSFs there are for ERP implementation. The authors claim to add value to the existing ERP body of knowledge with this review through their new distribution of the CSFs over the ERP implementation process.

The CSFs found in prior research are hence condensed, in a manner, down to the 22 distinct CSFs. The authors describe these 22 factors as conclusions drawn from the 64 found in their literature review; it can be observed that several CSFs can be identified within the 22 synthesised factors. The 22 distinct CSFs as found by the authors are as follows; (1) Cultural change readiness, (2) Top management support and commitment, (3) Knowledge capacity production network, (4) Minimum customization, (5) Legacy systems support, (6) ERP fit with the organisation, (7) Local vendors partnership, (8) Detailed cost, (9) Business process reengineering, (10) Quality management, (11) Risk management, (12) Detailed data migration plan, (13) Measurable goals, (14) Small internal team of best employees, (15) Open and transparent communication, (16) Base point analysis, (17) Morale maintenance, (18) Contingency plans, (19) ERP success documentation, (20) User feedback usage, (21) Maximum potential usage and (22) Results management.
2.3 CSFs in ERP Implementation

In this section, the proposed CSFs in ERP implementation will be described using the content of the literature reviews and the sources from which they draw their conclusions. The CSFs have been chosen after examining the frequency of which they are used in the literature reviews. We have chosen to use the CSFs that are mentioned in three or more reviews. This is to ensure that the CSFs that we choose indeed can be considered accepted as critical. After exploring the chosen reviews, we could see that several CSFs could be combined since they represented the same factor. Due to this, we categorised the factors which resulted in 14 CSFs. Each CSF's description will include the role of the system user, leading to the formulation of a hypothesis. We define the system user as an employee working with and within the supply chain whose daily work involves working in an ERP system. Hence, these are the CSFs that we will use to answer RQ.

2.3.1 Top Management Commitment

The number one cited CSF and considered the most relevant and critical factor by prior researchers is “Top management commitment and support”. This concept is referred to the need of having committed leadership at the top management level (Finney & Corbert, 2007). Successful ERP implementation very much depends upon active and persistent top management involvement, and the importance of top management support in each step in all company levels is crucial (Zabjek et al., 2009; Sarker & Lee, 2003; Nah et al., 2003). Harrison (2004) argues that when some companies hand over their ERP implementation responsibility to the technical departments, they make a vital mistake resulting in a failed project. The use and success of IT in organisations should include participation from the top management, as that reflects that the top management works actively together with the rest of the company towards a successful IT-implementation (Byrd & Davidson, 2003; Nah et al., 2003). Motwani, Mirchandani, Madan, and Gunasekaran (2002) conclude that not only should the top management be active in the implementation process, but to ensure progress and ultimately success. They should also be able to anticipate glitches that might occur; this naturally puts a great demand on their knowledge regarding ERP systems and the implementation process (Motwani et al., 2002). This is what Yusuf, Gunasekaran and Abthorpe (2004) stress in their contribution; they argue that the commitment has to be solidified by a knowledge base, not only built on strategic planning and leadership but also of technical expertise. This knowledge can express itself in understanding the importance
of delegating enough resources to the project in order for it to be successful (Nah et al., 2003). Since top management commitment includes reinforcing the commitment of all employees, including the system users, the first hypothesis is:

H1: Top management commitment in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.2 Implementation Strategy

Mandal and Gunasekaran (2004) argue that this is indeed the most important CSF for a successful ERP implementation, from a top manager’s point of view. Several questions have to be asked in order to form a well-functioning strategy for implementation; what are the specific information needs at operational and managerial levels, how will the ERP system integrate with the existing system, and what is the schedule for the implementation? Answering these questions, the company can develop a plan which would increase their chances of success with 90% compared to companies without a plan (Mandal & Gunasekaran, 2003). Many researchers promote a phased approach to the implementation since it gives the company flexibility to make changes in the timeframe should any unforeseeable events occur (Mandal & Gunasekaran, 2003; Scott & Vessey, 2000; Saini, Nigam & Misra, 2013). Scott and Vessey (2000) bring up FoxMeyer and their rather horrific implementation of SAP R/3 as an example. They argue that FoxMeyer would have been more successful in their implementation should they have been able to adapt their implementation strategy (Scott & Vessey, 2000). Several authors stress the need for thorough testing to avoid as many unforeseeable events as possible. Gargeya and Brady (2005) argue that this indeed is a vital part of the implementation and Collett (1999) agrees with Mandal and Gunasekaran (2004) in that testing and developing a plan greatly increases the chances for success. Since the implementation strategy directly involves the system users, the second hypothesis is:

H2: Implementation strategy in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.
2.3.3 Communication

Failing to achieve a fluent and open communication between top management and the system user is a major cause of ERP implementation failure (Huang et al., 2004). Motwani et al. (2005) argue that a company encouraging its employees to participate actively in the implementation is more successful than a company that does not. Furthermore, Motwani et al (2005) discuss the importance of open communication when sharing the news of the change of ERP systems as well as the ongoing updates regarding the change. Indeed, cross-functional and interdepartmental coordination is of utmost importance when implementing an ERP system and having excellent company-wide communication is vital (Chen et al., 2009). Dezdar and Ainin (2011) argue that communication is an important tool to use for management when trying to avoid resistance to change from their employees. Continuous communication with the whole company will let the system users know what is happening, what results are to be expected and if something goes awry, they are directly informed and involved in solving the problem instead of left behind in confusion (Dezdar & Ainin, 2011). Plant and Willcocks (2007) stress the time aspect of communication; even though continuous interdepartmental communication is considered important both pre-, and post implementation, taking too much time making sure that communication is reaching everyone can be, and often is, a waste. Instead, making sure that the most vital information reaches the employees that are directly affected by it is a better way of dealing with communication (Plant & Willcocks, 2007). Since the way, a company communicates during an implementation affects the system users directly, the third hypothesis is:

H3: Communication in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.4 Training and Education

Somers and Nelson (2004) describe training and education to be crucial when implementing an ERP system. Lack of user training and misunderstanding the enterprise applications appear to be two large reasons responsible for many ERP implementation failures. ERP implementations require a vast amount of knowledge to enable people to solve problems that may occur within the framework of the system. Umble et al. (2003) argue that if the employees do not understand how the system works, they will invent their own processes, by excerpting parts of the system that they can manipulate. To make system
user training successful, the training should preferably start well before the implementation process begins (Umble et al., 2003). One of the key variables when planning for a new system is to plan for education and training programs, which in conjunction with other variables are important ingredients to a successful implementation (Mabert et al., 2003). Executives often underrate the level of education and training necessary to implement an ERP system and the additional costs, thus, as already mentioned, top management involvement is of high priority (Zabjek et al., 2009; Sarker & Lee, 2003; Nah et al., 2003; Mabert et al., 2003; Umble et al., 2003). However, the executives have to be able to predict the amount of training and education to reap the full benefits of the implemented system (Motwani et al., 2002; Aladwani, 2001). Cobert and Finney (2007) argue that in order to build user acceptance with regards to the project and nurture a positive employee attitude, training and education can be used as a tool to achieve those goals. Nah et al. (2007) continues this argument and entails that education should be a priority from the beginning of the project, and both money and time should be spent on various forms of education and training. By doing that, the company helps the system users to see the benefits and need for the new ERP system, and to furthermore understand how the system will change business processes (Somers & Nelson, 2004; Nah et al., 2007; Motiwalla & Thompson, 2012). All too often employees are expected to be able to effectively run and use the new system based only on the education. However, Umble et al. (2003) stress the importance that much of the learning process comes from hands-on use under common operating conditions. Since the degree of training and education directly impacts the system user’s ability to function during the implementation, our fourth hypothesis is:

H4: Training and education in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.5 Implementation Team

For an implementation to run smoothly, training is not the only tool that can be used. The need for a strong, competent core team of dedicated and capable employees is also important, especially at the very start of the implementation (Cliffe, 1999). This team is meant to lead the way, using their talents to probe for details when carrying out the planning phase of the implementation. Soh, Kien and Tay-Yap (2000) emphasize the fact that the users have to grow from being just complacent and passive to actually delving deeper into the implementation process; this is particularly true for the core team. Snider,
da Silveira and Balakrishnan (2009) also argue that the use of smaller task forces consisting of a few talented employees is a way to reach success when implementing an ERP system. They argue that smaller teams more often seek guidance when problems that they cannot solve by themselves arise, and by doing so, they got the input from outside parties more often which both increased their knowledge and also made sure that the implementation was on the right track (Snider et al., 2009). Larger groups of experts tend to base their decisions solely on their prior experience which, in Snider et al.’s (2009) case study showed to be inefficient. However, the competence of the team must be rather high; the team must be able to understand both the technical aspects of the process as well as be able to lead the project in an effective manner (Dezdar & Ainin, 2011). Shaul and Tauber (2013) also draw conclusions to the project team competence from several studies to emphasise team members’ knowledge; how well the team is building morale and motivation, if there are good relations between the project team and users, is there a balanced project team or even cross-functional project teams. Many researchers also highlight the need for a project champion as a part of the implementation team (Mandal & Gunasekaran, 2003; Kraemmergaard & Rose, 2002; Somers & Nelson, 2001; Nah et al., 2001; Summer, 1999). This individual employee should facilitate strong leadership skills together with knowledge of business, technology and personnel management (Mandal & Gunasekaran, 2003; Kraemmergaard & Rose, 2002). Somers and Nelson (2001) describe the project champion as owning the role of change for the life of the project and that they should understand the whole organisation throughout. They continue explaining the benefits of having an executive level individual with extensive knowledge of the organisation and its processes, which Falkowski et al. (1999) agree with; through this executive, senior management can monitor the ERP system implementation since the project champion is directly responsible for the project outcome (Somers & Nelson, 2001). The project team should consist of system users in order for the team to understand the practical implications of the implementation process (Akkermans & van Helden, 2002). This is why our fifth hypothesis is:

H5: The composition of the implementation team in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.
2.3.6 Change Management

Nah et al. (2007) stress the importance of change management, starting at the project phase and continuing throughout the entire life cycle. The enterprise’s wide culture and structures have to be managed; this includes people, organisation and cultural change (Nah et al., 2007; Davenport, 2000; Legare, 2002). The pre-existing organisational structure and processes found in most companies are not compatible with the new structure, tools and information that is provided by the ERP systems (Umble et al., 2003). Even if a system is flexible, it imposes its own logic and sheds new light on a company's strategy, organisation and culture. Thus, in order to cope with that, an organisation may force the re-engineering of key business processes or developing new business processes to support the organisation’s goals (Umble et al., 2003). Consequently, the system users might resist changing to the new system; Legare (2002) stresses the individual characteristics to influence a successful ERP implementation. If these characteristics are not in line with the top management's perception of how the system is to be established, the higher the risk of impediments in the implementation phase. Companies can cope successfully with user resistance by establishing a change management team, and a program made up of top and project management. The program involves procedures for constant feedback, monitoring the achievement, and rules for reporting responsibility (Shaul & Tauber, 2013). In addition to that, Francoise, Bourgault and Pellerin (2009) outline some efforts in relation to the user that the change management team could be facing, such as; formally gather support from opinion leaders prior the start of the project, assess the organisation’s capabilities to accept change, secure that the training provided for the whole organisation is complete, identify the risks and threats in conjunction with defining mitigation plans, circulate information/rumours on the benefits and changes that an ERP system will give, not starting the transition prematurely until the whole organisation is ready, begin actions to reduce resistance to change at the very start of the implementation, consolidate employees’ motivation throughout the project and specifically, prepare the project leader to handle change management problems. To conclude, if the change management process includes letting the employees, e.g. the system users, voice their opinions and be heard, the implementation process is more likely to be successful. Since the change management process is sure to affect the day-to-day work for the system users, the sixth hypothesis is:
H6: Change management in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.7 User Involvement

In relation to change management and as a result of the frequently cited failures, companies often encounter user resistance. The users are in many cases, often afraid that the ERP implementation will change their role, job status, importance, responsibilities and the access of valuable information (Shaul & Tauber, 2013). The user involvement can hence, be referred to a psychological state of the individual as the importance and personal relevance of the system to the user (Bhatti, 2005). Beyond the CSF as mentioned above; i.e. education and training, it is important to get users involved during the development of the system, get a hold of the existing knowledge from the user in areas where the team have insufficient expertise (Francoise et al., 2009). Moreover, Shaul and Tauber (2013) emphasise the activity of nominate user delegates that contain solid knowledge of the organisational processes, thus, be in charge of the cross-functional requirements in the redesigns of the processes, activities and functional areas both during the initial implementation and over time. Therefore, the user involvement and participation are considered critical success factors as they will result in a better fit of user requirements and enhancing a better system quality, use and acceptance (Esteves & Pastor, 2000). However, it is necessary to consider the impact of changing from one system to another, and the nature of work in connection to the specific job descriptions (Finney & Corbett, 2007). The management has to take into account how the staff may need to be redesigned or restructured (Motwani et al., 2002; Mandal & Gunasekaran, 2003). Despite that, Bhatti (2005) argues that there are two areas for user involvement when the company decides to implement an ERP system: (1) user involvement in the phase when the company defines the ERP system needs and (2) user participation in the implementation phase of the ERP systems. Regardless of which of Bhattis (2005) two areas that a company chooses, the system user is involved in the implementation process. This is why our seventh hypothesis is:

H7: User involvement in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.
2.3.8 Business Process Reengineering

Francoise et al. (2009) state that BPR and customization is crucial in the different stages of the project. An ERP project pushes organisations to revisit their business processes and scrutinises the ways of doing things relative to the best practices already embedded in the system. Bhatti (2005) uses the definition to BPR as “the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed”. According to Dezdar and Sulaiman (2009), it also involves alignment of the business with the new system; process adoption, new process standards, business process skills and job redesign. There are special considerations to be undertaken during this phase, such as enhancing the ERP interface quality (Aldawani, 2001) as well as the need to plan the infrastructure of the technology (Mabert et al., 2003). An issue with packaged software is the risk for conflict between the organisation’s needs and the pre-existing business processes (Somers & Nelson, 2004). Responsibilities of individual business processes are deployed among the boundaries in the organisation, therefore, to identify the core business processes is important and a necessary step before re-engineering. Since it is quite often that these processes are invisible, as they have never been documented (Zabjek et al., 2009). Indeed, BPR plays a crucial role when implementing a new system and particularly at the earliest stages, from introduction through adoption; however, it tends to be less important when the technology has become a routine and embedded in the business processes (Somers & Nelson, 2004; Mabert et al., 2003). Since the BPR is sure to affect the outcome of the business processes that are likely to be in place after the implementation, hence, involving the system users, the eighth hypotheses are:

H8: Business process reengineering in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.9 Use of Consultants

In the review by Dezdar and Sulaiman (2009), the CSF referred as “Use of consultants” were considered to have been one of the less frequently cited CSF. However, from the categorization made, it appears to be sufficiently brought up by authors. Somers and Nelson (2001) state that organisations use consultants in order to facilitate the implementation process as they may be familiar to specific industries, possess knowledge
about the modules and have adequate competency in determining which suite will be a better fit for a given company. Organisations frequently use outside consultants when setting up, installing, and customising their software and the use of external parties appear to play an essential role in the initial start of the project but diminish during the latter stages of implementation when the system is running (Somers & Nelson, 2004). Finney and Corbett (2007) argue that many researchers have advocated the need to include ERP consultants as part of the implementation team. However, in doing so it is also imperative to arrange for knowledge transfer from the consultants to the company, so it ends up decreasing the dependency for the consultant over time (Al-Mashari et al., 2003).

From the system user perspective, a consultant can provide information, training and manage the overall implementation. The top management can negotiate with the vendors and get to an acceptable price for engaging external consultants, providing their users with adequate training (Upadhyay & Dan, 2009). The consultant-customer partnership also refers to consultant involvement, support and connectedness with the user department and effective communications with the users (Dezdar & Sulaiman, 2009). Moreover, Upadhyay and Dan (2009) argue that an adequate vendor support and participation from the external consultants even after finalising the implementation are one of many underlying factors for successful ERP projects. Using consultants affect the system user’s learning process which leads to our ninth hypothesis:

H9: Use of consultants in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.10 Project Support

Since the implementation of a new ERP system is such an undertaking for a company, both financially, technically and time-wise, the need for support is to be considered important. Training and educating the system users is indeed a way to support the process, however, if something goes wrong that needs external help, there should be a support system ready to be kicked into gear (Kremers & van Dissel, 2000). This support system is not only meant to be active when problems occur, but continuously; Hirt and Swanson (2001) argue that one primary function of the project support is the maintenance. This feature is activated during the last stage of the implementation process discussed by Motiwalla and Thompson (2012), the operations stage. Hirt and Swanson (2001) mean that the maintenance part is vital for the implementation to be ultimately successful; during this
phase, continuous upgrades are installed, additional training that might show itself to be necessary takes place and steady problem shooting is carried out in order for the company to foresee future problem areas. Light (2001) argues that the project support can be hampered by an ERP system with a high degree of customization; much in line with what Motiwalla and Thompson (2012) discuss regarding chocolate contra vanilla implementation. The more customizations made, the larger the risk of needing a heavy support system which is costly and in the long run highly inefficient. The project support function is consequently supposed to work as a point of fallback for the system users; hence, the amount and quality of the project support affects the system users, which is why our tenth hypothesis is:

H10: Project support in an ERP implementation is considered to be a critical success factors by the system users in the context of procurement management.

2.3.11 ERP Selection

Selecting the right ERP system from the start is vital to the success of the implementation process. For a company to be able to choose the right ERP system, the implementation phases need to be carefully worked through (Motiwalla & Thompson, 2012). Kraemmergaard and Rose (2002) argue that the ERP system must match the business processes of the company for it to be successfully implemented; this is in line with what many researchers mean when they are promoting the vanilla approach when implementing the ERP system (Somers & Nelson, 2001, 2004; Nah et al. 2001; Palaniswamy & Frank, 2000). Law and Ngai (2007) argue that the fit between the company and the ERP system of choice is paramount to the success of the process. Choosing an ERP system which does not fit the organisational processes to a certain extent will lead to the company struggling to adapt, spending precious resources and ultimately having to abandon the conversion as a whole and try again (Law & Ngai, 2007). As the process is very costly and time-consuming, companies should not take this matter lightly. Selecting the right system also means selecting the right vendor to distribute the system. The company should base their vendor decision on several factors; the characteristics of the vendor, i.e. reputation, the relationship between the company and the vendor, the support that the vendor can offer and which tools the vendor has to its name (Davenport, 2000; Esteves & Pastor, 2006; Nah et al., 2001; Somers & Nelson, 2004; Yusuf et al., 2004). Since the ERP selection process and
what ERP system, as well as what vendor that is chosen by the company, affects the system user, the eleventh hypothesis is:

H11: ERP selection in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.12 Project Management

Nah et al. (2001) state that a good project management is essential in an ERP implementation project. The project management activities span the first four stages of the ERP life cycle from beginning the project until closing it (Somers & Nelson, 2001; 2004). The approach to project management suggests that the project planning and control is in correlation with the project's characteristics such as project size, experiences with technology and project structure (Somers & Nelson, 2004; Holland & Light, 1999). An individual or group of employees should be given the responsibility to drive success in the project management (Nah et al., 2001). When the project team is formally established, the team must subsequently be defined in terms of its milestones (Holland & Light, 1999). It includes determining the critical paths of the project, deciding on the timeliness of the project and managing the force of timely decision making (Nah et al., 2001). Hence, the scope should be established, clearly defined and be limited. As ERP projects tend to be huge and inherently complex, due to the extensive combination of hardware and software as well as the countless organisational, human and political issues (Somers & Nelson, 2004). A project scope that is too broad or ambitious can cause problems (Somers & Nelson, 2001). Since the structure and planning of the project that is the ERP implementation process directly affect the system user’s ability to function within the organisation, the twelfth hypothesis is:

H12: Project management in ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.13 Quality Management

Saade and Nijher (2015) state that quality management is referred to the data integration of previous data, and the accuracy ensuring the data quality fulfils the requirements of the new system. Moreover, much of the success of the implementation process and ultimately of
the total success of the system relies on the ability of the team to ensure data accuracy when converting it into the new system (Umble et al., 2003; Somers & Nelson; 2001, 2004). Finney and Corbett (2007) argue that the conversion process of the implementation may involve cleaning up suspect data that is not required in the new ERP system. The conversion process should be such that there is a minor chance of loss of data during the migration (Saini et al., 2013). This part of the implementation also involves ensuring the system reliability, system integrity, stability and compatibility of the software. Adding to that, in relation to the system user, the quality management regards the user fit and if the system user fully understands the applications. Assessing if the ERP system is perceived as complex or not by the users and whether the ERP fits the organisations business processes (Dezdar & Sulaiman, 2009). Before going “live”, Saini et al. (2013) argue that the organisation should execute a variety of tests so that the system is stable, hence, detecting flaws and errors before the introduction. Involving the users in the system testing via test cases is vital, so that the user can check the robustness of the system, furthermore control that it works properly in the operational environment, and is one of many steps for user acceptance (Yusuf et al., 2004). Since quality management is the step assuring that the users are acquainted with the system and assessing the robustness of the system, our thirteenth hypothesis is:

H13: Quality management in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

2.3.14 Risk Management

Last but not least is the CSF named risk management which involves developing proper troubleshooting tools, adequate skills and techniques and in relation to the CSF use of consultants, working closely with vendors and consultants when something is wrong in the system (Shaul & Tauber, 2013). Troubleshooting errors is critical when implementing an ERP, and the relationship with vendors and consultants to resolve software problems should also work well (Holland et al., 1999; Nah et al., 2001). The need to be flexible in ERP implementations and to learn from unforeseen circumstances have been argued by Finney and Corbett (2007) and Al-Mashari et al., (2003) as an ongoing requirement of the implementation process. Chen et al., (2009) state that there are two risk factors influencing unfavourable project outcomes; external (e.g., business models and entrants) and internal (e.g., project size, duration, complexity, and outsourcing). These aspects represent a risk to
the project, and are important for the project managers to consider in the implementation when developing a proper risk management plan to be able to foresee risks project failure. Aloini et al., (2007) argue that the nature of ERP project risk is determined by the risk factors; hence they suggest a risk management approach to mitigate the risks of ruining the project. Stated different phases in descending order; context analysis, risk identification, risk analysis, risk evaluation, risk treatment, monitoring and review and lastly communicating and consulting. Thus, managers can consider measuring the risk within an ERP project as an important part of risk management (Chen et al., 2009). However, despite having a proper risk management strategy, the users should be the one having the knowledge about any contingency plan if the errors occur, thus, the know-how of troubleshooting the system when the system is live. If they do not have the knowledge of doing that, they might get over-reliant on the vendor to resolve technical queries (Maguire, Ojiako & Said, 2010). Moreover, if the user does not have the proper education and knowledge that the system user is exposed to, they will find it hard to give precise details of the deficiencies and leading to delays from the vendors to solve the problem (Maguire et al., 2010; Umble et al., 2003). Since the system user has direct contact with the ERP system and hence is directly affected by the troubleshooting aspect of crisis management, our fourteenth and last hypothesis is:

H14: Risk management in an ERP implementation is considered to be a critical success factor by the system user in the context of procurement management.

Table 2 contains the proposed CSFs as constructs from the original CSFs found in the literature reviews chosen in the frame of reference. This categorization is meant to ease the orientation of the CSFs for the reader and to further align the CSFs and their meanings. The next chapter will describe the chosen methods and the underlying philosophy for this thesis, in order to validate the proposed hypotheses.
### Proposed CSFs

<table>
<thead>
<tr>
<th>Top management commitment</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Top management commitment and support (Finney &amp; Corbett, 2007), top management involvement (Moon, 2007), top management support and commitment (Dezdar &amp; Suleiman, 2009), support of top management (Shaul &amp; Tauber, 2013), top management support and commitment (Saade &amp; Nijher, 2015)</td>
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### Implementation strategy

<table>
<thead>
<tr>
<th>Implementation strategy</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Implementation strategy and timeframe (Finney &amp; Corbett, 2007), software implementation process (Moon, 2007), contingency plans (Saade &amp; Nijher, 2015), implementation strategy (Shaul &amp; Tauber, 2013)</td>
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### Communication

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<th>Communication</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Communication plan (Finney &amp; Corbett, 2007), communication (Moon, 2007), enterprise-wide communication and cooperation (Dezdar &amp; Suleiman, 2009), open and transparent communication (Saade &amp; Nijher, 2015)</td>
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### Training and education

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<thead>
<tr>
<th>Training and education</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>User training and education (Dezdar &amp; Suleiman, 2009), education and training (Moon, 2007), education and training (Shaul &amp; Tauber, 2013)</td>
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### Implementation team

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<thead>
<tr>
<th>Implementation team</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Balanced team (Finney &amp; Corbett, 2007), ERP team composition, competence and compensation (Dezdar &amp; Suleiman, 2009), project team competence (Shaul &amp; Tauber, 2013), project champion (Finney &amp; Corbett, 2007), empowered decision makers (Finney &amp; Corbett, 2007), small internal team of best employees (Saade &amp; Nijher, 2015)</td>
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### Change management

<table>
<thead>
<tr>
<th>Change management</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Managing cultural change (Finney &amp; Corbett, 2007), stable and successful business setting (Moon, 2007), organisational change management (Moon, 2007), change management programme (Dezdar &amp; Suleiman, 2009), organisational experience of major change (Shaul &amp; Tauber, 2013), cultural change readiness (Saade &amp; Nijher, 2015)</td>
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### User involvement

<table>
<thead>
<tr>
<th>User involvement</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>User feedback usage (Saade &amp; Nijher, 2015), user involvement (Dezdar &amp; Suleiman, 2009), user involvement (Shaul &amp; Tauber, 2013)</td>
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### Business process reengineering

<table>
<thead>
<tr>
<th>Business process reengineering</th>
<th>Original CSFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPR and software configuration (Finney &amp; Corbett, 2007), business process alignment (Moon, 2007), BPR and minimum customization (Dezdar &amp; Suleiman, 2009), BPR (Saade &amp; Nijher, 2015)</td>
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### Use of consultants

<table>
<thead>
<tr>
<th>Use of consultants</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Consultant selection and relationship (Finney &amp; Corbett, 2007), legacy systems support (Saade &amp; Nijher, 2015), use of consultant (Dezdar &amp; Suleiman, 2009)</td>
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### Project support

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<th>Project support</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Project support (Moon, 2007), vendor support (Dezdar &amp; Suleiman, 2009), local vendor partnership (Saade &amp; Nijher, 2015)</td>
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### ERP selection

<table>
<thead>
<tr>
<th>ERP selection</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Selection of ERP (Finney &amp; Corbett, 2007), careful selection of ERP software (Dezdar &amp; Suleiman, 2009), enterprise system selection process (Shaul &amp; Tauber, 2013), ERP fit with the organisation (Saade &amp; Nijher, 2015)</td>
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### Project management

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<tr>
<th>Project management</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Project management and evaluation (Dezdar &amp; Suleiman, 2009), project tracking (Shaul &amp; Tauber, 2013), project management (Moon, 2007), project management (Finney &amp; Corbett, 2007)</td>
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### Quality management

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<tr>
<th>Quality management</th>
<th>Original CSFs</th>
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<tr>
<td>System testing (Finney &amp; Corbett, 2007), system quality (Dezdar &amp; Suleiman, 2009), quality management (Saade &amp; Nijher, 2015)</td>
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### Risk management

<table>
<thead>
<tr>
<th>Risk management</th>
<th>Original CSFs</th>
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<tbody>
<tr>
<td>Troubleshooting and crisis management (Finney &amp; Corbett, 2007), software analysis, testing and troubleshooting (Dezdar &amp; Suleiman, 2009), software maintenance (Shaul &amp; Tauber, 2013), risk management (Saade &amp; Nijher, 2015)</td>
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*Table 2: Proposed CSFs*
3. The Research Design

The research design chapter consists of the section methodology, which starts with a discussion regarding the philosophy of the study, together with the approach and strategy. The method section follows, in which it is explained how the data is collected and which tools are used to analyse this data. The chapter ends with a discussion regarding the research quality and what has to be taken into account when conducting reliable research.

3.1 Methodology

Saunders, Lewis and Thornhill (2009) define the term methodology as “The theory of how research should be undertaken, including the theoretical and philosophical assumptions upon which research is based and the implications of these for the method or methods adopted.” We will now describe the ways through which we will conduct our study, gather our empirical data and furthermore analyse it.

3.1.1 Research Philosophy

The term research philosophy refers to a system of beliefs and assumptions about the development of the knowledge. Saunders, Lewis and Thornhill (2009) argue that a well-thought-out and consistent set of assumptions will create a credible research philosophy. That underpins the researcher’s methodological choice, research question and data collection techniques as well as the analysis procedures. When conducting research, it is, therefore, important to be aware of the underlying research philosophy of the particular study as that implies a particular way of viewing the world (Saunders et al., 2009). Bryman and Bell (2011) distinguish the two dimensions of research philosophy as ontology; assumption and nature of reality and existence, and epistemology; the theory of knowledge which helps researchers understand the best ways of studying the nature of the world (Easterby-Smith, Thorpe & Jackson, 2015). There are four different philosophies that can be adopted, and it is the research purpose and further, its research questions that dictate what philosophy is best suited to apply: (1) Positivism, (2) Realism, (3) Interpretivism, and (4) Pragmatism. Positivism entails working with an observable social reality to produce law like generalisations (Saunders et al., 2009). Realism, on the contrary, sees its objects independently of the human mind. Thus, it suggests that our senses show
the truth of reality (Bryman & Bell, 2011). Interpretivism emphasises that humans are different from the physical phenomena because they create meanings and that the social world of business management is too complex to be grasped by explicit laws. Thus, they are critical to the positivist attempts of discovering definite, universal “laws” that apply to everybody. They argue that the researchers must, therefore, understand the differences of humans in a social context (Saunders et al., 2009). Lastly, pragmatism argues that there cannot be predetermined theories or frameworks that shape knowledge and truth. Neither do they accept that people are constructing their truths out of nothing, thereof, it is possible to adopt more than one position within a study (Easterby-Smith et al., 2015; Saunders et al., 2009).

The philosophy adopted for this study was positivism, as the study aimed to reveal law like generalisations about the phenomena and new knowledge. Furthermore, since the study’s aim was to research the CSFs when implementing an ERP system from a system user perspective, which is a different angle than prior studies, an observable phenomenon was considered to provide knowledge. The study was conducted in a value-free way where the researchers was detached, neutral and independent with an objective stance, hence seeking to yield pure data and facts uninfluenced by human interpretation or bias.

3.1.2 Nature of the Research

Since this study adopted elements from the positivist philosophy and paradigm, it implied that the purpose could be of an exploratory, explanatory, or descriptive nature. Saunders et al. (2009) argue that a descriptive study suggests research questions likely, to begin with “‘Who’, ‘What’, ‘Where’, ‘When’ or ‘How’” which is in line with this thesis research questions. Furthermore, the purpose of this study was to identify the critical success factors of ERP implementation from a system user perspective. Basing the study on prior research and existing theories meant that the nature of the study was not exploratory. That would have implied more open questions to discover what is happening, nuances and deeper shrewdness about a topic of interest (Saunders et al., 2009). On the contrary, the research aimed to determine the CSFs in the implementation of an ERP system from a system user perspective, which extended knowledge in existing theory.

To be able to identify CSFs in an ERP system implementation, an extensive literature review to tweak it towards system user’s perspective was required, which suggested that
this study was of a descriptive nature. Notwithstanding, the research study aimed to provide valuable insights from a system user perspective with the objective CSFs in hand through an ERP implementation, thus, empirical data was needed. Hence, the research’s nature combined both descriptive and explanatory attributes leading to a nature of the research being descripto-explanatory (Saunders et al., 2009).

3.1.3 Research Approach

According to Saunders et al. (2009), there are three different approaches to business research; the deductive, the inductive and the abductive approach. The deductive approach refers to test the theory by explaining the relationships between variables. The inductive approach aims to formulate a theory based on empirical data derived from qualitative methods. Thirdly, abductive approach moves back and forth, in essence combining deduction and induction (Saunders et al., 2009). The proposition of this study started with existing theory and was subjected to test the empirical prevalence of the theory, meaning that deduction was the best suitable approach to this study. According to Robson (2002), deduction follows five sequential stages:

1. Deducing hypotheses from theory
2. Expressing the hypotheses in operational terms
3. Testing the operational hypotheses
4. Examining the specific outcome of the inquiry, and
5. If necessary, modifying the theory in the light of the findings

These steps can be seen in this study, where the literature review lead to the CSFs that were used for the formation of the hypotheses. These hypotheses were then connected to the user perspective in an ERP implementation. In operational terms, the hypotheses were then empirically tested with the premises and the logic of the argument that produced them. Furthermore, if the results of the analysis were not consistent with the premises, the tests failed and the theory could be considered false and in need of either rejection or modification. That meant if a hypothesis was rejected, the theory of the corresponding CSFs could be amended and thus, the factors derived from theory were not considered critical from a system user perspective.
3.2 Method

3.2.1 Research Strategy

Saunders et al. (2009) give the deductive approach the assumption, which is present in this research study, to usually entail a connection with a survey strategy. The deductive approach also emphasises quantification in the collection and analysis of data (Bryman & Bell, 2011). A survey research covers a cross-sectional design in which data are collected predominantly through a questionnaire; to receive a body of quantifiable data in connection with two or more variables, are expected to detect patterns of association (Bryman & Bell, 2011). By conducting a survey, the authors were able to describe the population regarding different characteristics and furthermore test relationships and assumptions based on this population (Jackson, 2015).

Since this study aimed to establish the correlative relationship between a predictor variable and several response variables and was from a descripto-explanatory nature, the primary data was collected by using web-based questionnaire, that subsequently was utilised for further statistical analysis.

3.2.2 Methodological Choice

It is argued by Saunders et al. (2009) that researchers have the possibility to conduct research by using a qualitative, quantitative or a mixed design, using both. The nature of qualitative research tends to be concerned with words rather than numbers, predominantly emphasising an inductive approach; employing an unstructured research design and focuses at contributing with insight, interpretation and understanding (Bryman & Bell, 2011; Malhotra & Birks, 2007). Also, non-numerical data analysis and data collection techniques such as interviews and categorization are related in qualitative research (Saunders et al., 2009).

By contrast, quantitative research can be construed as being a collection of numerical data and exhibiting the view of the relationship between theory and empirical findings (Bryman & Bell, 2011). Moreover, it entails using statistical analyses to be able to see, understand and interpret the numerical input gathered from the sample (Malhotra and Birks, 2007).
The above-mentioned definitions of the two research methods explain the reason behind the decision to adopt the quantitative approach in this study. From an extensive literature review, the research derives hypotheses to test the relationship of variables. The authors employed a web-based survey, where the users were asked to rate the variables on a Likert scale. Which delivered data that was converted into numerical data that were furthermore statistically tested through a statistical software. Moreover, the purpose and approach of this study suggested the use of a quantitative methodology; to answer the research question and the ability to accept or falsify the hypotheses.

3.2.3 Time Horizon

The major distinction to decide on the time horizon of a research study depends whether the study is longitudinal or cross-sectional (Saunders et al., 2009). It entails if the research is a snapshot, which would be a cross-sectional study, or a diary, which is considered a longitudinal study. This study aims to focus on a particular phenomenon at one particular time. Hence, this time horizon, which is cross-sectional, correlates with survey strategy (Easterby-Smith et al., 2015; Robson, 2002). However, it could have been argued that the nature of this study, to observe the user perspective of the ERP system, would have fit a longitudinal study, as a long-term research can describe change, development and perceptions. Like most research projects undertaken though, time was scarce, hence the reason for embracing a cross-sectional study concerning this study’s purpose, since it does not require observations of changes or developments over time.
3.3 Data Collection

Data collection is determined on the methodological approach that is used (Bryman & Bell, 2011). Since the use of a quantitative methodological approach in this study has been described, one could argue that this study was employing a mono method quantitative research; that is a data collection technique which involves a questionnaire and corresponding quantitative analytical procedure (Saunders et al., 2009). The collection of data within this study was executed by the utilisation of one single data collection technique, the questionnaire, and an analysis corresponding to that type of procedure.

3.3.1 Questionnaire

As mentioned in previous sections, the survey strategy used in this research included using a questionnaire for primary data collection. These data were considered data that specifically are collected to serve the purpose of this study. Saunders et al. (2009) present several different types of questionnaires, where the major distinction is made from interviewer-administered questionnaires; includes the means of telephone or in person, or self-administered questionnaires without the researchers being present at the moment of surveying, this could be done through e-mail or online questionnaires. Furthermore, the adequate choice of a questionnaire is distinguished by several factors; the sample size, the number and types of questions and lastly the importance of reaching particular respondents (Saunders et al., 2009).

For this research, a personal presence of the authors was not intended as the questionnaire was conducted through a self-administered questionnaire that was web-based. In order to reach a high number of ERP system users from the procurement department that was widespread geographically, the online questionnaire was chosen to ensure a smooth procedure, potentially reaching as many respondents as possible. As the respondents were holding supply chain management job positions, e.g., within procurement, their time constraints favoured a self-administered questionnaire rather than an interviewer-administered as that allowed more flexibility with regards to the time of answering the questionnaire. Furthermore, the web-based questionnaire gave the respondents the possibility of submitting the questionnaire online conveniently when they saw fit. To conduct the online survey, the authors choose Qualtrics who are a provider of web-based survey solutions, free of charge and hence without budget constraints.
3.3.2 Design of the Questionnaire

The online provider Qualtrics (http://jibs.eu.qualtrics.com) was used for constructing, executing and operating the questionnaire (see Appendix B). Since both the questionnaire and introduction letter were sent to different countries with separate languages, we used English to create a common linguistic platform; this was to avoid confusion due to different interpretations of the questions in the questionnaire and the introduction letter (see Appendix A). When the questionnaire and the introduction letter were created, they were discussed together with the Chief Information Officer (CIO) and the Chief Procurement Officer (CPO) of Consolis to make sure that the questions were clear to understand and that they could serve their assigned purpose. During this meeting, the possible number of respondents were also discussed.

Each respondent received the introductory letter in which the study was explained briefly and a necessary explanation of what ERP success was defined as within the confines of the study. This was in order, again, to avoid confusion for the respondents when answering the questions. The estimated time needed to be was also given together with an assurance of anonymity. To get access to the survey, a link was provided to the respondents in the introductory letter; the letter in conjunction with the link was then distributed to the respondents through key distributors within Consolis and contact persons in each targeted office. The 15 close-ended questions within the survey were then answered with a Likert rating scale. The respondents answered by selecting one of the seven possible options where one meant strongly agree, two meant agree, three meant agree somewhat, four meant neither agree nor disagree, five disagree somewhat, six disagree, and seven strongly disagree.

3.3.3 Sample Selection and Response Rate

In quantitative research, the sample size and how it is selected can be used to determine the reliability of the results of the study. A sample is a segment of the population that is selected for investigation, hence, a subset of the population (Bryman & Bell, 2011). The reasons for using samples in research is described by Saunders et al. (2009); when surveying the entire population would be impracticable; when budget constraints prevent from surveying the entire population; if time constraints are preventing from surveying the entire population. For this study, probability sampling was chosen as that is most commonly used
with survey research strategies where one needs to make inferences from a sample of a population in order to answer the research question (Saunders et al., 2009). It would have been impractical to test all of the system users within the case organisation using non-probability samples; where one seeks to make generalisations of the total target population (Saunders et al., 2009). To be able to call a study representative and be able to generalise the findings statistically, the data collection process requires a sample of sufficient size (Yin, 2014). However, it is argued by Saunders et al. (2009) that the sample size depends on the research objective, credibility and available resources. The target group of this study was the system users in procurement management who experienced the implementation of the ERP system within an organisation. This very niched group of employees rendered a rather limited number of possible respondents; however, the chosen employees were in turn very credible since they sufficiently fit the study’s purpose.

The entire population of system users could not be surveyed due to impracticability and time constraints. Thus, to ensure of receiving enough submitted questionnaires, a case organisation was selected. The chosen case company, Consolis, agreed to provide access to their pool of system users from three headquarters; the United Kingdom, Poland and Lithuania. These three offices have all experienced a recent ERP implementation and were hence viable for our study’s purpose. The chosen sample, i.e. the procurement management system users in various locations, was not distinguished to represent all of the system users, but yet a fraction of the target population within the overall procurement management departments in the case company. The probability sampling was hence the most appropriate to answer the study’s research question and abovementioned purpose. Moreover, the type of probability sampling was chosen to use the simple random method. With random sampling, each unit of the population had a similar probability of inclusion in the sample, which was intended when deciding the population size (Bryman & Bell, 2011).

As previously mentioned, the rather niche purpose of this study resulted in a limited eligible sample. The study asked for system users within procurement management who have experienced an ERP implementation and therefore can understand the importance of the different success factors which in turn confirms that they are representative. Saunders et al. (2009) state that a probability sample has to represent the population that is targeted. We defined our population to be the procurement management part of Consolis, which then could be generalised to similar companies. This population amounted to a total of 132
system users. 32 of these users provided were deemed unusable due to them not having experienced any recent ERP implementation, or in other ways did not properly fit the required needs for the study. This left us with an adjusted population of 100 system users (62 from Lithuania, 35 from Poland and 3 from the UK). From these 100, 80 were randomly selected using the simple random method. 73 users provided complete answers. This resulted in a response rate of 91,3%, which should be considered adequate according to Nulty (2008). This meant that our confidence level reached 6 at a confidence level of 95%, which was not ideal as we would have wanted a confidence level of 5 (Saunders et al., 2009). We made extensive efforts to increase the response rate with e-mails reminding the respondents to finish their questionnaire. We still believe that the respondents and their answers were representative of the case company and their system users and helped sufficiently in answering our research question and fulfilling our purpose.

3.3.4 Reliability

The term reliability is concerned with the question if the results of the study are repeatable (Bryman & Bell, 2011). In other words, it refers to replication and consistency, thus, if research can be replicated by a third party and would achieve the same findings, seeing the research as being reliable (Saunders et al., 2009). This can be ensured by demonstrating the procedures, showing transparency and giving thorough explanations about the methodological choices, data collection and analytical steps as detailed as possible (Yin, 2013). Reliability concerns the robustness of the questionnaire, thus, if the produced findings will be consistent over time and under different conditions, such as different samples and respondents. Mitchell (1996) outlines three common approaches to assessing the reliability of the questionnaire. The test-retest method involves administering a test or measure on one occasion and then re-do it to the same sample on another occasion (Bryman & Bell, 2011; Saunders et al., 2009). This method, however, can be complicated as the questionnaire needs to be distributed twice to the same respondents, and they might be reluctant to complete it twice. Therefore, that approach was not chosen, due to the risk of not get the answers twice and due to the time constraints. The next approach named by Mitchell (1996) is the internal consistency and involves correlating the responses to the questions in the questionnaire with each other; the most frequently used method of doing that is via the measurement of Cronbach’s Alpha ($\alpha$) (Saunders, et al., 2009). The final approach outlined by Mitchell (1996) is the alternative form approach, which involves assessing the reliability of the questionnaire by comparing responses to alternative forms of
the same questions or groups of a question (Saunders et al., 2009). That approach, however, is usually utilised in longer questionnaires and was considered inappropriate for the questionnaire in this study as it merely consisted of 15 questions.

For this research, the internal consistency approach was exerted with the use of the Cronbach’s Alpha ($\alpha$) method, to ensure the reliability of this study. This statistic is mostly used to measure the consistency of responses to a set of questions that are combined as a scale. It consists of an Alpha coefficient with a value between 0 and 1. Since the questionnaire was utilising a Likert-type scale, this approach was considered most appropriate to apply to test the reliability of the scale. Values of 0.7 or above are typically employed “as a rule of thumb” and implies an acceptable level of internal consistency (Bryman & Bell, 2011; Saunders et al., 2009). The Cronbach’s alpha value resulted in a number of 0.734 (see Appendix C) which is a value that is within the “rule of thumb” values mentioned above. This confirmed that the value received in the questionnaire was on an acceptable level. Thus, the reliability of this study could, therefore, be accepted. The authors also tested whether the value of the Cronbach’s alpha would increase if any of the questions would have been deleted. An item-total statistics calculation (see Appendix C) showed that there would not have been any significant changes in the results if any questions would have been removed. Worth mentioning though is that if the question 1 would have been removed the value of the Cronbach’s alpha would have resulted in 0.760 which would have been higher than the one received and of course rendered in a higher internal consistency. However, removing the first question of the survey would not have been an option since it determines whether the respondents believes the previous ERP implementation was a success or not. The question was hence vital for this study’s purpose as the hypotheses derived from the literature study is tested towards that perception. The authors, moreover consider the reliability of this research of high level, as both the questionnaire and the cover letter are accessible for any third party to take part of.

3.3.5 Validity

Assessing validity about questionnaires according to Saunders et al. (2009) refers to the ability of the questionnaire to measure what is intended to be measured. In a survey study, the measurement validity applies primarily to a quantitative study and has essentially to do with the question of whether a measure that is devised of a concept reflect the reality that it is supposed to be representing (Bryman & Bell, 2011; Saunders et al., 2009).
The questionnaire was constructed and distributed in English which can be considered a common business language around the world. To avoid any misinterpretations or the probability of misconceptions, we applied the accuracy of expression to assure that each stated question and statement were easily understandable and that they mirrored the purpose of this study.

To further ensure the validity and prior using the questionnaire it is argued by Bryman and Bell (2011) to include a pilot testing with respondents similar to those who will complete it. The statement “however pressed for time you are, do your best to give the questionnaire a trial run” (Bryman & Bell, 2011) indicates the importance of the completion of a pilot testing before actually reaching the representing respondents. The authors conducted the pilot with five representatives holding a position within a procurement department at Consolis. Due to the time constraints concerned, the authors endorsed that it was better to ask a smaller population in the pilot for the questionnaire than using none at all (Saunders et al., 2009). They were further asked to give feedback on the plausibility of the questions, clarity of the instructions if anything was unclear and the usability of the questionnaire.

Furthermore, one must note the importance of obtaining external validity which is the issue whether the outcomes of a study can be generalised beyond the particular research context (Bryman & Bell, 2011). Considering the variety of involved actors within Consolis, divided over multiple countries, with procurement departments in each one of them, focusing on the headquarters in United Kingdom, Poland and Lithuania, the case company gave implications to the generalisation of the findings to other equal cases. Notwithstanding, an ERP implementation can differ from case to case; different business processes, organisational structures and cultures and internal competition are aspects to consider beforehand. With that said, the findings in this research can be generalised to a certain extent, however, since this research focuses on a single case company, a complete generalisation is debatable.
3.4 Data Analysis

For the purpose of testing the formulated hypotheses and furthermore analysing the collected data, the authors used the methods of descriptive statistics and Spearman’s rank correlation analysis. The received answers were further synchronised with the software IBM SPSS Statistics 20 that provided further statistical analysis of the data. SPSS helped the authors first to create descriptive tables to show the frequencies of answers for each variable, which further helped in order of describing and comparing variables in a numerical fashion (Saunders et al., 2009). Moreover, it created coefficient tables that showed how different variables related to each other or not, establishing an interpretation of relationship among them. This data analysis method was viable for our study since we wanted to identify which CSFs from prior research correlates with the perception of the system users.

3.4.1 Descriptive Statistics

The term descriptive statistics relates to the process of collecting, presenting, summarising and describing the data in a fashion so that the data can be more easily comprehended (Burns & Burns, 2008). By using this method, significant aspects of ERP implementation from a system user perspective can be gathered and visualised. Saunders et al. (2009) argue that using descriptive statistics enables a study to describe and compare variables numerically, which is intended when doing a quantitative study. Using statistics to describe a variable focuses on two aspects; the central tendency and the dispersion. The first refers to describing a sample or population providing a general impression of values that could be considered common, middling or average. Values that most frequently occurs is mode, middle value, mid-point, median and mean (Saunders et al., 2009). It is furthermore important to describe how the data values are dispersed around the central tendency. The two most frequently used ways of describing the dispersion is; the difference within the middle 50 percent of values inter-quartile range, and to which extent values differs from the mean, hence the term standard deviation (Saunders et al., 2009). This summary enabled the authors to use an initial description of data that could be part of a more extensive statistical analysis. The data was gathered, as mentioned before, through a web-based survey which then was processed by SPSS.
3.4.2 Spearman’s Simple Rank Correlation

As argued by Bryman and Bell (2011), there are a few different tools for bivariate analysis, i.e. when analysing if and how two variables are related. Deciding which tools to can be done through deciphering the nature of the variables. We investigated the relationships between ERP implementation success and our 14 CSFs; all variables were non-dichotomous and ordinal in nature. As mentioned before, the respondents were to show their perceptions through a spectrum of values on a 7 point Likert scale reaching from “Strongly agree” to “Strongly disagree”. Bryman and Bell (2011) recommends using Spearman’s simple rank correlation, also known as Spearman’s rho ($\rho$), when dealing with ordinal variables and we did as such. Through Spearman’s simple rank correlation, we studied if there existed a monotonic relationship between our independent (ERP implementation success) and dependent variables (Hypothesis 1-14). With a monotonic relationship, it means that the relationship does not have to be linear; if that were the case, we would have used Pearson’s correlation coefficient instead. If there had existed a positive monotonic relationship between our independent and any of our dependent variables, we would have observed an increase in the dependent variable when the independent variable increases. The increase does not, however, have to be linear, but it has to be continuous or at least not be negative during any part of the observation. The same situation goes for the opposite, where the monotonic relationship is negative. The limits with the use of Spearman’s simple rank correlation is that it can miss variables that impact the outcome of the study; it solely measures correlation between one independent and one dependent variable (Bryman & Bell, 2011). It could also be hard to precisely determine what the respondents think since the different choices in the Likert scale can be interpreted differently by the respondents. This is something that we will have to keep in mind when analysing the data.
4. Results and Analysis

In this part of the study, we will present the results of our survey showing how well the critical success factors discussed in prior research, focusing primarily on the management perspective, corresponds with the perceptions of the system users. Each hypothesis will be analysed by using the descriptive statistics and Spearman’s simple rank correlations derived from SPSS. The results show that four out of the fourteen hypotheses can be accepted; these will be presented in the final part of the chapter in accordance with Daniel’s (1961) guidelines regarding the most important success factors. The hypotheses will also be analysed using the frame of reference in order for us to make sense of the empirical findings and give explanations as to what the results imply.

4.1 The Success of Previous Implementations

As a beginning remark, it is very interesting to see the answers regarding the first statement in the survey (see Appendix C); “The previous implementation was successful”. 8,2% of the system users responded that they strongly disagree, 8,2% answered that they disagree and 5,5% responded that they disagree somewhat. 27,4% of the system users answered that they did not agree nor disagree with the statement. 37,0% of the system users answered that they agree somewhat, 11,0% that they agree and 2,7% that they strongly agree. The perceptions of the system users were hence very varied. However, the majority of the system users agreed to some extent. It displays a rather ambiguous general perception but the system users generally feel that the implementation was partly successful using the definition of Ifinedo (2006). This shows that an ERP implementation is indeed a complex process with many factors to be accounted for and the result from this first question will help us in analysing the outcome of the hypotheses in a proper manner.

4.2 Results and Analysis of Hypotheses

4.2.1 Hypothesis 1: Top Management Commitment

The first hypothesis regarding top management commitment received a Spearman’s simple rank correlation coefficient of 0,058 at a 0,628 significance level which means that it is not statistically significant at p < 0,05 and is hence rejected (see Appendix C).
This is interesting since top management commitment is rated as a major critical success factor by prior research. For an ERP implementation, a thorough and persistent involvement of high-level executives is discussed as paramount for an ERP implementation to be successful (Zabjek et al., 2009; Sarker & Lee, 2003; Nah et al., 2003). Even more interesting is that a majority (45.2%) of the system users surveyed that they agree with the statement that top management commitment is important in an ERP implementation (see Appendix C).

This implies that many system users find top management commitment important when working with an ERP implementation. However, they do not find it critical. Handing the implementation over entirely to the technical departments of a company as per Harrison (2004) is as he discusses, a mistake. Albeit, this survey would imply that top management can be overzealous in their efforts to contribute. Byrd and Davidson (2003) and Nah et al. (2003) argue for the participation of top management that they should actively work together with the system users; this might, however, lead to the top management taking over the implementation completely and in the end excluding the system users. This highlight what is discussed by Yusuf, Gunasekaran and Abthorpe (2004); that the top management should not only possess technical expertise but maybe more importantly, proper leadership skills in knowing not to take control over the implementation completely. Legare (2002) further discuss the importance of recognising the human factor while implementing the ERP system; being able to acknowledge the different needs of the system users and knowing when to step in and when just to observe is critical for the implementation to be successful. To conclude, there is no statistically significant correlation between the success of an ERP implementation and the commitment of top management; however, we can see that it is an important factor in that top management have to refrain from engaging too hard in the implementation process.

4.2.2 Hypothesis 2: Implementation Strategy

The second hypothesis tested the perception whether the implementation strategy could be considered important in an ERP implementation or not. The Spearman's simple rank correlation coefficient depicted a result of -0.021 at 0.863 significance level which means that it is not statistically significant at p < 0.05 and the hypothesis is hence rejected (see Appendix C). The CSF of implementation strategy is considered to have no relationship
with success in an ERP implementation by the system users of Consolis procurement department.

Looking deeper into the frequency of answers, 11.0% of the system users strongly agreed, and 64.4% of the system users agreed, 19.2% somewhat agreed while 5.5% neither agreed nor disagreed on the Likert scale (See Appendix C). This suggests that implementation strategy as a factor is important in an ERP implementation, even for the system users. Backing this up with a mean value of 2.19 which suggests that the majority of the system users and population would either choose 1-3 on the Likert scale, from strongly agree to agree somewhat.

It implies that there could be several underlying factors of rejecting the hypothesis. Receiving such an outcome is interesting since previous research have entailed that the implementation strategy is indeed one of the most important critical success factors in an ERP implementation (Mandal & Gunasekaran, 2004). The authors furthermore argue that an implementation strategy increases the chances of success in an ERP implementation from a management point of view. Even though that is the case, Gargeya and Brady (2005) and Collett (1999) adds the need of thoroughly testing and developing a plan of implementation. Interpreting this, the users’ might believe that their previous implementation strategy lacked in testing parts of the strategy, thus, resulting in a non-significant relationship between the variables. Another suggestion could be that the implementation strategy was formulated by senior staff, which did not require the system users’ participation. This could be a factor to why implementation strategy and the term ERP implementation success do not correlate according to Spearman’s rho. But even if it does not correlate with the terminology of success, and the hypothesis is rejected, the fact that the CSF is important in an ERP implementation should not be neglected. To conclude, there is no statistically significant correlation between the success of an ERP implementation and implementation strategy, yet we can see that the frequency of answers suggests that it is an important factor for the system users at Consolis, however, not critical.
4.2.3 Hypothesis 3: Communication

The third hypothesis asked for the importance of communication in ERP implementation. This hypothesis is rejected since it yielded a Spearman’s simple rank correlation coefficient of 0.030 at a significance level of 0.799 when $p < 0.05$ (see Appendix C).

However, looking at the frequency of answers, it shows that 50.7% of the system users surveyed that they agree with the statement that communication is important when implementing an ERP system (see Appendix C). This can be argued further using the mean of answers on this question, which is 2.05. This means that most system users answered between 1 and 2, i.e. either strongly agree or agree. Therefore, it can be stated that even though there is no statistically significant relationship between the success of an ERP implementation and communication as a critical success factor, system users find communication to be important in the process.

This is in line with prior research, which argues the importance of communication as a tool for updating the system users on the progress of the implementation (Motwani et al., 2005; Chen et al., 2009). The fact that the relationship is not statistically significant can be due to the argument held by Plant and Willcocks (2007); that too much information leads to waste. System users can indeed be flooded by information that they do not need to progress with the implementation, which instead would disrupt their work and slow down the process. Using Dezdar and Ailin’s (2011) research to explain this fact further can be useful; it is argued that communication can be utilised as a tool for management to avoid resistance to change from their employees, e.g. the system users. Connecting this with the analysis of hypothesis 1 it can be concluded that management can abuse the communication tool when trying too hard to avoid resistance to change by involving themselves too much in the implementation and instead slowing the process down and contributing to failure. Instead of using too much direct communication, utilising different tools to nurture the progression of the implementation can be advised. Looking at the correlation between hypothesis 3 and hypothesis 4, it can be seen that where system users agreed that communication is important, they also agreed that training and education is important (see Appendix C). Hence, utilising the tool of education to further the messages that management want to send to the system users can be a viable alternative to using direct communication via telephone, mail or other. To conclude, the hypothesis is rejected.
However, the system users still find communication to be an important factor in the process; top management can however consider using different tools to communicate.

4.2.4 Hypothesis 4: Training and Education

The fourth hypothesis tested whether the system users considered training and education to have been important in their latest ERP implementation. The importance of proper education and training has been emphasised by prior research to influence a successful implementation both pre-, during and post installation of the new system (Somers & Nelson, 2004; Umble et al., 2003; Mabert et al., 2003). The Spearman simple rank correlation coefficient resulted in -0.232 at a significance level of 0.049 when p < 0.05 which means that the hypothesis is accepted (see Appendix C).

Notably, the descriptive statistics suggest an explanation between the variables; the system users do consider training and education an important factor in the implementation. The mean value of 1.87 indicates that a majority of the users agree with the statement or would choose one of the alternatives that suggest so. The frequency table and the following bar chart show that over half of the system users strongly agreed while 16.4% agreed and 26.0% somewhat agreed (see Appendix C). Only 5.5% were undecided as they neither agreed nor disagreed with the abovementioned statement.

Previous researchers have suggested that training and education can mitigate a possible failure of the project since it involves the users accepting the project. Hence, nurturing a positive employee attitude and reaping the full benefits of the implemented system is vital (Finney & Corbett, 2007; Somers & Nelson, 2004; Umble et al., 2003). Accepting this hypothesis is interesting and possible underlying factors can help explaining the outcome. It is important to note initially the negative correlation, which indicates that as the success of an ERP implementation increases, the criticality of training and education decreases. Reversely, as ERP implementation success decreases, the need for training and education increases. This is what is argued by Somers and Nelson (2004), that the lack of user training and understanding of the ERP system implemented often renders in an ERP implementation failure. The outcome of the first question in the survey showed that the general understanding of the users was that their previous implementation process was successful only to a certain extent. The outcome of this hypothesis could be interpreted as the users felt that training was critical in certain parts of the process, but that when the
implementation was sure to be successful, the training was not considered critical. Furthermore, when the success of the implementation was in danger, training and education were sure to be critical. Connecting this implication with Mabert et al. (2003), who conclude that one of the key variables when planning for a new system is to plan for a proper education and training program, could provide an interpretation. It would seem that Consolis indeed had planned sufficiently for the implementation. However, the need for training decreased as the success of the project was solidified, which could imply that the users felt that when the process went smooth, there was no critical need for training. Despite that, the importance of hands-on use as a part of the learning process should not be neglected (Umble et al., 2003), and could have been a factor influencing an even more positive outcome of the hypothesis since the significance level was close to 0,05. However, realising the importance of providing the system users with sufficient education helps to understand the system and reap the full benefits from the same at the beginning from the “go-live” state (Nah et al., 2007). Another possible explanation of why the responses were leaning towards agreeing instead of disagreeing on the variable of education and training, was an overall understanding that training and education in an ERP implementation are important. To conclude, training and education showed a statistically significant correlation with ERP success from a system user perspective.

4.2.5 Hypothesis 5: Implementation Team

The importance of the implementation team in an ERP implementation was the fifth hypothesis being tested. This hypothesis is rejected since the Spearman’s simple rank correlation coefficient depicted a value of -0,034 at a significance level of 0,773 when p < 0,05 (see Appendix C).

Despite that, the frequency of responses as shown in the histogram tells that the system users; 19,2% strongly agree, 35,6% agree and 16,4% agree somewhat that the implementation team have been an important factor in the previous implementation. The mean value suggests a number of 2,68 (see Appendix C) which would explain that the major part of the sample would either answer 2 or 3 on the Likert scale ranging from 1 to 6 as there were 4 of the respondents who somewhat disagreed and disagreed with the statement.
Prior research argues that the implementation team should lead the way, carrying out the planning phase, building morale and motivation and highlighting the need for a project champion as a part of the implementation team (Mandal & Gunasekaran, 2003; Kraemmergaard & Rose, 2002; Somers & Nelson, 2001; Nah et al., 2001; Summer, 1999). This could offer a possible speculation to why the respondents answered in such a positive manner when they assessed the question. There might have been an implementation where the implementation team was involved with task forces to connect users cross-functionally and to build a sense of togetherness during the process. One reason for the rejection of this hypothesis could be that there was some dissatisfaction with the implementation team or simply that they did not think that the implementation team was an important factor for the project as a whole. Akkermans & van Helden (2002) state that the implementation or project team should consist of system users in order for the team to understand any practical implications. Following that logic, the respondents opting to disagree could be interpreted as that the system users not included in the project teams, or that there might not have been any practical implications within the project. With that said, and to conclude the remarks above, there is no statistical significance between the variable of success and implementation team according to the Spearman’s rank correlation, hence the hypothesis is rejected. However, it would be harsh to deny the importance of having an implementation team in an implementation per se, since the majority of the respondents still believes that they were important, yet not statistically evident in this study.

4.2.6 Hypothesis 6: Change Management

The sixth hypothesis measured the importance of change management in ERP implementation. This hypothesis is accepted; it yielded a Spearman’s simple rank correlation coefficient of 0.246 at a significance level of 0.036 when p < 0.05 (see Appendix C). This means that a statistically significant positive relationship exists between the success of an ERP implementation and the critical success factor change management, i.e. as ERP success increases so does the importance of change management.

Looking at the descriptive statistics, 19.2% strongly agreed, and 28.8% agreed. 21.9% agreed somewhat, 21.9% neither agreed nor disagreed, 2.7% disagreed somewhat, and 5.5% disagreed (see Appendix C). The mean answer for this question was 2.77, which is higher than expected but can be explained with that no system user answered 7. The mean
value shows that the majority of the system users agreed to the statement that change management is important when implementing an ERP system.

Francoise, Bourgault and Pellerin (2009) argue the importance of gathering the support of opinion leaders within the company as a step in the change management process; changing an organisation puts great demand on the ERP system users who have to adapt to new standards and tools and by extension new threats and risks. These opinion leaders can form a change management team, and it is important that the team consists of both top managers who do not consistently use the ERP system as well as day-to-day system users (Legare, 2002). The positive relationship between the success of an ERP implementation and change management implies that the importance of a clear change management process intensifies as the success of an implementation increases. It could be that when the implementation is successful, the pressure on the system users increases to perform; letting the system users’ voices be heard can then be of greater importance when expressing their feedback, both negative and positive. Shaul and Tauber (2013) note that an important part of change management is to monitor the achievements continuously throughout the implementation process. This could be interpreted in the way that as the implementation increases in success, so does the need for monitoring for the system users, since they then can see what they are doing right and feel that they are contributing to the success. In order, however, for there to be any success, the change management must involve training (Shaul & Tauber, 2013). The validation of this hypothesis implies that when the implementation process is successful, the need for a clear training program that continues after the system is in place increases in importance; in order for the system to be truly successful, the implementation process must continue through necessary updates and amendments even long after the implementation process itself is finished. It is important to note that change management indeed includes many different aspects of change; be it organisational, cultural or other. It is possible that the validation of this hypothesis could be due to the system users including nuances of other CSFs in change management, for example BPR, training and education and implementation team. The fact that change management as a CSF is so broad could offer an explanation as to why and how it can contribute to implementation success. To conclude, change management is considered to be critical when implementing an ERP system by the system users and the hypothesis is accepted.
4.2.7 Hypothesis 7: User Involvement

The seventh hypothesis tested if there was any relationship between ERP success and user involvement. This hypothesis is rejected since the Spearman’s simple rank correlation coefficient yielded a value of 0.022 at a significance level at 0.853 when p < 0.05 (see Appendix C).

However, the descriptive statistics show that the respondent's answers yielded a mean value of 2.22 with a minimum and maximum values ranging between 1 to 4. That tells us that none of the system users of Consolis neither strongly disagreed nor disagreed or somewhat disagreed but rather thought of user involvement as being important in the ERP implementation. The frequency of answers was rather evenly distributed across the different options with the option strongly agree at 21.9% of the responses, and agree with 47.9% of the answers. 13.7% neither agreed nor disagreed with the statement of user involvement and the last proportion of 16.4% somewhat agreed on the statement (see Appendix C).

It is evident that the sample of the population overall believed that the user involvement in the ERP implementation was important to consider. Despite that, not critical to a successful ERP implementation, hence the rejection of the hypothesis. This is interesting though, since there could be several factors influence rejecting the hypothesis. First of all, it seems that Consolis have considered the importance of involving their system users in the implementation according to the frequency of answers, which is emphasised in the literature by Bhatti (2005) and Francoise et al. (2009). They argue for the importance to involve the users in the development of the system and to get a hold of existing knowledge in areas the implementation team lacks sufficient expertise. Esteves and Pastor (2000) further argue that involving the users enhances the system quality, use and acceptance of the system. Rejecting the hypothesis could be due to the implications that the users perceived the implementation lacking somewhat on including them in the process. Motwani et al. (2002) and Mandal and Gunasekaran (2003) argues that the management has to take the staff into account when redesigning or restructuring the organisation in any way. This could be another factor affecting the results of the hypothesis, as some of the respondents did not feel that they were explicitly included in the project, thus, did not perceive the user involvement as critical to an ERP implementation being successful.
However, the majority still responded for the importance of being involved in the ERP implementation, or fundamentally believes that user involvement is important in any ERP project to proceed efficiently. Yet the rejection of the hypothesis could have nuances of user involvement being scarce in every stage of the implementation, leading to different perceptions of how important the involvement actually was for each individual in the sample.

4.2.8 Hypothesis 8: Business Process Reengineering

The BPR in an ERP implementation was the eighth hypothesis being tested. This hypothesis is rejected since the Spearman’s simple rank correlation coefficient depicted a value of -0.007 at a significance level of 0.955 when p < 0.05 (see Appendix C).

Looking closer to the descriptive statistics showed that the mean value of answers yielded a value of 2.85 which depicts that the majority of respondents chose the options on the higher scale of the questionnaire. More specifically 35.6% somewhat agreed with the statement, while 38.4% agreed, 17.8% of the respondents neither agreed nor disagreed with the statement and 5.5% somewhat disagreed and 2.7% strongly agreed (see Appendix C). It entails that the respondents do in some sense believe that the BPR was important, yet not critical to the implementation being successful.

Since BPR refers to fundamentally rethinking and radically redesigning the existing business processes to fit the new system (Bahtti, 2005; Dezdar & Sulaiman, 2009), the reasons for rejecting the hypothesis could be rooted in the system users resisting to change. Another reason for implementing a packaged software is that it comes with a potential issue of incompatibility of the pre-existing processes (Somers & Nelson, 2004), which further impedes the smoothness of installing the system. However, it could also be that of when deciding upon implementing the system, the need to redesign the processes was simply not needed, hence, reengineering was redundant. Moreover, BPR is considered not being on the top-tier list of factors to emphasise on in the project leading to the beliefs that it is not critical when nurturing a successful ERP implementation. Even if prior research has emphasized that BPR plays a crucial role, both in the earliest stages and throughout the implementation phase (Somers & Nelson, 2004; Mabert et al., 2003), the perception has been presented from a management perspective and is not true when it comes to the system users’ perception.
4.2.9 Hypothesis 9: Use of Consultants

The ninth hypothesis asked for the importance of the use of consultants when implementing an ERP system. The hypothesis is rejected, based on a Spearman’s simple rank correlation of 0,103 at a significance level of 0,384 when p < 0,05 (see Appendix C).

Looking at the descriptive statistics that this hypothesis yielded, we can see some ambiguity in the answers. The majority answered that they either agree somewhat (45,2%) or agree (27,4%), whereas 13,7% neither agree nor disagree. 8,2% disagree somewhat, and 2,7% disagree and strongly agree (see Appendix C). This indeed mirrors the image that the system users do not find the use of consultants to be critical to the implementation of an ERP system. However, they do appreciate it to be important to some extent.

The rejection of this hypothesis is interesting, and the reasons behind why the system user do not agree with the importance of consultants could be explained by several reasons. The definition of ERP success as discussed by Ifinedo (2006) and Wu and Wang (2006) involves knowledge and involvement satisfaction. That is, for the implementation to be considered successful, the system users have to be able to understand the system and experience an increase in productivity when using the system. Al-Mashari et al. (2003) discusses the importance of knowledge transfer from the consultants to the system users; the rejection of this hypothesis could be founded in that the system users did not experience an increased knowledge of the use of consultants and instead felt it is a waste of time and effort. Somers and Nelson (2004) note that the impact of consultants should be essential at the start of the implementation process, but diminish over time to avoid the company becoming dependent on the consultants. Moreover, Upadhyay and Dan (2009) state that consultants often offer their support and participation even after the implementation is finalised. The system users could have felt that the dependence on the consultants during and after the implementation was too noticeable and that their productivity was impacted, or that the consultant support was not needed at all post implementation. Another possible factor behind the rejection of this hypothesis could be that the implementations in the three offices were conducted in different ways; different consultants with varying quality could very likely have impacted the responses of the system users. To conclude, the system users see some importance in using consultants but do not find the factor to be critical when implementing an ERP system.
4.2.10 Hypothesis 10: Project Support

The tenth hypothesis asked for the importance of the project support when implementing an ERP system. The results depicted a Spearman’s simple rank correlation of 0.077 at a significance level of 0.516 when p < 0.05 (see Appendix C). The hypothesis is hence rejected since the significance level yielded a value above the p-value stating that it is not statistically significant to say that project support describes a successful ERP implementation.

Although the hypothesis being rejected, the descriptive statistics actually show some interesting data. The mean value of the answers for question eleven estimated 2.62 which basically suggests that the respondents agreed or somewhat agreed with the statement. Furthermore, the minimum and maximum value ranged between 1 (strongly agree) to 4 (neither agree nor disagree), and none of the respondents actually disagreed with the statement. But looking at the frequency of answers and which options the respondents picked the table (see Appendix C) depicts 56.2% of the respondents somewhat agreed, while 32.9% agreed, 5.5% strongly agreed, and 5.5% neither agreed nor disagreed with the statement.

The rejection of the hypothesis is rather interesting and could have several reasons. It could be that the project support system was not needed to be kicked into gear. Hence, the support system was not required to be executed due to a smooth implementation process. Kremers and Van Dissel (2000) argues that if anything goes wrong, the need for a proper support system is important to have planned. However, it is also suggested to have a support system in place during the implementation phase and is mainly referred as maintenance and surveillance of the system (Hirt & Swanson, 2001). It was perhaps that the respondents actually did not know whether they had an external support system or not, or that the support system was there without stating that it was present. Another option could be due to the level of customization of the system, the system implemented by Consolis was perhaps standardised which then would counter-argue the statement by Light (2001); the more customization made, the larger need of a heavy support system is needed. Either one of the reasons mentioned above can be adequate. However, it will not change the fact that the hypothesis was rejected due to the system users of the procurement department perception that project support is critical to the ERP implementation success.
4.2.11 Hypothesis 11: ERP Selection

The eleventh hypothesis regarded the impact of ERP selection. The hypothesis is accepted with the Spearman’s simple rank correlation coefficient of 0.271 at a significance level of 0.021 when p < 0.05 (see Appendix C).

Looking at the descriptive statistics for this hypothesis offers a view into the dispersion of the system users’ answers (see Appendix C). The mean value for this question is 3.15; this illustrates that the general perception of the system users was that they agree to some extent. The table of frequency shows this fact as well, where 24.7% surveyed that they neither agree nor disagree, 27.4% agree somewhat, 34.2% agree and 2.7% disagree somewhat. Only 2.7% strongly agree, and 8.2% disagree.

The fact that this hypothesis was accepted implies a number of scenarios. Indeed, the process of selecting the right ERP system to put in use is a very complex procedure, and the system users could have experienced both good and bad choices during the process. The positive correlation between the ERP selection and the success of the implementation means that as the success of the implementation increases, so does the criticality of the ERP selection. Reversely, as the success of the implementation decreases, the importance of ERP selection follows. Kraemmergaard and Rose (2002) as well as Law and Ngai (2007) highlight that the ERP system should match the company’s business processes in order for the implementation to be successful; the system users could have felt that the change from the previous ERP system to the new was smooth if the implementation meant no significant changes in the day-to-day processes. This fact could, in turn, be a product of the system users actively being asked when deciding which system to implement and that the system users got to contribute with what their preferences looked like during the selection phase (Motiwalla & Thompson, 2012). Since the company should choose system and vendor based on factors that only could be assessed by top management, it is possible that the top management also integrated the inputs of the system users in order for the match to be as good as possible (Davenport, 2000; Esteves & Pastor, 2006; Nah et al., 2001; Somers & Nelson, 2004; Yusuf et al., 2004). This could be a reason to why the system users regarded ERP selection as critical to the implementation. To conclude, the survey showed that ERP selection was deemed critical to the implementation.
4.2.12 Hypothesis 12: Project Management

The twelfth hypothesis tested whether the system users of the procurement department considered project management to have been important in their latest ERP implementation. An excellent project management has been emphasised to be essential by prior research to influence a successful implementation ERP project from a management perspective (Nah et al., 2003). The Spearman simple rank correlation coefficient, however, depicted in -0.071 at a significance level of 0.550 when p < 0.05 means the hypothesis is rejected (see Appendix C).

Moving to the descriptive statistics (see Appendix C), one could see that the mean value estimated in 2.48 which could be interpreted that the majority of the respondents agreed to some extent with the statement and considered project management to be important. The minimum and maximum value ranged between 1 (strongly agree) to 5 (somewhat disagree) which shows that some of the respondents were dissatisfied with the project management. The frequency table indicates that 35.6% chose the option to agree on the Likert scale, while 34.2% somewhat agreed, 16.4% strongly agreed, 11.0% neither agreed nor disagreed and 2.7% somewhat disagreed.

As previously mentioned, prior research has emphasised that a project management helps to coordinate the activities in all of the different stages in an ERP life cycle, from beginning until closing the project (Somers & Nelson, 2001; 2004). Despite that, the hypothesis is rejected and could have other factors underlying of coming to that realisation. As in the case of the user involvement, the project management is expected to assign an individual or a group of employees to drive success in the project management (Nah et al., 2001). However, the system users of the procurement management at Consolis might have been involved in a project team but not reflected on the importance of being part of one. The team is expected to plan for the implementation and set out certain milestones to fulfil during the journey (Holland & light, 1999). Either the set of milestones was achieved without complications or the users involved did not reflect that much on the importance of the project team in relation to the ERP success. The previous research also verifies the determination of critical paths of the project, timely decision making as well as a set of organisational, human and political issues (Somers & Nelson, 2004; Nah et al., 2001). Therefore, another possible factor could be, that either there were some major
organisational, human and political issues that were dealt with in an adequate fashion or the opposite. However, it could simply be that the system users did not acknowledge that the project management could explain ERP success and hence be critical factor, which would offer another explanation to why the survey resulted in the hypothesis being rejected.

4.2.13 Hypothesis 13: Quality Management

The thirteenth hypothesis assessed the importance of quality management when implementing an ERP system. The hypothesis is rejected with the Spearman’s simple rank correlation coefficient of -0,101 at a significance level of 0,394 when p < 0,05 (see Appendix C).

Despite rejecting the hypothesis, the descriptive statistics estimated a mean value of 2,65 with a minimum value of 1 and maximum of 5. The respondents agreed to some extent with the following statement, hence, it could be interpreted that they do think that the quality management was important to the implementation, yet not a contributing factor to a successful one. Delving deeper into the frequency table, it depicts rather evenly distributed responses from agreeing to neither agree nor disagree options. 42,5% responded agree, 35,6% somewhat agreed, 11,0% neither agree nor disagree and where the minority responded 8,2% strongly agree, and 2,7% somewhat disagree with the statement (see Appendix C).

The term quality management is referred to as integrating previous data and assuring that the data quality fulfils the requirements of the new system (Saade & Nijher, 2015). The system users could believe that the data accuracy fitted the new system without any complications, and the migration was run smoothly onto the applied system. Another important task of quality management is the involvement of the system users; ensuring accurate data, cleaning up suspect data, and converting data (Umble et al., 2003; Somers & Nelson, 2001, 2004). It is a rather complex task to accomplish and might have been outsourced by Consolis to their consultants, meaning the system users did appreciate the importance of it, yet not how critical it is in relation to ERP success. Moreover, to determine whether the system is complex or not relies on the perceptions of the system users (Dezdar & Sulaiman, 2009), and assuring that the users fully understand the applications of the system lies in the quality management to assess. Yusuf et al. (2004) emphasise that the quality management responsibility is to affirm that the system works
correctly in the operational environment, leading to user acceptance of the system. Either the quality management for the Consolis ERP implementation pushed the users to accepting the system, emphasising user involvement in testing the system and ensuring that there were no corrupt data in the implemented system. Or they did not push for it, and the respondents believed that the quality management still was important, but not to the extent that it implies an overall success of the implementation. To conclude, the survey showed that quality management was not considered critical to the implementation; the system users of the procurement management at Consolis did not perceive that factor to have severe impact on the success of the ERP implementation.

4.2.14 Hypothesis 14: Risk Management

Now for the last hypothesis asking the system users for their perception of importance regarding risk management in the ERP implementation process. This hypothesis is accepted based on a Spearman’s simple rank correlation of -0.312 at a significance level of 0.007 when \( p < 0.05 \) (see Appendix C). The moderate negative correlation coefficient can be interpreted as when the ERP implementation is not successful, the need for risk management is high, or the inverse where the implementation is successful and the need for risk management low.

The descriptive statistics show that the majority of the system users agree with the statement that risk management was important in their previous implementation experience. No system user in the survey disagreed with the statement to any extent; instead, all users either agreed to a greater or smaller extent (72.6%) or did not agree nor disagree (27.4%) (see Appendix C). The mean value of answers is 2.84 when the answers range from 1 to 4. This illustrates that the system users indeed generally agreed with the statement.

Now to interpret the negative correlation between ERP success and risk management as a CSF. The survey answers to the first question reveal that the success of the system users’ previous implementations was not in general very successful. Indeed, 8.2% of the respondents surveyed that they strongly disagree with the statement. In such cases, where the ERP implementation fails, risk management is sure to be important. Troubleshooting, training, being flexible in the implementation are all factors in prior research contributing to risk management (Shaul & Tauber, 2013; Holland et al., 1999; Nah et al., 2001; Finney &
Corbett, 2007; Al-Mashari et al., 2003). When an implementation is going poorly, naturally the ability to find what is causing the problems, training to avoid it happening again and being sufficiently flexible in the process to recover from the problem and move on is vital for the implementation to succeed ultimately. The hypothesis could be accepted based on the hindsight of the system users who experienced a failed implementation; if we had been able to locate the source of the problem, if we would have had sufficient training or if we had not been so rigid in our process, then the project would have been more successful.

Aloini et al. (2007) discussion regarding risk factors in an ERP project is viable to mention here; risk identification, analysis, evaluation and treatment all include an inherent skill to foresee failure before it can happen and mitigate the possible damage before the problem actually is realised. Failing an implementation can, as discussed throughout this study, be due to a myriad of reasons, however, being able to spot the major flaws when designing an implementation strategy as well as during the process is vital to the success of the project (Aloini et al., 2007). This could be the underlying reason for why this hypothesis is statistically significant and hence accepted. Discussing the hypothesis with an inverse scenario in which the implementation goes smoothly; in this case, the perceived need for risk management is low. It could, however, be the case, which when the implementation is successful, so is also the risk management however it is not noticed by all system users. Spotting the problems before they can be noticed by the system users so their work can flow as usual would mean that the system users cannot appreciate the importance of risk management when the implementation is successful. To conclude, risk management is considered a critical part of success in the ERP implementation process by the system users of the Consolis procurement management and the hypothesis is hence accepted.
4.3 The Key CSFs

Daniel (1962) states, as previously mentioned that a company can be influenced by three to six key factors. To conclude the results and analysis chapter, we can after surveying the system users within procurement management at the three offices of Consolis argue that four key factors influence the success of an ERP implementation. These are specifically; training and education, change management, ERP selection and risk management.

The next step of this study will be to conclude our findings and to answer our research question and ultimately fulfil our research purpose.
5. Conclusion

In this chapter of the thesis, we will briefly summarise the study and draw conclusions related to the purpose of the study, as well as the research question of the study.

5.1 Summary

As modern companies worldwide face an ever-increasing degree of globalisation, the need for a constant flow of information is intensified (Zabjek, Kovacic & Stemberger, 2009). ERP systems have become vital to companies in their efforts to hasten and sharpen the flow of information, however implementing an ERP system is complex and costly (Gibson, Mentzer & Cook, 2005). Much research has been done on what makes an ERP implementation successful, however the research is fragmented and skewed to the perspective of the management (Daniel, 1961; Davenport, 1998; Nah, Zuckweiler & Lee-Shang Lau, 2003; Somers & Nelson, 2001, 2004). In this study, we focus on system users within procurement, a part of the supply chain in which a steady flow of information is paramount and a well-functioning ERP system is vital. Researching the correlation between the CSFs mentioned in prior research and the perception of the system users shows us that there exists a gap between the two and that the perspective of the system user needs more academic attention. We can however, with our study identify four CSFs from prior research that correspond well with the system users’ perception of what goes into a successful ERP implementation; training and education, change management, ERP selection and risk management.

5.2 Purpose and Research Question

To fulfil the purpose of this study, a research question is formulated: What factors derived from prior research does a system user regard as critical to a successful ERP system implementation in the context of procurement management? The questions in our survey test ERP system users’ perspective on how well ERP implementation success correlates with the CSFs cemented in previous research. The results of the survey show us that four out of the fourteen CSFs from prior research are deemed critical to ERP implementation success by the system users; training and education, change management, ERP selection and risk management. The results
illustrate that there is a gap between the perception of management and system users regarding what makes ERP implementations successful. We can however see that the system users recognize varying importance of other CSFs, but that they are not critical to ERP implementation success. The purpose of this thesis was to *identify critical success factors in ERP implementation from a procurement system user perspective*. We have fulfilled this purpose by identifying four CSFs from prior research that are recognized by the system users within procurement management to be vital before, during and after an ERP implementation. The 10 other hypotheses that were condensed from prior research were not statistically significant when correlating them with the success of an implementation.
6. Discussion

In this chapter of the thesis, we discuss our thoughts regarding our contributions to research, the limitations that we faced that might have impeded the quality of the study, and finally we discuss how future research can be built upon our study.

6.1 Contributions

The purpose of this study was to delve deeper into the fairly underdeveloped area of research regarding CSFs in ERP implementation from a system user perspective, rather than from a pure management perspective. This study was a first step in order to determine what types of critical success factors is needed in an ERP implementation both from a management and a system user perspective. By comparing the CSFs broadly accepted as true by prior research with the perceptions of system users within an area of expertise in which the ERP systems fill a crucial function, the research area is expanded. Through a thorough overview of existing literature within the area, the most commonly cited CSFs were condensed; this condensation adds to the research as it compiles much of the research made earlier within the field. By comparing the correlation between these CSFs and the perspective of the system user, clear gaps in perceptions could be identified. The managerial implications from this study are that there clearly remain issues in the ERP implementation process and it would be in the interest of all companies to revise their implementation strategies to involve the system users to a greater extent. The academical implications of the study are that there exist vast gaps between what has been investigated within the field of ERP implementation and the perception of the system users. These gaps can be used both by companies searching to understand what makes an ERP implementation work with regards to their system users but also by researchers when conducting further research within this field. While the study is based on one case company, the outcome can very well be generalized to other similar companies whose procurement management is of vital importance. Since Consolis is a MNC and the study focused on three offices in different parts of the world, it could be argued that the outcome can be generalized geographically as well. This point will however be further discussed in the section about future research.
6.2 Limitations

Whereas this study contributes to research by discussing a rather underdeveloped niche of ERP implementation research as well as delving deeper into detail by examining a part of the supply chain in which the information flow is critical to a point, there are limitations to it. The fact that only one company was used to do research on limits the outcome of the study. Using a broader array of companies and by doing so, getting a more diverse base of respondents could have provided a sturdier outcome. The fact that Consolis was the only company used for this study was due to time constraints and access to other companies similar to Consolis. Finding new nuances of a phenomenon like ERP implementation success was furthermore difficult to achieve when conducting this quantitative study; however, the aim was rather to distinguish the perceptions from one user to another than to find new underlying factors. For instance, there might be different perceptions of what an ERP implementation success are depending on who is asked, which could affect the outcome of this study. The use of Spearman’s simple rank correlation and descriptive statistics could also have limited the results of our study since Spearman’s simple rank correlation only measures monotonic relationships between two variables. Using a regression analysis for example could have provided us with more explanations to the outcome of our survey, however the choosing the right additional independent variables would have been difficult since it would require another study to find out which variables that impacts each CSF from a system user perspective. Furthermore, the purpose of the study was to identify which CSFs from prior research correlates with the perceptions of the system users; this is why Spearman’s simple rank correlation is deemed as most fitting and hence utilized. The study could also be limited by the population that we can reach; it is relatively limited. However, the purpose of the study calls for not only ERP system users, who can be hard to define and hence find, but also ERP system users who have experienced an implementation first hand. These conditions limit the study; however, they are vital for the research to be valid and credible.
6.3 Future research

Since this study focused on system users within one single company, the results are only partly generalisable. Further research could focus on more companies from different industries in order to study if there are differences from one industry to another; or from one part of the company to another. Moreover, focusing on companies from various locations across the world could be of interest, since size, organisational structures and culture could very likely have an impact when trying to succeed in implementing a new system. Different tools for analysis can also be used in future research, such as a regression analysis, in order to delve deeper into what can affect the perceptions of the system users. This was not carried out in this study since the purpose was solely to examine how the CSFs from prior research correlated with the perceptions of the system users. When conducting a regression analysis, separate CSFs could be considered to be able to draw conclusions on what exactly impacts each CSF from a system user perspective. Regression analysis could also be utilised to examine if certain characteristics of the system users affect which CSFs that are considered important; for example age, education and position within the company. Using other independent variables, like mentioned above, could also be interesting to see if it would yield different outcomes. This study focused on the procurement management - further research could study if there are differences in perceptions of system users within other segments of a company. A qualitative study could also be conducted with the system user in focus; since there is an apparent gap between the CSFs constructed with a management mindset and the perception of the system users, it is possible that other factors can be revealed through interviewing the system users.
7. Reference list


Appendices

Appendix A - Introductory letter

Hi,

We are Jonathan and Daniel, two students from Jönköping International Business School conducting research for our master thesis in logistics and supply chain management. First and foremost, we would like to thank you for agreeing to take part in this survey measuring critical success factors in an ERP implementation from a system user perspective.

Previous research has identified critical success factors that have had great influence when implementing an ERP system. However, most of them have been conducted with a top management point of view and not been focused on the employees actually using the system on a day-to-day basis. We think that the perception of the system user should be of utmost importance when determining what makes an ERP implementation successful and hence, this is what we want to research.

This survey helps us test the applicability of each critical success factor that has been identified in relation to you, the system user. As there are many definitions on “success”, we have predefined what we mean by an implementation being “successful”. A successful ERP implementation, according to the definition that we derived from literature, should lead to:

1. The system user improving individual productivity,
2. Increased information timeliness, accuracy and reliability, and
3. Easily understood business functionalities.

We are sure that your personal perception of what a successful ERP implementation is somewhat in line with these three dimensions, but please do keep them in mind when answering the first question. When rating the importance of the different success factors, please be as honest as you can. We will keep your answers anonymous and should you wish to get to know the results of the research we will be happy to share it with you once the thesis is completed.

Thank you for your cooperation!

Jonathan Arvidsson & Daniel Kojic
Appendix B - The Questionnaire

Please rate the following factors in terms of importance when implementing an Enterprise Resource Planning (ERP) system. Each statement is to be answered with a number from 1 to 7, where:

1 = Strongly disagree
2 = Disagree
3 = Disagree somewhat
4 = Undecided
5 = Agree somewhat
6 = Agree
7 = Strongly agree

1. The previous ERP implementation was successful.
(See definition of successful in the introductory letter)

2. Top management commitment was important to the implementation.
(Top management support, top management involvement, top management knowledge)

3. The implementation strategy was important to the implementation.
(Integration strategy, time schedule, software testing)

4. Communication was important to the implementation.
(Open communication policy, interdepartmental communication, continuous updates regarding implementation)

5. Training and education was important to the implementation.
(Continuous training of employees, education regarding new business processes)

6. The composition of the implementation team was important to the implementation.
(Implementation team competence, project champion competence, implementation team
Appendix

7. Change management was important to the implementation.
   (Program for constant feedback, monitoring achievements, reporting responsibility)

8. User involvement was important to the implementation.
   (System user knowledge utilization, system user inclusion, system user participation)

9. Business process reengineering was important to the implementation.
   (Process adaptation, new process standards, new business process skills, job redesign)

10. Use of consultants was important to the implementation.
    (Consultants as educators, consultants as support functions, consultants as programmers customizing software)

11. Project support was important to the implementation.
    (Continuous support system, ever-present maintenance functions, vendor support)

12. Careful ERP selection was important to the implementation.
    (Vanilla implementation approach, organisational fit, compatible business processes, vendor reputation)

13. Project management was important to the implementation.
    (Project planning and control, time management, critical paths of the project, defining project scope)

14. Quality management was important to the implementation.
    (Data integration, data accuracy, cleaning up unnecessary data, system reliability, system integrity, software compatibility)

15. Risk management was important to the implementation.
    (Troubleshooting, flexible implementations, foreseeing project risk)
### Appendix C - Data results

#### Reliability Statistics

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** Correlation is significant at the 0.01 level (2-tailed).
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