CRITICAL SUCCESS FACTORS OF IMPLEMENTING AN ERP SYSTEM FOR GROUP OF COMPANIES IN SRI LANKA: A CASE STUDY OF THE CAPITAL MAHARAJA ORGANISATION (PVT) LTD

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Declaration

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Dr.Shehan Perera   Date:

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Abstract

Enterprise Resource Planning is an integrated IT solution system which supports an organisation in the incorporation of information from all internal departments vertically & also connects the suppliers and the customers. ERP implementation deals with many stakeholders and various teams and it requires a coordinated effort of all stakeholders and the teams within the organisation. Although ERP is a supportive system which helps an organisation improve its processes, it takes a long period of time to implement and is involved with a substantial risk as well as a major investment.

The purpose of the study is to identify the critical factors that contribute to the successful implementation of the ERP system. This study has been focused on a qualitative basis and the qualitative data were gathered from interviews, which were conducted in a group of companies in Sri Lanka. For this study, ten respondents were selected as the sampling frame and the data collections were conducted by the researcher through individual company basis. In this study seven variables have been identified as the independent variables and one variable has been identified as the dependent variable. Based on the relationship between independent variables and the dependent variable, seven hypotheses were developed. The collected qualitative research data has been analysed using the thematic analysis which is supported by the ground theory. Based on this analysis it was concluded that there is a relationship between all the independent variables and the dependent variable of the study. All the hypotheses which were developed at the beginning of the study were supported and several recommendations have been made according to the findings of the study. Getting all the team members involved in the decision making process, getting the contribution of the top management and to continue with a two-way communication system are some of the recommendations of this study.

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Abbreviations

ERP	Enterprise Resource Planning
SQL	Structured Query Language
SAP	Systems, Applications and Products
IT	Information Technology
GT	Grounded Theory
CIO	Chief Information Officer
IQ	Intelligence Quotient
BPR	Business Process Reengineering

1. CHAPTER ONE

INTRODUCTION

1.1 Chapter introduction

This chapter provides an overview of the study and also discusses the overview of the research and related areas which are important to implement an ERP system such as what an ERP system is, the purpose of the ERP system and the processes which should be included in implementing the ERP system successfully. The purpose of the research, background of the research, preparation of the research problem, objectives and significance of the study have been explained briefly in the following section.

1.2 Research Background

Nowadays, organisations are affected by the globalization of market and dramatically changing economies. In order to align with these unsolidified situations, the use of technology including information communication systems is almost compulsory. Particularly, the implementation of Enterprise Resource Planning (ERP) systems are the key since the IT systems are involved in the collaboration of all the activities of the organisation and have become a significant factor for current businesses. As cited by Zhang et al., (2005) ERP systems are information systems packages that incorporate information and information based practices inside and across all functional areas in a business organisation (Kumar et al., 2000). This growing demand for ERP application is derived through some factors such as the expectation of revenue growth, competitive pressure to become a low cost producer, expectation to re-engineer the business in order to respond to the market challenges and the ability to compete internationally in this highly competitive global business arena. An ERP implementation project is complex in nature; it involves a lot of people, requires the coordinated effort of multiple teams and should deal with resistance to change within the organisation. It also needs a considerably high investment and has a long completion period. A successful ERP implementation requires the commitment of all stakeholders. ERP systems have fundamentally changed the way of doing work in organisations. The total size and complexity of ERP implementation make managing these projects difficult. There are two main aspects of ERP implementation management. These are people and technology. A country like Sri Lanka faces complexities in both these areas. An ERP

package is able to re-design the entire organisation and can affect most business processes and employees. The scope of an ERP can be so broad that it is impossible for each person in a team to know every aspect of the business or its processes.

Many successful cases of ERP system implementation have been found in literature. However, the majority of organisations have announced their ERP systems as failed projects. When considering Sri Lankan businesses, they have a lower level of technological resources. As a result, Sri Lankan firms face more difficulties which cause them a huge loss of money and time. As cited by Shatat, (2015), failure of the ERP system will certainly cause a huge loss for the organisation and may even lead to bankruptcy (Davenport et al., 2004).

Defining the factors that are placed behind a fruitful ERP implementation has been a key issue in the literature. Implementation of an ERP system is considered as a complex process including more factors and situations that can possibly have an impact on successful implementation. These factors may have a direct impact on the ERP implementation project outcome, whereas the absence of these conditions can produce trouble through ERP implementation. As Zhang et al., (2005) has stated in the literature, difference concerning what factors are important for successful ERP implementation or accountable for its failure. According to Nah et al., (2003) critical success factors that affect ERP implementation projects have been examined from different points of view. Most of the researchers have identified a range of   factors that might be important to the success of an ERP system implementation. For example, education towards the new business processes, top management support, user training on software, project management, cultural and structural change management, clear understanding of strategic goals, good implementation team and data accuracy, (Somers and Nelson, 2004; Al-Mashari et al.,2003; Umble et al. 2003; Dezdar and Sulaiman,2009) are some of these factors.

1.2.1 What is ERP?

An ERP system is recognized as a technological substructure that can assist an organisation in incorporating information from all internal departments with suppliers and customers (Shatat, 2015). It connects all business areas in an organisation's internal functions and processes with external ones to create a close association between both customers and suppliers. Understanding the need for internal integration, many

companies have replaced or are currently replacing their old standalone back-end systems with newer ones using DBMS and ERP systems. ERP system can handle all the business processes from supply chain management to customer relationship management such as material management, production planning, inventory control, sales, finance and human resource management. The total business process can be managed by the correct adaptation of ERP and it can add value to each business process from different perspectives. Some of the values are information processing activities, business process and management activities. In fact, an ERP system will provide competitive advantages for the company by various means. The setting up of an ERP system in a company successfully can provide many benefits and add business values to its processes and will ensure smooth business activities. It will help to increase the revenue by reducing the operating & manufacturing/service cost.

1.2.2 Evolution and Background of the ERP System

During the 1960s most organisations designed, developed and implemented centralized computing systems, regularly computerizing their inventory control systems using inventory control packages. These were legacy systems based on programming languages which did not have many powerful features at that time.

Enterprise Resource Planning has evolved from its predecessor, Manufacturing Resource Planning. During its formative years in the 1970s, Manufacturing Resource Planning was referred to as Manufacturing Requirements Planning. Manufacturing Resource Planning and the first ERP systems were designed as an 'organisational and scheduling tool for use in manufacturing firms. The purpose of the next generation ERP software systems stretched beyond the confines of what it could do for an individual manufacturing firm's internal use and began including customers and suppliers. It wasn't long before other industries began to recognize the benefits of ERP systems; government agencies and organisations in the service sector began to get attracted to the advantage of this new technology.

During the 1970s, hardware and the first PCs were growing fast. A shift towards business processes and accounting capabilities began to emerge. In this time, companies such as Oracle, JD Edwards and SAP were formed, and it was Oracle that presented the original commercialized Structured Query Language (SQL). The 1980s saw the

creation of closed-loop business processes with MRP II, which was largely supplied by IBM.

The 1990s was a time of extensive growth in Information Technology, particularly with ERP software systems that were meant to integrate businesses processes throughout every functional area of the business. "Purchase-to-pay" and "order-to-cash" were being incorporated more and more regularly. New developments and the number of options in both software and hardware grew quickly, but by the early 2000s, the key software vendors began to merge. This resulted in the end of many vendors, but Oracle and SAP were the big software firms that weathered the storm. To facilitate the environment of planning and initiating, accounting, HR and supply chain business process software suites grew their functionality. figure 1-1 graphically presented the evolution and background of the ERP system

1960 • Inventory Control Packages

1970 • Material Requirements Planning (MRP)

1980 • Manufacturing Resources Planning (MRP II)

1990 • Enterprise Resource Planning (ERP)

2000 • Extended ERP

Figure 1-1: Evolution and background of ERP System

1.3 Research Problem

In the past three decades, companies all around the world have implemented Enterprise Resource Systems. Following the international inspiration, many companies belonging to different industries in Sri Lanka including telecommunication, product manufacturing, healthcare, insurances, etc. have also adopted ERP systems.

However, the success of implementation is less than half as an average. The scenario for implementation of ERP system for a multidimensional group of companies is very different from a single business entity. These implementations have been done with limited resources, communication problems, cultural issues and absence of evaluating their competence and capabilities. Thus, these implementations are less likely to survive and tend to fail. In the Sri Lankan context, ERP awareness among top managers is very limited. That is because many of them are reluctant to take on the risk of an ERP implementation and rely heavily on legacy systems. These managers do not have confidence over what an ERP is able to offer them. In addition, culture and knowledge in Sri Lankan companies are extremely limited and most organisations have internal departmental conflicts. Successful implementation is solely dependent on the collaboration between departments within the organisation. Implementation of ERP in the organisation highly depends on the computer literacy of employees. End users are considered as the key stakeholders of maintaining perfect ERP operations. Labour incentive industries in Sri Lanka still expect cheap labour with less literacy. Moreover, project management is considered as one of the major factors and the qualified and experienced project manager is behind the success of the project. As Sri Lanka does not have much evidence on finding perfect ERP implementation, the project manager's duty is a challenge.

The implementation of an ERP system is a time consuming and complex project where organisations find great opportunities whilst experience a massive risk. In order to get benefits from potential opportunities, it is necessary to concentrate on the factors that help a successful implementation of ERP. Being conscious of these factors, an organisation can positively impact the success of the project's implementation and efficiently reduce the project's risk. Considering these critical success factors have great importance whenever a new system is to be adapted or a running system requires to be replaced or upgraded.

1.3.1 ERP implementation needs

The business environment is rapidly changing. Companies today face the challenge of increasing competition, expanding markets, and rising customer expectations. This intensifies the pressure on companies to lower the cost involved in the entire supply chain, shorten output times, considerably reduce inventories, expand product choice, provide more steadfast delivery dates and better customer service, improve quality, and efficiently coordinate with global demand, supply, and production.

Some companies chose to adapt an ERP implementation because of their needs to integrate different systems throughout the enterprise to face the competitiveness of the business. Companies can maintain all the business process through one system by integrating with each sub-systems such as Finance, Human Resources, Logistics, Sales, Marketing etc. By using one system from all process of the business, it will help the middle management to manage their process smoothly and help top management to get accurate decisions based on facts.

1.3.2 Processes of ERP implementation

Implementing ERP is hard work for any kind of company. Following are the basic processes to ensure ERP implementation will be a success.

- Identify correct product for the organisation
- Identify a correct internal team
- Implementation process (Actual)
- Cut over and go live
- After go-live support and maintenance

1.3.3 Why ERP fails

Most of the time ERP implementations fail because of not following the proper processes in implementation. Not only those processes, there are many other factors also that affect the failure of ERP projects such as lack of knowledge about ERP implementation and employee engagement etc. The most successful ERP projects always consider all the areas which influence when implementing the ERP system.

Specifically, the research problem being addressed in this study is to. identify the critical factors for implementation and how the success of an ERP implementation can be ensured.

1.4 Research Question

To find a solution to the research problem stated in section 1.3, it is necessary to find answers to following research questions:

- What are the critical success factors that help in implementing the ERP Systems?
- What kind of areas should we consider to make a successful ERP system?

1.5 Objectives of the Research

The main objective of this research is to identify successful implementation of the ERP system in multidimensional large-scale Sri Lankan organisations. This article has explained the processes and factors which should affect the successful implementation of an ERP system and offers real world advice to help ensure that the implementations are a success for a group of companies.

1.5.1 Sub-objectives of the research

- To analyse Sri Lankan case studies for the people who are interested to gather knowledge about the ERP implementation process. It will be very helpful to the local audience because Sri Lankan case studies are very limited to be found within the local environment.
- Researchers have developed a conceptual framework with the gathered information from past research studies and literature with reference. Persons who are referring this case study can easily find out the other related literature to get more knowledge about the domain.

1.6 Significance of the Research and Contribution

1.6.1 What are the solutions derived from this research?

Basically, this study investigates the critical success factors of implementing an ERP system. Investigating the critical success factors will help the organisation to decrease time and cost of its operations. Through this study, the company can improve the information flow within the organisation that will facilitate the decision making and organisational activities. In addition, this study will help to improve the majority of areas such as order preparation time, size of the inventory, standardization of human

resource information, enhancing product diversity, inventory delivery on time, standardization of production processes, etc. Improvement of these areas helps the organisation to get competitive advantages over their rivals.

1.6.2 Who are the people benefiting from this research?

This research provides a roadmap to the company under discussion. The Top management and all Heads of departments will be benefited through this study. This can be used for companies in similar industries to improve their existing processes and create competitive advantages over competitors. In addition, this study provides empirical evidence to the existing literature which will help researchers to further investigate this area. This study provides guidance to the students who are interested in the field of ERP implementation.

1.7 Scope and limitations of the research

The scope of this particular case study has been limited to the starting and ending of the implementation of ERP due to the fact that it has been identified with an area which has been subjected to research studies earlier. Furthermore, this research is only focused on the large-scale multidimensional group of company organisations in Sri Lanka. The case study approach is conducted in terms of eight large-scale organisations in Sri Lanka due to limitations in time and available resources.

This case study does not have information on costing or after implementing a process such as profitability, productivity etc. This will be more helpful to IT staff, IT Managers and the top management to make correct decisions for the relevant process and who are involved directly to change or implement the ERP system.

1.8 Company Background

The Capital Maharaja Organisation Limited is one of the largest privately held group of companies in Sri Lanka. It comprises over 20 operating companies, divided broadly into spheres of activities. Those are multifaceted, a multidimensional group whose activities span manufacturing, marketing, exports, communication, media, information technology, foods, packaging and more. Their slogan is "The Courage to be Different". They are doing many new innovative changes to show their uniqueness and they are unique among others.

The change we are addressing in the case study is, Implementing new Enterprise Resource Planning (ERP) process in The Capital Maharaja Organisation Limited.' This is important as it affects after implementing IT systems in the organisation. This is more important in manufacturing and other service sector processes to go smoothly without having any unnecessary cost and time wasting. There were many requirements to change prior to implementing the ERP system. Previous BIPIX ERP system is over 15 years old and hardware was reaching the end of life. A service agreement with IBM will be expiring soon and they are not in a position to renew the agreement any further. The company's best option was to go for a suitable new ERP system.

In this document will be discussing the steps and procedure to manage the change to SAP ERP system from BIPIX. Through this ERP implementation change procedure, there were various issues that had to be dealt with. Total IT infrastructure of the organisation had to be changed for this and on the other hand there were some parallel projects with ERP. Another one that had to be changed was the employees' attitudes, especially the ones who have been there for many years, were not likely to embrace with arms wide open. Employees are bound to resist such a change, which would not only put them at great difficulty but also, contribute towards many factors such as employee dissatisfaction, fear of technology etc.

This change affected the entire organisation including IT infrastructure, IT users, non-IT users and the senior management. This ERP change was one of the biggest challenges that the organisation faced and the organisation's entire production plan had to go through this system. Therefore, there should not be a single error while the system was going live.

Otherwise, the entire production process may be error prone. Therefore, this was a very crucial process from the organisation's end. On the other hand, system users should be well trained for the brand-new change in the organisation, starting from the bottom level.

1.9 Chapter Summary

This study is carried out in order to investigate the critical success factors in the implementation of the ERP system with reference to the Sri Lankan context. In addition, this study addresses the issues in relation to a well-established group of companies in Sri Lanka. Currently, almost all companies in the world including Sri Lanka have experienced the high level of global competitiveness. It might cause huge changes in the business processes. The one key tool that will help to cope up with these changes is technology. As a result, present organisations are making an attempt to implement ERP systems in their organisations. This is basically to reap the positive results from the existing competition. It integrates all the internal departments together and provides better satisfaction to the customers as well as the suppliers. It also provides many advantages to the organisation. Most of the time their implementation of ERP will not be successful. It may be due to several factors including top management support, user training on software, project management, cultural and structural change management etc. These factors are considered as critical success factors that affect the successful implementation of an ERP system in the organisation. This study attempts to investigate the most influential factors that affect the successful implementation of an ERP system. In addition, this study investigates the applicability of the critical success factors in the implementation of this ERP system with reference to a group of companies in Sri Lanka.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

The previous chapter discussed the background of the study and provided an overview of the entire study. This chapter discusses the theoretical background on ERP and its implementation related factors. Most companies in the world are using enterprise resources planning (ERP) in order to respond to the growing global competition. Hence, it is important to concentrate on ERP and the factors that affect its successful implementation within the business. Initially, it provides an introduction to the ERP (section 2.2). Secondly, it elaborates the critical success factors of implementation of ERP (section 2.3). Then it discusses the empirical findings (section 2.4), conceptual framework (section 2.5) respectively. Finally, it provides the chapter summary (section 2.6) at the end of this chapter.

2.2 Introduction to ERP

According to Kumar et al., (2000) Enterprise Resource Planning (ERP) system is a configurable information system package which has the capability of incorporating information and information-based processes in and across areas in a business organisation. On the other hand, this ERP system can be defined as the core software in a firm that is used to manage various information among every area of the business. ERP implementation supports the organisation to manage enterprise-wide business processes by one shared database and common management through IT tools.

2.2.1 Need of ERP

The need for integration becomes significant with organisations converting from the functional style of operation to a business process structure where total departments cooperate together to obtain the essential business objective. This change is replicated in the need to incorporate various technologies from diverse departments, to combine business units into an amalgamated software and database, and to increase business performance through having the best insight of the organisation's information (Magal and Word, 2009) that can be obtained by using ERP system as the stage for business incorporation.

Enterprise resource planning system helps the organisation to systemize their business processes by synchronizing the information between departments. Monk and Wagner, (2009) have considered this as a significant advantage of this system. It gives the business organisation with cross-functional enterprise software with combined modules for every department with a unique database for all of them (Magal and Word, 2009). This enables the organisation to make it easier to control, implement, store data and monitor the main business processes including production, procurement and completion processes. In addition, functions of other departments such as sales, marketing, human resources, and accounting and production units are benefited. This integration is very much needed for any kind of business. That is because the ERP system provides solutions to the negative silo effect that a legacy system has. The ERP implementation project is reflected as a complicated project since it engages more steps and it is related to all aspects of the business which needs a teamwork and incorporation between all functions of the business. These functions comprise of finance, human resource management, information technology and manufacturing. This is the project which will influence the future of the business on a strategic level. Successful implementation has a high level of positive influence in a business organisation. In a nutshell, a failing ERP implementation project will have a core negative influence on the implementing organisation. Thus, most of the considerations and critical success factors have to be well thought of and more faults and risks have to be avoided to see this project as an effective and successful one.

Not only ERP has advantages to the business organisations but also it has some drawbacks. Regardless of the possible advantages discussed, ERP systems are likely to be very large, complex and expensive (Mabert et al., 2001). In addition, ERP implementation needs a huge time commitment from the information technology department of the organisation or outside professionals. Then, ERP systems influence many core departments in an organisation. They are likely to build changes in more business processes. Moreover, implementing ERP needs a new set of procedures, employee training and technical and managerial support (Shang and Seddon, 2002).

2.2.2 Evolution of ERP

Initially, inventory control was the main concentration of manufacturing companies in the 1960s. These companies were able to maintain many inventories on hand in order

to fulfill customer demand and still be competitive. Accordingly, methods concentrated on the competent way to control a large volume of inventory. According to Ptak and Schragenheim, (2000); Shankarnarayanan, (2000) many software packages were formed to handle inventory relying on conventional inventory concepts.

Companies were unable to afford the luxury of keeping a large volume of inventory in the 1970s. This provided the opportunity for the introduction of material requirements planning systems (MRP). MRP denoted a giant stage forward in the material planning phase. For the first time, using a master production schedule, supported by the bill of material files that identified the specific materials needed to produce each finished item, a computer could be used to calculate gross material requirements. The accessible quantity of on-hand or scheduled –to-arrive materials could be used using the accurate inventory records in order to determine net material requirements for each stage of the production. Then, activities such as placing an order, abandoning an existing order or modifying the timing of current orders were promoted. There was a formal mechanism for the first time in order to keep priorities valid in a challenging manufacturing environment. As Ptak, and Schragenheim, (2000); Shankarnarayanan, (2000) have pointed out, the capability of the planning system to systematically and effectively schedule all activities was a fabulous step forward for both quality and productivity.

So far, in manufacturing, production priorities and material planning ~~was~~ the only portion of the problem. An equal challenge represented by capacity planning. In response, methods for capacity planning were included in the fundamental ERP system capabilities. Tools were created to help the planning of cumulative production and sales levels (sales and operational planning), the growth of a certain build schedule (master production scheduling), high-level resource examination (rough-cut capacity planning) and estimating, sales planning and customer order promising (demand management). Scheduling methods for the workshop floor and supplier scheduling were integrated into the MRP systems. When this happened, the user started to consider their systems as enterprise-wide systems. This progress developed in the next evolutionary phase that became known as closed loop MRP.

In the 1980s, companies began to take advantage of the increased power and affordability of available technology and could couple the movement of inventory with the coincident financial activity. Manufacturing resources planning (MRP II) systems

grew to incorporate the financial accounting system and the financial management system along with the manufacturing and materials management systems. This allowed companies to have a more integrated business system that derived the material and capacity requirements related with the desired operations plan, allowed input of detailed activities, translated all this to a financial statement, and suggested a course of action to address those items that were not in balance with the desired plan.

Continuous improvement in the technology enabled MRP II to be extended in the 1990s in order to integrate all resource planning for the whole organisation. Then the plan was included in information warehousing, capacity planning, product design, communication systems, materials planning, project management, finance and human resources. Therefore, the ERP was invented. According to Ptak, and Schragenheim, (2000); Shankarnarayanan, (2000) ERP can be used not only in the manufacturing organisations but also in any company that needs to increase the competitiveness through most efficiently using all its assets like information.

2.3 Critical success factors of the implementation of ERP

Deciding the factors which are instrumental in a fruitful ERP system execution has been a major research problem in previous studies. According to Nah et al., (2003) critical success factors of ERP implementation projects have been examined from several different perspectives. According to Doom et al., (2010) critical success factors that affect the ERP implementation are the factors where ERP execution can be assessed to its accomplishment.

This study would discuss 27 significant critical factors available in the literature with regard to the ERP implementation. Those factors will elaborate how ERP project goes live effectively and can be mentioned as follows.

2.3.1 Top Management Support

According to Ang et al., (1995); Duchessi et al, (1999) most of the researchers have emphasized the significance of the top management support in a successful ERP implementation. That is because ERP systems are normally large-scale and need broad resources (Ngai et al. 2008). A full cooperation of bottom line and staff members from all sections of the business is needed for this highly incorporated system, its design, execution and operation. As found in the literature, top management is playing a

significant role in settling disputes and in giving clear signals to any doubts. According to Slevin and Pinto, (1996) top management is needed to give required authority and resources for the success of the particular project.

When it comes to the role of top management in the implementation of ERP in the organisation, there are two main facets. Their first role is to provide leadership and their second role is to provide required resources to the project. They need to monitor the execution progress and give a clear path of the project. According to Umble et al., (2003) there are several responsibilities of the top management in ERP implementation such as developing an understanding of the limitations and capabilities, exchanging the company's strategy with all members in the organisation and representing commitment and creating coherent objectives for the ERP implementation. ERP implementation in the organisation doesn't engage changes in software systems usage, rather it engages the relocation of an organisation and conversion of all business practices. Thus, top management of the organisation should provide their assistance openly, clearly and sincerely in order to highlight the preferences of the ERP implementation (Somers and Nelson, 2004).

2.3.2 Project Management

Project management can be defined as the ongoing management of the project implementation plan. Since ERP implementation is a distinctive process it needs organisation-wide project management. Thus, it contains a planning phase, provision of responsibilities, the explanation of milestones and critical paths, determination of measures for success and training &human resources planning (Al-Mashari and Al-Mudimigh, 2003). In addition, this includes a clear definition of objectives, development of both a work plan and a resource plan, and careful tracking of project progress (Davis and Wilder, 1998; Laughlin, 1999). In addition, the project plan should establish aggressive, but achievable, schedules that instil and maintain a sense of urgency (Laughlin, 1999). A clear definition of project objectives and a clear plan will help the organisation avoid the all-too-common ''scope creep'' which can strain the ERP budget, jeopardize project progress, and complicate the implementation progress (Laughlin, 1999; Minahan, 1998). The project scope must be clearly defined at the outset of the project and should identify the modules selected for implementation as well as the affected business processes. If the management decides to implement a

standardized ERP package without major modifications, this will minimize the need to customize the basic ERP code. This, in turn, will reduce project complexity and help keep the implementation on schedule (Sherrard, 1998). Constant project management enables the organisation to stay on the important perspectives of the ERP implementation and guarantees that schedules and timelines are met.

2.3.3 User Training and Education

ERP is a complex system, thus sufficient training and education should be offered to allow users to use them properly (Correa and Cruz, 2005; Zhang et al., 2005). According to Mandal and Gunasekaran, (2002) ERP training and education can be defined as the process of delivering to the management as well as the employees with the logic and general concepts of the ERP system. One major reason to fail projects in the implementation phase is the lack of proper training. As Nah et al., (2003) have elaborated, adequate training on the ERP system can enhance the potentials of ERP system implementation's success. On the other hand, absence of adequate training can obstruct the implementation. It has been confirmed by Somers and Nelson, (2004) by stating that there may be drastic consequences in implementing an ERP system without sufficient training and education. Not only that, sufficient training and education on the ERP system may also help the business organisation to create optimistic attitudes towards the system. Bradley, (2008) has explained that training and education enhance the ease of use and decrease user resistance whilst increasing the possibility of ERP system use as well as its success. The main aim of the education and training program for ERP implementation is to make the user comfortable with the ERP system as well as to enhance the proficiency and knowledge of the people.

2.3.4 Business Process Re-engineering

Hammer and Champy, (1993) have explained business process re-engineering as the basic rethink and essential redesign of business processes to accomplish a significant growth in modern measures of performance. For instance; quality, speed, cost and service. Somers and Nelson, (2004) have pointed out that business process re-engineering plays an important role in the initial stages of implementation. This may involve changes in the required business processes in which organisations are conducting their routine activities and might result in changing staff's responsibilities (Holland and Light, 1999; Hong and Kim, 2002; Yusuf et al., 2004). Business process

re-engineering needs to continue with novel ideas and updates which have complete advantage of the ERP system when the system is in use (Nah, 2003). The execution of ERP needs examination of many business processes, which is supposed to be one of the vital and useful results of the execution of ERP system.

2.3.5 Team Composition

An ERP implementation works on all functional areas of the organisation. According to Somers and Nelson, (2001) cooperation and involvement of business, technical experts and end users is essential for successful ERP implementation. The competence as well as the skills of the project team is also a major determinant that affects the success of ERP implementations. More skilled and experienced project team members have a better chance for the success of the project (Wong and Tein 2004). In addition, ERP teamwork and composition is very important throughout the ERP life cycle. According to Buckhout et al., (1999) the ERP implementation team should comprise of the best people in the organisation. Here, creating cross functional teams is also very important. As Sumner, (1999) has stated, ERP implementation team should comprises of a mix of internal staff and consultants. This provides internal staff an opportunity to create the required technical skills for both design and implementation. The ERP project should be the one and only priority of this implementation team. Wee, (2000) has mentioned that team members are needed to be assigned full time execution. As far as possible, they need to be located together at an allocated location. This allows team members to work together.

By following the views of Wee, (2000), it can be revealed that the team should be allocated adequate compensation as well as incentives. This is given basically for the successful implementation of the system on time and within the given financial budget. As Rosario, (2000) have mentioned, the ERP implementation team need to be familiar with the business functions as well as products. This enables the ERP team to know what necessities have to be done to help major business processes. In addition, partnership trust can be built through sharing information within the company especially between the implementation partners and between partnering organisations (Stefanou, 1999). Moreover, regularly scheduled meetings help to maintain a better partnership between members. Simultaneously, a better partnership can be maintained through incentives and risk sharing agreements. With these findings, it can be

concluded that a project team is significant since it manages the project during the project implementation in terms of both materials related (schedule making, implementation plan) and human related ways (to control user training problems and responsibilities appointments) (Umble et al., 2003).

2.3.6 Effective Communication

For a fruitful implementation of ERP systems, effective communication across the different functions as well as levels of a firm is required. Communication is recognized as one of the major difficult and challenging tasks in any ERP project implementation. As Somers and Nelson, (2003) have mentioned, effective communication is regarded as a critical success factor in the implementation of ERP system by many scholars. Effective communication is needed for building an understanding, a support of the execution and sharing information between the project team members and the entire firm, the results and the goals in each execution phase. Moreover, effective communication enables implementation to begin the required final acceptance in order to obtain approval and user acceptance. Communication is needed to begin early in the ERP execution project to insert the outline of the system and the reason for executing it to be stable and constant. By following the views of Esteves-Sousa and Pastor-Collado, (2000) it can be concluded that internal communication among ERP project team members as well as outward communication to the whole organisation is very important. As Kumar et al., (2003) have pointed out, communication among various functions and levels of ERP implementation projects requires a communication plan to ensure that open communication occurs in the entire organisation and with suppliers and customers. An argument has been provided by Muscatello and Chen, (2008) and stated that communication plans need to set up to keep senior management informed on the subject of ERP project influence, risks, progress and challenges. Communication needs to be carried out during the ERP steering committee meetings and the usual status recording. Two scholars have provided communication tools which are used to keep users informed regarding ERP implementation project progress such as monthly bulletins, newsletters and weekly meetings (Holland and Light, 1999). Communication should be begun early, be constant and continuous and should comprise an overview of the particular system, reasons for implementing the system and objectives on how the business organisation would change and how the system will assist these (Nah and Delgado 2006).

2.3.7 Change management

According to Somers and Nelson, (2003) change management is recognized as a fundamental concern in most of the business organisations engaged in ERP implantation. As they have revealed, the majority of ERP implementations fail to obtain the expected results, probably because organisations undervalue the efforts involved in change management. Organisational change is the body of knowledge which is used to guarantee that a multifaceted change, connected with the new large information system, obtains the right results, in the correct timeframe, at the correct costs (Esteves and Pastor, 2001). Change management engages the initial participation of all people influenced by a change process in order to decrease resistance against these changes. One of the biggest limitations that could be identified in ERP implementation is resistance to change. It has been confirmed by Gupta, (2000) and stated that struggle to change is one of the major challenges faced by the majority of companies. The opposition may be unhelpful because it has the ability to form conflicts between actors, it may be time consuming.

As Davenport, (1998) has stated that the way business organisations do business is required to change and way people do their own jobs also is required to change, in order to have a successful ERP system implementation. A useful technique has been identified by Nah et al., (2001) for recognizing, managing and following changes in executing an ERP system. It is known as a recurrent improvisational change methodology. In this change management process, adequate training is a key element particularly in the IT department as well as an early communication of the changes to give employees a chance to react (Al-Mashari and Al-Mudimigh, 2003). Strategies of the change management should be responsible for maintaining the organisational-wide cultural as well as structural changes. Thus, it is required to educate and train the employees in a number of ways. With that change management aims at avoiding rejections as well as helping acceptance. In addition, participating the employees early in the planning and implementation process is significant to obtain this understanding. A support team should be available during the user training session to simplify and provide answers with regards to the questions related to functions and new processes. As Loh, T.C., Koh, (2004) have stated, an extra assessment with the end users should be obtained in order to avoid discords and provide solutions to uncover problems.

2.3.8 Technology infrastructure

According to Finney and Corbett (2007) it is significant to assess the IT infrastructure of a firm. However, if needed, the infrastructure should be upgraded. Before going for an ERP implementation, an organisation needs to have adequate hardware and networking infrastructure (Jarrar et al., 2000). As Bhatti, (2005) has mentioned even though hardware selection is at the hand of the company, ERP vendors select suitable hardware that support ERP applications. In terms of the technical perspective, the best IT infrastructure helps the firm's vision whilst decentralized and legacy infrastructure can break a company.

2.3.9 User involvement

This refers to involvement in the system change and execution process through representatives of the target user groups (Amoako-Gyampah, (2007). System execution denotes a threat to perceptions of the users and their control over the work and a period of change throughout which users must align with differences between old and new work systems. This factor is effective since it stores supposed control through involving the whole project team. User involvement is needed in the phase where defining the ERP needs for the company and in the phase where ERP is implemented.

2.3.10 Consultants involvement

Since consultants have experience in relation to many industries and broad knowledge about specific modules, many organisations use consultants to support the ERP implementation process (Piturro, 1999). As Thong et al., (1994) have stated, consultants involve performing several functions in a project including recommending a suitable solution, conducting requirement analysis and managing and execution. Businesses need to keep control over all stages of the project through identifying what third parties can control.

2.3.11 Clear goal of ERP implementation

As Slevin, and Pinto (1987) have pointed out, the initial stage of a project should start with a conceptualization of the goals. Goals need to be clarified and provide general guidelines of the project. Before seeking the top management assistance, the goal of the project should be set. Lack of a clear plan leads to failure of the project. As Schwalbe,

(2000) has mentioned, project management needs to specify the goals with respect to time, scope and goals.

2.3.12 Data accuracy

Inaccurate data input into one module will negatively affect the functioning of another module because modules of the ERP systems are interconnected to one another (Umble et al., (2003). If the users input wrong data into the ERP system, it provides misleading outcomes. Therefore, accuracy of the data is considered as a major element of the success of ERP implementation (Duchessi, 1999).

2.3.13 Vendor support

ERP systems are considered as a lifelong commitment for many business organisations (Davenport, 1998). Vendor supports replicates a significant factor with any packaged software. That includes extended technical support, emergency maintenance, special user training and critical updates.

2.3.14 Organisation culture

A culture with shared values and common aims is needed to succeed. (Jones et al., 2006). Business firms need to have a strong corporate distinctiveness that is open to change. Business firms also need to identify the importance of cultural factors, affecting how employees work together and with external partners. Many scholars have investigated the problem of the ERP implementation and have determined the major impact organisational culture plays on the success of ERP implementation (Ke and Wei, 2008).

2.3.15 Avoidance customization of the system

SAP AG offers products that are industry related and this removes the need for costly customization most of the time (Somers and Nelson, 2004). These products are tested working answers which are industry related. Any changes to the modified product are not reinforced by SAP AG. Eluding customization has the same application along all the stages. Customization should be considered when managers are making decisions.

2.3.16 Vendor packages selection

Selection of the package is crucial in terms the budget, timeframe, goals and outcome that design the whole project. According to Janson, and Subramanian, (1996) selection of the right ERP package should match the information needs of the organisation. In addition, it should be ensured that the minimal modification and successful execution is carried out. Selection of a wrong software package will not best fit with the strategic goals of the organisation (Al-Mashari, 2002).

2.3.17 Technical and business knowledge (Knowledge Management)

Knowledge management during ERP implementation projects is an important factor. Sharing knowledge is somewhat unique since ERP projects redefine jobs and blur traditional intra-organisational boundaries (Jones and Price 2004). It is crucial to exchange knowledge and problems within the organisation. Employees possess a knowledge base that is indispensable to the company (Francoise et al. 2009). During ERP implementation knowledge must be shared among departments and across functional and divisional boundaries (Baskerville et al. 2000). Thus, a knowledge management process has to be established to ensure that information will be correctly exchanged within the project team, and with all other people involved in the ERP project (e.g., external consultants or the ERP vendor's employees). In addition, the organisation must ensure the transfer of as much knowledge as possible from consultants or ERP vendors, in order to be able to use the new ERP system autonomously (Francoise et al. 2009).

2.3.18 Monitoring and Evaluation of Performance

This comes into consideration at the shakedown stage. In order to keep track of the progress, milestones and targets are important (Fui-Hoon Nah et al., (2001). Accomplishment of the project should be assessed against the project goals. Operational criteria should be used to assess the production system whilst project management based criteria used to assess the cost, time and the quality.

2.3.19 Project champion

According to Beath, (1991), success of the technological innovations has been associated with the attendance of a champion who performs the critical functions of transformational leadership, assistance, and marketing the project to the users. Project

champions should perform the role of change champion throughout the project. As Clemons, (1998) has pointed out they should be accountable for the project outcome. It is good to position the champion high in the organisation so that the authority can move.

2.3.20 Business plan and vision

According to Buckhout et al., (1999) a strong business plan and vision is needed to provide directions of the project during all its stages. As Wee, (2000) has pointed out, a business plan outlines the firm's strategies, resources, tangible benefits, costs, risks, and timeline. This business plan will be a roadmap to the business and helps in tracking stated goals.

2.3.21Software development, testing and troubleshooting (ERP system effective implementation)

Software development, testing and troubleshooting are critical in the project stage. The overall ERP architecture needs to be formed prior to the development through taking into consideration the most important necessities of the implementation. Wee, (2000) has mentioned that that avoids reconfiguration at each stage of the implementation. Interfaces for commercial software applications are required to be developed in-house when they are not available in the market. Troubleshooting is also important and a firm's ERP implementation should work well with consultants and vendors in order to solve software issues. Moreover, Rosario, (2000) has mentioned that modern software testing is easing the implementation.

2.3.22 Feasibility/evaluation of ERP project

Enterprise analysis and diagnosis should be done prior to the start of implementation, and the creation of the enterprise functioning model with the integrated system support (Ghosh and Skibniewski, 2010).

2.3.23 Cost/budget

Business organisations need to create an accurate budget to contain all costs for the implementation, like software, hardware and staff resources etc (Ehieand Madsen, 2005). The majority of organisations expect a timely Return on Investment (ROI) from an ERP project (Some organisations decrease the project budget in an effort to increase

on the ROI. The areas generally condensed are change management, training and project management.

2.3.24 Empowered decision makers

This includes a collection of people with company and technical knowledge at a proficient level (Shanks, 2000). These people should be senior level project members within the organisation. In the real scenario, majority of organisations suppose that their provider will proactively suggest best practices depending on what they have learned from past projects with other clients. Empowered decision making is more related in the middle stages since there is the requirement to speedily decide things and thereby obtain project plan on time (Finney and Corbett, 2007).

2.3.25 Focus on user requirements

This factor is one of the most frequently cited CSFs (Esteves et al. 2003). Users and stakeholders must perceive the system as being important and necessary to their work. Thus, involvement and participation in the ERP project is mandatory for all end-users and stakeholders affected by the ERP implementation, and will result in meeting more user requirements, better system quality, and an increase in use and acceptance (Esteves and Pastor 2000). It is important to get users and stakeholders involved during system implementation, and to make use of their knowledge in areas where the project team lacks expertise and knowledge (Francoise et al. 2009).

2.3.26 Strategic IT planning

Strategic IT planning is considered as a critical success factor because ERP implementation is merely based on the IT infrastructure of the organisation (Al-Mashari et al., 2003). A best fit IT planning should be done prior to the ERP implementation.

2.3.27 External pressure

When companies find themselves under pressure from the external environment, they tend to try harder to achieve their desired goals (Zhu et al., 2010). Therefore, the higher the external pressure, the more successful the implementation of the ERP system.

2.4 Empirical findings

A study which was conducted by Willcocks and Sykes, (2000) revealed that senior level sponsorship, support, championship and participation are phases of organisational factor that affects ERP implementation's success. The study which was conducted by Shahin Dezdar and Sulaiman Ainin, (2011) found that training and education on ERP system is positively associated with the satisfaction of users that in turn influences the organisation. This finding has been similar to the findings of Colmenares (2004); Bradford and Florin (2003); Yusuf et al (2004) and Correa and Cruz (2005). Furthermore, results of the study of Shahin Dezdar and Sulaiman Ainin, (2011) have pointed out that top management support and enterprise-wide communication were positively associated with successful ERP implementation. A study has been conducted by Ahmad (n.d) in order to identify Critical Success factors of ERP systems at the higher education sector. Findings of this study have revealed that top management support and the commitment and change management are the most influential on the ERP implementation success. Another study was conducted by Zhang et al., (n.d) in order to create a framework for enterprise resource planning systems implementation success in China. A scale has been developed to test the suggested proposed model. Moreover, two independent factors were extremely important in the ERP implementation in China and supported by empirical data. Those two factors were business process re-engineering and organisational culture. The study was carried out to examine the critical success factors in enterprise resource planning (ERP) system implementation in Oman. Findings of this study conclude that ten critical success factors should be considered during the ERP implementation among the twenty factors which are recognized in the literature. These factors were user involvement, strategic IT planning, top management support, vendor support, clear goals and objectives, project champion, user training and education, monitoring and evaluation of performance, education on new business processes and teamwork and composition. Findings of the study of Bhatti, (n.d) have revealed that project management is the critical success factor which highly correlate with other factors. This is because the project management scale includes items such as effective association with ERP vendors, reduce the issues that will be projected to be ~~success~~ unsuccessful in the ERP implementation. Furthermore, findings of this study revealed that business process re-engineering strongly conforms with change management, user involvement and

technological infrastructure. Moreover, Ehie and Madsen, (2005) have conducted a study to investigate the critical issues of enterprise resource planning implementation. Findings of the study pointed out that, out of the eight critical success factors which were used in the study, six critical success factors were correlated with the ERP implementation. These factors are project management principals, feasibility and evaluation of ERP in the firm, top management support, business process re-engineering, consulting services, and cost or budget issues. The study which was carried out to investigate the critical success factors in ERP implementation revealed that eight major success factors should be considered in the ERP implementation of the organisation. These factors comprise of re-engineering business process, business plan and vision, top management support, careful package selection process, effective project management and project champion, education and training, user involvement and teamwork and composition.

2.5 Critical success factors in ERP implementation

This study examines the critical success factors in the ERP implementation. For that the author has used several critical factors which have a better impact on the ERP implementation. Those factors can be elaborated in the following list:

1. Technology infrastructure
2. User involvement
3. Consultant's involvement
4. Clear goal of ERP implementation
5. Data accuracy
6. Vendor support
7. Organisation culture
8. Avoidance customization of the system
9. Monitoring and Evaluation of Performance
10. Software development, testing and troubleshooting
11. Business plan and vision
12. Top Management Support
13. Project Management
14. Business Process Reengineering
15. User Training and Education
16. Vendor packages selection
17. Change management
18. Effective Communication
19. Knowledge Management
20. Project champion
21. Cost/budget

22. Evaluation of ERP project
23. External pressures
24. Empowered decision makers
25. Team Composition
26. Focus on user requirements
27. Strategic IT planning

2.6 Chapter summary

This study makes an attempt to investigate the critical success which affects the successful ERP implementation. Hence this chapter provides a strong theoretical background through examining the existing literature with reference to the ERP implementation. With the economic growth, business organisations are experiencing various challenges. Organisations try to enhance customer satisfaction, increase the market share as well as enhance the competition. It is true that effective and accurate information sharing and communication allows the organisation to reach the above objectives. ERP is an information technology solution which helps to achieve these objectives. ERP implementation is a relatively high-risk project; thus it is important to discuss different factors that determine its successful implementation. There are numerous factors that determine the successful ERP implementation. Among the factors that are available in the literature, author of this study uses twenty-seven critical factors that affect the successful ERP implementation. The next chapter will discuss the methodology of this study.

<h1>CHAPTER THREE</h1>

<h1>3. METHODOLOGY</h1>

3.1 Chapter Overview

The previous chapter discussed the various theoretical frameworks through examining existing literature with reference to the ERP implementation. This chapter aims to cover the methodology that will be undertaken to study this research in detail and provide evidence that the conceptual framework of the researcher is valid or invalid. This chapter will provide theoretical information about research methodology in detail and will cover which concepts and strategies are relevant to this study.

This chapter consists of the background of research methodology which provides a detailed description of the different types of research methodology (section 3.2); qualitative research methodology and quantitative methodology, quoting various literature sources. This will then outline the hypotheses that will be tested within this study (section 3.3) and then the different data sources and analytical methods will be explained in detail (section 3.4 and 3.5). The main body of this chapter includes a definition of research strategy (section 3.6) and the backbone of the study which is the conceptual framework (refined) is then designed (section 3.9). Finally, the research questions will be tested using a sample of a population. A technique of sampling and details about the population is briefly described in section 3.11.

3.2 Research Methodology

Research methodology is the logical series of activities carried out to conduct this research study. The methodology follows a series of processes starting from the development of research questions, designing the conceptual framework, selecting an appropriate method and defining the type of data that needs to be collected; whether quantitative or qualitative data is required. This chapter will further elaborate on determining the population, sampling techniques and methodology of data analysis.

The research approach defines the way in which the research problem will be undertaken to address the hypotheses of the study. The two basic research approaches are a deductive and inductive approach to research. The deductive research approach deals with the development of hypothesis from the existing theory and continues with

testing the specific theory using current data in a given circumstance. However, the inductive approach focuses mainly on the practical problem of the research. Through investigation, the researcher intends to generate a theory that explains the current situation (Saunders, et al., 2007). The main aim of the research is to investigate the reality that is hidden and has not been discovered so far.

Data is the next most important aspect of a research, and the type of data that is collected to test the hypotheses of a study needs to be clearly defined beforehand. In general, there are three types of data that is used in carrying out a research of this nature – qualitative data, quantitative data and a mix of both types. Quantitative data involves statistics, data analysis, frequencies, measurements etc. to examine the research questions. Qualitative research data includes data that cannot be interpreted in a quantitative form and hence these types of data are collected via conducting interviews, focus groups, observing and recording behaviours.

The nature of the research questions of this study could be best evaluated using quantitative data and therefore, quantitative research approach will be used throughout the study. Directly measurable variables are defined in this study, which can be adequately analysed using statistical tools.

3.2.1 Qualitative Research Methodologies

There are three philosophical perspectives for research (De Wit & Meyer, 2010) which are explained further in this chapter. These are in the form of research philosophies under qualitative research; Positivism, Interpretivism and Critical research. According to theorists, research philosophy deals with the source, nature and development of knowledge of a study (Bajpai, 2011).

3.2.2 Different Types Research Perspectives

The followers of **Positivism** believe that there is no change in theory and reality. They believe that there is only one reality to any research occurrence. These researchers are generally structural with a clear research topic and hypothesis with predefined research methodology (Churchill, 1996).

Interpretivism assumes that reality can be found in multiple social elements. Their task is to interpret the observations and elements of the study. They take into account

human interests in their studies. They also take data collection methods such as interviews and observations. The selection of research philosophies usually determines the research approach as well (Dudovskiy, 2016).

Critical researchers assume that social reality is established in the early years and that it is historical. It is produced and reproduced by people in the present context. Although people can consciously act to change their social and economic situations, critical researchers recognize that their ability to do so is limited by various forms of social, cultural and political factors (De Wit & Meyer, 2010).

This research is a method to develop a hypothesis and test an existing theory. The theory of critical success factors will be tested based on certain assumed variables that are hypothesised to have an impact on the critical success factors of implementing an ERP system in a company. Thus, the research perspective of this study is Interpretivism.

3.2.3 Different Types of Qualitative Research

Grounded Theory – Grounded Theory (GT) has been recognized among interpretivism as an exploration philosophy that looks to create a hypothesis that is grounded in information methodically assembled and dissected. Grounded theory is a general research approach utilised as a part of building naturalistic assumptions and is well established in social science.

Ethnographic- This is a qualitative research methodology that is used to identify the varieties among numerous ethnic, cultural and other identifiable groups. This method is used to investigate patterns and changes in ethnicity functions over time. Observations, interviewing and documentation are considered the most popular forms of data collection that rules with this research type.

Case Study- The case study approach is a method of selecting a smaller range of data and information to reveal a complex research problem in reality. A small-scale case is analysed to generalise the findings for a large population. A variety of case studies are available such as exploratory case studies, explanatory or descriptive case studies which are used to analyse string research questions.

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It has been identified that many types of research that are insufficiently documented tend to use the grounded theory as a way of approaching the research study. GT is posed to be popular among Information Systems or Information Technology researchers where documentation is still being built rather than existence (Matthew, 2017). As a partially IT related research, and given the number of articles on this topic, it is suggested that the GT theory will be most appropriate to approach the study.

3.2.4 Quantitative Research Methodology

As mentioned earlier, the use of statistical tools to evaluate research questions and establish solutions to these are the method of quantitative research methodology. The objective of directing quantitative research is to identify relationships between an independent variable and a dependent variable within the circumstances of a defined population.

Quantitative research outlines are either expressive or trial. Expressive means that the variables are measured only once while trial means variables are measured in advance and action is implemented later on. A separate report sets up just a relationship between the variable factors; an exploratory investigation builds up casually.

3.2.5 Different Types of Quantitative Research

There are four principal types of quantitative research plans: descriptive, correlational, quasi-experimental and experimental. The different approaches used between the four kinds of quantitative researchers principally identifies with the degree of control of the factors in the investigation. Following is a concise depiction of each kind of quantitative research configuration.

The current status of a variable or phenomenon is described via a Descriptive Design. The design commences with the development of a hypotheses. The developed hypotheses will be further mentioned in the next chapter.

A Correlational Design investigates the connection between factors utilizing measurable examinations. However, it does not search for circumstances and conclusions in this manner. It is only expected of identifying relationships among and between variables.

A Quasi-Experimental Design (regularly referred to as Causal-Comparative) tries to build up a connection between at least two factors or variables. The researcher does not assign groups of people and does not control the independent variables.

Experimental Designs, regularly called genuine experimentation, utilize the logical technique to build up cause-impact relationship among a gathering of factors in an exploration method. The effects of the independent variable on the dependent variable are collected and analysed to assess the relationships.

3.3 Hypothesis Development

The hypotheses mentioned below are categorised into the following types;

H_0: Null Hypothesis

H_A: Alternative Hypothesis

Hypothesis 1

H_A1- There is a relationship between Project Management and Critical success factors in ERP implementation.

H_01- There is no relationship between Project Management and Critical success factors in ERP implementation.

Hypothesis 2

H_A2- There is a relationship between User Training and Education and Critical success factors in ERP implementation.

H_02- There is no relationship between User Training and Education and Critical success factors in ERP implementation.

Hypothesis 3

H_A3- There is a relationship between Change Management and Critical success factors in ERP implementation.

H_03- There is no relationship between Change Management and Critical success factors in ERP implementation.

Hypothesis 4

H_A4- There is a relationship between Top Management Support and Critical success factors in ERP implementation.

H_04- There is no relationship between Top Management Support and Critical success factors in ERP implementation.

Hypothesis 5

H_A5- There is a relationship between Effective Communication and Critical success factors in ERP implementation.

H_05- There is no relationship between Effective Communication and Critical success factors in ERP implementation.

Hypothesis 6

H_A6- There is a relationship between Team Composition and Critical success factors in ERP implementation.

H_06- There is no relationship between Team Composition and Critical success factors in ERP implementation.

Hypothesis 7

H_A7- There is a relationship between Business Process Reengineering and Critical success factors in ERP implementation.

H_07- There is no relationship between Business Process Reengineering and Critical success factors in ERP implementation.

3.4 Data Sources

There are two main types of data that are used for analysing a research study; primary data and secondary data (Bryman & Bell, 2003). Primary data is the raw data that the researcher may collect himself specifically focused on his/her topic of study.

Primary data sources are usually surveys, questionnaires, interviews etc. If the study is a qualitative one, structured interviews, semi-structured interviews and observations are suitable as interviews can open a wide range of information that is relevant or irrelevant to the study. However, questionnaires and surveys are usually relevant for qualitative data analysis due to its nature of capability to interpret this type of data into the

measurable format. As this research will be undertaken via a qualitative data analysis method, the main source of primary data is a questionnaire.

The other type of data that is used for this research is secondary data. These data are also used to justify what other resources state about the validity of this study and its hypotheses. There are several sources of secondary data and can include information gathered from publications, journals, articles, books, reports and electronic sources. The benefit of using secondary data is that these are readily available sources and also inexpensive than carrying out extensive surveys and interviews to collect primary data. One other benefit of using secondary data is that information sources will be able to provide data collected over a long period of time and this facilitates the researcher to identify patterns of change over time.

In fulfilment of the objectives of this study, both primary and secondary data sources were used. The main primary data collection was through a semi-structured interview.

3.5 Data Analysis Methods

In order to analyse the data, different approaches will need to be used separately to define the output of qualitative data collected and different numerical methods can be used. The type of data analysis will depend on the type of data collection method used. The main technique that will be used to study collected from the semi-structured interview is to conduct a thematic analysis of data analysis. Thematic analysis is defined as "a method for identifying, analysing and reporting patterns within data" (Braun & Clarke, 2006).

3.5.1 Stages of Qualitative Analysis

As the initial stage of a qualitative analysis, the semi-structured interview questions will be designed as attached in Appendix 1. Then the interviewees are approached to gather information. There will be audio taping and notes taken with regard to the responses of the interviewee. After that, transcribing will take place. This is the stage where the full interviews are written into a word processing package. Transcribing is done in order to avoid non-verbal dimensions of the conversations, interpreting data and representing data that has been gathered.

The amount of data gathered from a qualitative study is immense. Larger projects tend to collect thousand and millions of data to prove a certain theory or practice. This large

qualitative of data is summarised and then analysed and explained in a study. Features and patterns of data are illustrated using a thematic analysis. The purpose of the thematic analysis is to generate patterns and themes that enable to examine the meaningful and symbolic content of patterns available in qualitative data.

3.5.1.1 Reliability and validity

Reliability of data in a research study describes the degree of stability and consistency of the results of that study. Reliability alone is not sufficient to prove that data collected is accurate. Validity reveals that the data gathered will sufficiently measure the purported intentions of the study. For qualitative data, homogeneous samples of respondents who have experience about the topic of the study are used to demonstrate that the data collected are reliable and valid to use.

3.6   Research Strategy

The researcher followed the research strategy below when developing this research study;

1. **Research Topic:** The proper caption that is used to create attraction and demonstrate the importance of the study is posted via the research topic. It will simply explain the main research idea.

2. **Problem statement**: The research idea converted into a proper problem statement is done in this section. Using preliminary research, it is then fine-tuned to mention the real importance and practicability of the topic.

3. **Research Proposal**: A formal research proposal document is presented which included the research topic, extended problem statement, the area of focus of the proposed study, research objectives, target audience, some justification of the research and initial literature referred.

4. **Research Methodology**: Predominantly considered the distinct features of quantitative research methodology and qualitative research methodology. Then it was decided to adapt qualitative research methodology for this study.

5. **Research Design**: Research design methodology was prepared and continued the research according to the model. The design used for this research study is the grounded theory under practical scenarios.

6. **Data Collection**: Based on the conceptual model that was initially developed, a semi-structured interview was prepared for the target audience. This semi-structured

questionnaire was used during the interviews with the selected interviewees as informants. The interviews are recorded and analysed using specific qualitative analysis methods.

7.Data Analysis: Data was then analysed using the qualitative analysis methods such as using thematic analysis. Then the results were evaluated accordingly.

8.Recommendation & final Report: Based on the results, with recommendations drawn, it is stated that the initial objectives of the study are met and all this information is compiled into the final Research Report.

3.7 Developed Conceptual Framework

A conceptual framework is used mainly as a model or a guided framework for identifying specific variables that will be tested in this study and to gather facts during the data collection process that is relevant for this study. The preliminary conceptual framework was developed using the basic ideas put forward by previous researchers identified under the literature review. As there were many variables in that framework, it was further simplified and defined again in a simplistic format for the ease of study.

Associating literature review has proven that there were many variables that impact the critical success of implementing an ERP system for an organisation. The researcher has been able to identify 27 variables out of which seven have been selected based on the H5- Index. The H5-Index is developed based on the number of most cited literature articles from other publications that are relevant to the current topic. The index reflects the number of articles published in relation to a particular variable so that it enhances the quality of the current study. Calculating the H5- Index values of past research papers allowed to calculate the maximum total value variables and seven of such high potential variables have been selected to be tested in this research. Furthermore, the research questions and independent variables in this study are developed around this selected seven variables from the H5- Index.

3.8 Research Questions

Based on patterns identified regarding the critical success factors that affect the implementation of an ERP system via literature review, it has been identified that the main critical success factors of the study would be Project Management, User Training and Education, Change management, Top Management support, Effective communication, Team composition and Business Process Reengineering. Hence,

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aligned to the hypotheses as well, the following list of research questions has been defined to successfully meet the objectives of the study.

1. What is the level of relationship between Project Management and Critical success factors in ERP implementation?
2. What is the level of relationship between User Training and Education with Critical success factors in ERP implementation?
3. What is the level of relationship between Change management and Critical success factors in ERP implementation?
4. What is the level of relationship between Top Management support and Critical success factors in ERP implementation?
5. What is the level of relationship between Effective communication and Critical success factors in ERP implementation?
6. What is the level of relationship between Team composition and Critical success factors in ERP implementation?
7. What is the level of relationship between Business Process Reengineering and Critical success factors in ERP implementation?

3.9 Refined Conceptual Framework

The figure 3-1 conceptual framework has been derived after simplifying the information collected from the preliminary framework:

Independent variables   **Dependent variable**
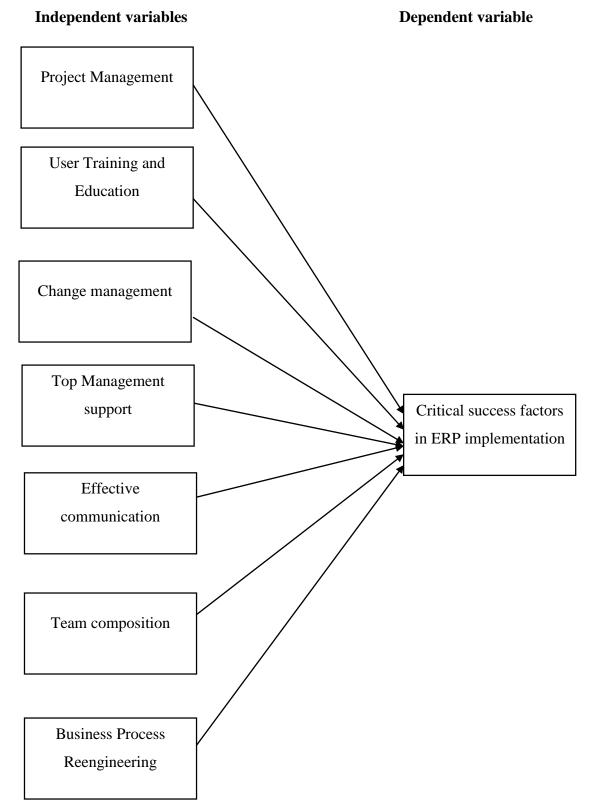
Figure 3-1: Redefined conceptual framework

3.10   Population, Sample Selection and Sample Size

Based on the preliminary research carried out regarding ERP system implementation in Sri Lanka, the following sampling methods have been used to find a sample to fulfil the objectives of the study.

This study aims to find out factors which affect the successful implementation of ERP systems among multidimensional, largescale, Sri Lankan organisations. There are many similar large companies in Sri Lanka such as MAS Holdings PLC, Brandix Lanka Ltd, Dialog Axiata PLC, Hayleys Group Ltd, Nestle Lanka PLC, Unilever Sri Lanka Ltd, Aitken Spence, Fonterra Brands Lanka and many more. All these companies are using some form of ERP system to connect their business processes within the country and with a parent or subsidiary companies around the world. Thus, the population is large in this context and these companies represent a wide range of industries from agriculture to apparel to consumer goods to pharmaceuticals.

Due to the complex nature of data collection from several companies across the country which have already implemented the ERP system, this study will limit to analytical scope as only one large company selected. The study aims to undertake as a case study The Capital Maharaja Organisation Limited. The Capital Maharaja Organisation won the SAP ACE Award 2014 in the category of Best run award in ERP Emerging Enterprise in a South East Asian country. It is also a factor in selecting The Capital Maharaja Organisation for the case study. The sample population is selected using a random sampling technique from those employees who participated in the recent ERP system implementation of the organisation. Ten such employees will be selected to provide data and information for this study. The types of employee designations who will be selected for this sample are expected to be a balance of Accountants, Project managers, Technicians and etc.

3.11 Data Collection Methodology

The data collection methodology of this study is arranged around the qualitative nature of the study which is usually done via a questionnaire. Questionnaires are usually used to collect regular or infrequent routine data. The data will be gathered from participants via an interview. They will be asked direct questions as defined in the questionnaire and answers are recorded for further interpretation.

The figure 3-2 depicts a flowchart of the data collection process of a qualitative study.

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┌──────────────────────┐                          ┌──────────────────────┐
│   Literature Review   │                          │      Pilot Study      │
└──────────────────────┘                          └──────────────────────┘
            │                                                  │
            └──────────────┐              ┌────────────────────┘
                           ▼              ▼
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                    │   Conceptual Model    │
                    └──────────────────────┘
                               │
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                    ┌──────────────────────┐
                    │ semi-tructured interviews │
                    └──────────────────────┘
                               │
                               ▼
                    ┌──────────────────────┐        ┌──────────────────────┐
                    │   Data Collection     │◄───────│  List of candidates   │
                    │   (   Interviews   )  │        │     Appointments      │
                    └──────────────────────┘        └──────────────────────┘
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                    ┌──────────────────────┐
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                    │      Validation       │
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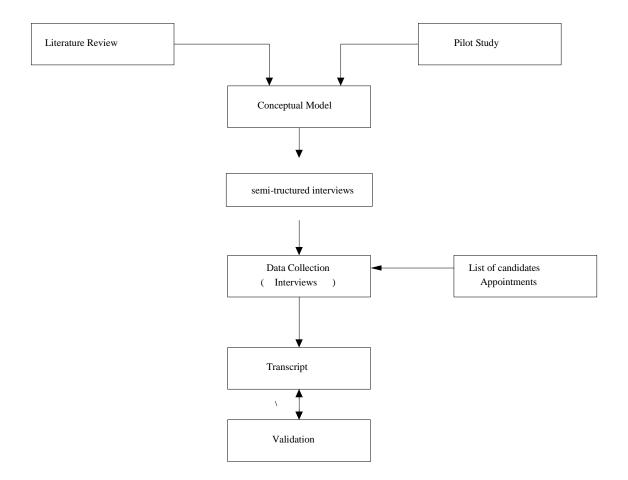
Figure 3-2: Steps of research methodology carried out

3.11.1 Design of the Questionnaire

The first four questions of the study will refer to the demographic details about the interviewee. This information is useful to define characteristics of the selected sample. The questions asked are summarised in the table 3-1.

Table 3-1: Demographic information

Demographic information	**Q1**- Could you please tell a little bit about your company or Group?
	Q2- Could you please tell me about yourself and relationship with the company or group?
	Q3- What is your opinion about your Company/Group current ERP system?
	Q4- Was it a successful implementation?

The questions five to thirty will be asked from the interviewees in relation to the research questions of this study and it will cover relevant independent variables of the conceptual framework. The summary of the list of questions are covered in the following table 3-2.

Table 3-2: Questionnaire

Research Question	Variable	Questionnaire
What is the level of relationship between Project Management and Critical success factors in ERP implementation?	Project Management	**Q5**- Do you think that project management was a critical success factor to implement the ERP system?
		Q6- Who managed this project during the implementation?
		Q7- What is your opinion of the project management during the ERP implementation?
		Q8- What kind of impact did project management have for successful ERP implementation?
What is the level of relationship between User Training and Education with Critical success factors in ERP implementation?	User Training and Education	**Q9**- Do you think that user training and education was a critical success factor to implement the ERP system?
		Q10- What kind of impact did user training and education have for successful ERP implementation? How did it impact the success/failure?
		Q11- What is the process you followed to train and educate users?

What is the level of relationship between Change management and Critical success factors in ERP implementation?	Change management	**Q12**- Do you think that change management was a critical success factor to implement the ERP system?
		Q13- How did you plan the change?
		Q14- What Change Management activities did you carry out during your ERP implementation?
		Q15- How successful was your efforts in Change Management?
		Q16- What kind of impact did Change management to successful ERP implementation?
What is the level of relationship between Top Management support and Critical success factors in ERP implementation?	Top Management support	**Q17**- Do you think that top management support was a critical success factor to implement the ERP system?
		Q18- How does top management support the ERP implementation?
		Q19- What kind of impact did Top management support to successful ERP implementation?
What is the level of relationship between Effective communication and Critical success factors in ERP implementation?	Effective communication	**Q20**- Do you think that effective communication was a critical success factor to implement the ERP system?
		Q21- Did communication help to successfully implement the ERP system? If yes, please can you give us some examples of how effective communication help to successful ERP implementation?
		Q22- What kind of impact did Effective communication have for successful ERP implementation?
		Q23- What are the most effective communication methods?

What is the level of relationship between Team composition and Critical success factors in ERP implementation?	Team composition	**Q24**- Do you think that team composition was a critical success factor to implement the ERP system?
		Q25- Was there a project manager or project management team to overlook ERP implementation process?
		Q26- What was the team selection criterion of the ERP implementation?
		Q27- What kind of impact did Team Composition have for successful ERP implementation?
What is the level of relationship between Business Process Reengineering and Critical success factors in ERP implementation?	Business Process Reengineering	**Q28**- Do you think that business process re-engineering was a critical success factor to implement the ERP system?
		Q29- Are there any changes to the existing business process with the introduction of the new ERP system? If yes, what are the changes that were made to the business processes?
		Q30- What kind of impact did Effective communication have for successful ERP implementation?
Common question for further research		**Q31**- Are there any additional factors that you consider as critical? If so, what are they and how did they contribute to the success?

3.11.2 Data Collection Strategy

Data collection is one of the key tasks of this study and it is the most important driver of the study that achieves the objectives of the study and addresses all the research questions. A clear strategy of data collection will facilitate the accuracy and ease of access to information generated from this study. The researcher followed the following steps as a part of the data collection strategy;

1. Prepare semi-structured questions to conduct interviews.

2. Identify potential candidates for the interview i.e. CIOs, Head of ITs, IT Executives, Operations Executives etc.

3. List them with their basic profile that includes information about their company and about the use of ERP system in their company.

4. Identify the audience and individuals before reaching them and before designing the questionnaire. Tone and technical terms need to be understandable to the audience.

5. Introduce the researcher and the purpose of the interview in advance.

6. Conduct the interview and record the responses with permission and protecting the anonymity of the respondent.

7. Record the responses in tables in a way that ease the complexity of a lengthy questionnaire.

3.12 Chapter Summary

This chapter demonstrated an overview of the research methods that are adopted in this study. The chapter has outlined the different methods that can be used in similar studies and have made sections as to which methods are appropriately applied to this study. The study will be analysed qualitatively using the grounded theory technique. Specific research questions and hypothesis were developed based on the preliminary conceptual framework followed by the literature review. It is concluded that Project Management, User Training and Education, Change management, Top Management support, Effective communication, Team composition and Business Process Reengineering will be considered as independent variables that affect the critical success of ERP implementation process. A sample of ten employees who have been a part of the recent

ERP implementation process from Capital Maharaja Organisation Limited have been selected to provide the necessary and useful details relating to ERP implementation and its critical success factors.

CHAPTER FOUR

4. DATA ANALYSIS

4.1 Introduction

In the previous chapter, the method of undertaking this research study has been explained. The data collection has been done as suggested previously. This chapter focusses on presenting the data that has been collected and analysed using qualitative data analysis tools and models. Ten persons who were directly involved in the implementation of the ERP system at Capital Maharaja organisation were selected as resource personnel to provide information about the transition from the existing system to the implementation of the new SAP ERP system within the company. In the first section, the demographics or the background of the participants will be explained and then the relevant responses to the questions in the questionnaire will be presented and analysed accordingly.

4.2 Grounded Theory Analysis

Grounded theory can be identified as an analysis methodology which implies four main phases namely, coding, categorizing, memo-writing and theory generation. Further, it can be defined as a research method, which enables to develop a specific theory which offers an explanation about the majority concern of the population of the substantive area and how it will be resolved or processed.

4.2.1 Coding and catagorization

Coding and categorization of the data hold a significant position in the qualitative data analysis. In this, it has identified the major categories and the corresponding codes, their frequency as well as the percentage of those codes and categories.

4.2.2 Memo writing

Memos were used to identify the responses, behaviours and the other important contents of the interviews. There was some kind of information which could not be identified and captured within the interviews and the researcher has decided to include this when analysing the data in table 4-1.

Table 4-1: Results of the grounded theory analysis

Category	Name	Frequency	Percentage %
Project Management	Operationalization	8	2.9
	Team Management	10	3.6
	Planning	8	2.9
	Controlling	7	2.6
User Training & Education	Formal processes	6	2.2
	Informal processes	9	3.3
	Performance	7	2.6
	Motivation	11	4.0
Change Management	Participative decision	9	3.3
	Democracy	8	2.9
	Motivation	7	2.6
	Adaptation	6	2.2
Top Management Support	Decision Making	8	2.9
	Achieving objectives	9	3.3
	Critical Thinking	11	4.0
	Monitoring performance	14	5.1
Effective Communication	Formal communication	2	0.7
	Informal communication	12	4.4
	Mediums	11	4.0
	Communication system	14	5.1

Team Composition	Goal orientation	12	4.4
	Experts	9	3.3
	Proper mix	8	2.9
	Abilities	7	2.6
Business Process Reengineering	Automation	16	5.8
	Cost saving	17	6.2
	Implementation	12	4.4
	Knowledge	16	5.8
		274	**100**

4.3 Demographic analysis

The first and the foremost question asked from the participants was some description about the company. The compiled answer from all ten participants suggested a description similar to what is stated below about the company;

"The company is known as Capital Maharaja Organisation. It is the largest private conglomerate company in Sri Lanka. The business operates in the media industry. It is also engaged in manufacturing and providing services. The manufacturing industry focuses basically on the hardware industry and the FMCG industry. The types of services are shipping and IT services and in the media perception, there are radio, TV and entertainment. The business was established in 1939 which was almost 80 years ago."

In order to better understand the background of the business and its relative importance, the respondents were asked about the level of machine or labour intensiveness of the operational activities of the business. The respondents have been able to identify the business operation as a mix of both machine and labour intensive where almost everyone has agreed. The respondents have also stated that there are more than 500 people using the newly implemented ERP system. This is a vast majority where the business has to pay high concern in this aspect. The company needs to pay more

attention to the ERP system and effective implementation of the system in order to reap benefits from the project. Most of the respondents have stated that they agree on the fact that there is very high usage of the ERP system during the day- to- day operations.

The present employment period of the sample population is depicted in table 4-2 and graphically presented in figure 4-1.

Table 4-2: Duration of current employment

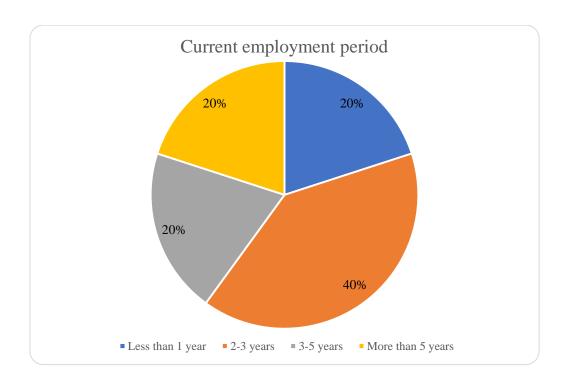| Current employment period	
Less than 1 year	20%
2-3 years	40%
3-5 years	20%
More than 5 years	20%

Figure 4-1: Duration of current employment

There is a mix of staff members of different employment periods in the company who have participated in the ERP implementation process. Majority of the participants in the survey are within the service category of 2 to 3 years. However, the experience of these participants in a similar industry to this is very high. A significant percentage of 90% of the sample has more than 8 years' experience in the industry which justifies that the data will be provided by a highly qualified and experienced set of staff members from the Maharaja Organisation.

The respondents for this study have performed the following roles in the implementation of the new ERP system in the company;

- Process Lead and the leader of the core team; to map processes and coordinate users, fulfilling the requirements
- Role of CIO
- Project accountant for the ERP
- Organising master data
- Routing audit as well as IT aspects of internal control.
- Core team member. Master data planning
- Supervise 2 SAP modules; SD (Sales and distribution) and FICO (Finance control) (From a company call PE Plus Private Limited)
- Steering committee member
- Project management-overlook the implementation
- Head of operations

The different roles performed by these members demonstrate that they have held higher positions in the project of ERP implementation in the company. Therefore, it can be suggested that the information provided by these participants is valid for assessment as they possess a higher degree of involvement in the ERP implementation process.

The next section of the questionnaire is focussed on inquiring information about the effectiveness of the ERP implementation process. Firstly, in this section, the respondents were asked whether the company/ group opinion is positive or negative towards the ERP implementation. The majority of the respondents have stated that they perceive that the group holds a positive opinion, where; 80% believes that the ERP system was very good and 20% has an opinion that the ERP system is good. There were

no negative responses to this. Some of the reasons provided by the respondents were that the majority of the functionalities of the new system are very effective and they believe that their efficiency has been improved by a major level from the previous system to the current and newly established system. Some respondents have also stated that the current ERP system provides greater scope of information and it is very transparent. Thus, it can be suggested that the overall opinion of implementing the new ERP system is positive.

Almost all the respondents also believe that the ERP system implementation was a success. 70% have stated that the current ERP implementation has been very successful and a further 30% also states that the implementation has been successful. As proof of this successful implementation, the respondents mention the importance of winning the SAP ACE award within the South Asia level. The company has been able to implement SAP ERP in 9 companies within a short span of 9 months which involved a speedy, yet successful implementation process. All respondents have mentioned the winning of the award as proof of successful implementation process.

4.4 Project management

In this section, the first question asked from the respondents was to identify whether the project management was a critical success factor for implementing the ERP system or not. All the respondents of the survey gave a positive answer for this by selecting the "Yes" answer. Next, the researcher has asked the reason for mentioning project management as a critical factor when implementing the ERP system in an organisation. Accordingly, they said that the nature of the responsibilities performed by the project management directly influences on the implementation of the ERP system and the duties performed by project management team will be directly responsible for the effective implementation of ERP system of the company. Some respondents emphasised the need of having a project management plan for successful ERP implementation.

According to the responses given by the respondents, the project implementation is a result of a team effort which includes the leader, core team, implementation partners and the centre team. Also, the project management team was guided by a senior management team from time to time either to monitor or direct the team.

When it comes to the opinion of the respondents regarding the project management during ERP implementation, the majority of the respondents hold a positive idea where they emphasised the need of effective coordination and the implementation of front end and the back end of the organisation.

Almost all the respondents mentioned that the project management made a significant impact on the success of ERP implementation. According to their opinion, from the identification of ERP system need of the organisation to the implementation process, the project management plays a significant role in the effective implementation of ERP and that is very much important as it helps to take important decisions in the organisation.

4.5 User Training and Education

The majority of the respondents identified user training and education as a critical success factor in order to implement the ERP system. According to their responses on this, they believe that the success of the ERP implementation is totally depending on the employee's effectiveness on managing and handling the ERP system even after the implementation of ERP system within the organisation. So, it is very much important to train and educate the users of the system than any other thing.

They responded that the user training and the education plays a significant role in implementing the ERP system and it has a huge impact on the successful implementation. With this training and education, it gives a broad knowledge and know how on how to use the new system and how to enhance the productivity and the efficiency of the organisation with the implementation of ERP system. Also, that is very important because the new technical know-how is extremely important for the users to manage the system in order to get the maximum benefits.

The majority of the respondents hold the idea that they have followed a formal process to be trained and educated in the new system. Some respondents hold an idea that they have used a mix of the formal and informal process of training and education. Other than that, they mention that they have used on the job training methods and over the phone training sessions for the users to guide them towards the successful implementation. The process was interesting and methodical. Firstly, they have conducted some preliminary and comprehensive training sessions for the core team

members and gradually after gaining sufficient training, they have been directed to train and educate their subordinate team members. It was mandatory for all the users to participate in the training sessions and they had a plan to create motivation for the participation of employees for it. Other than the formal proceedings of training and educate the users of the system, the majority of the respondents used some informal ways such as ad hoc ways to train the employees in order to ensure better performance.

4.6 Change Management

Change management can be identified as an important factor which ensures the successful ERP implementation within an organisation. In this survey, the majority of the sample respondents stated that the change management was a critical success factor in implementing the ERP system within an organisation. According to their views and beliefs, managing the change is critical. In order to implement the new system, it required changing the existing procedures of the organisation. Other than that, they have to change the users' behaviour, thinking pattern as well as the methods that they have been practising so far. Majority of the sample respondents stated that firstly they had changed the employees' attitudes towards the change by letting them know the importance of having the ERP system within the organisation. Also, they have stated that they emphasized the need of having the ERP practice for the development of the career lives of the employees. So, then they have quickly adapted to the process of ERP implementation.

At the same time, they have emphasised the advantages of the ERP system implementation and thereby they have motivated the employees towards the acceptance of the ERP system without showing a negative behaviour. Other than showing the advantages of ERP implementation for the employees they have made it compulsory for the employees within the organisation to continue with the process if they are to continue their services.

So, it was very easy to implement the ERP system within the organisation owing to the positive and participative contribution paid by the employees to the implementation process of ERP within the organisation. Continuous dialogues and the motivation between the employees and the management will ensure higher productivity and efficiency in their duties and the responsibilities carried out within the organisation. That is not only before the implementation process but also it needs to continue after

the implementation has taken place within the organisation because the orientation of the employees to the new system is very much important and the continuation of the attention towards the system is also very important.

According to the sample respondents, they have undertaken numerous change management activities in their respective organisation in order to change the employee's mindset and the organisational practices in order to ensure the successful ERP implementation. First of all, they have undertaken a survey study within the organisation by getting the insights of the employees. According to their views of the systems and the practices implemented so far within the organisation were outdated and as a result, employees wanted to have a new and computerized technology system within the organisation. After the reviewing of the employees' idea, the management took that opportunity to introduce the benefits and the advantages of implementing the ERP system in the organisation as well as the benefits and the advantages received from the ERP system practices to the career development of the employees. Other than that, they have given a general training and personal focus by the top management, as well as on the job training methods within the organisation. Monitoring and measuring the performance was also conducted within the organisation according to their perspective.

As said by the sample respondents who rendered their insights to the survey, the efforts taken by the management in the successful implementation of the ERP were very successful because the management was able to do a successful change management. According to the insights of the sample respondents, the change management has a significant and high impact towards the success of ERP implementation.

4.7 Top management support

The majority of the sample respondents hold the idea that the top management was a critical success factor in order to implement the ERP system. According to their views, the decision and the permission of the top management were extremely important and without having the contribution and the support of the top management it would have been very difficult to continue the process forward. Other than that, the ideas given by the top management to the development of the new implementations are also very much important and it will directly influence the success of the implementation.

According to the respondents' ideas, the support rendered by the top management of the organisation toward the success of the ERP implementation was invaluable. They also mentioned that the long-term view and the ability of critical thinking, direction and the guidance given by the top management has also helped to achieve the successful implementation of the company.

Since they are the ones who are involved in the process of strategic decision making, the ideas given by them were very important in terms of the organisation. Top management comprised of the consultants and the experts for each area, so it can take favourable suggestions for the further development of the organisation. As said by the sample respondents, the top management have a high impact on the success of ERP implementation.

According to a respondent of Capital Maharaja company, "I don't think that business plane came into our ERP. what we did was if you take a business plane of the entire company, the fact that a particular company going to increase their turnover by 25% this year would not affect the ERP. the job of the ERP is to make sure that the MIS is better, the business process is better, as a results productivity efficiency would increase automatically in a company and that would contribute to the bottom line. but the business plane cannot be faltering exactly how much the ERP is going to contribute. that will not happen. because, there was a plane, time frame, there is a budget and all that has to be worked out very proficiently before selection all the things. of course, keep controlling and monitoring against the plane, there could be certain unforeseen circumstances. so, you need sometimes a next small adjustment in the plane while keeping within the total time frame. So, we did that. we implemented all 19 companies in 9 months. that was our goal and that what we succeed."

Accordingly, the top management's support towards the successful implementation is very much important and it will ensure a sustainable implementation of ERP system within the organisation.

4.8 Effective Communication

Also, we had awareness communication through publishing notices on desktops of group computers.

According to the responses received from the sample respondents, it was mentioned that the effective communication was a critical factor in successful implementation of

ERP system within the organisation. Majority of the sample respondents hold the idea that in order to accomplish the successful implementation of a project within the organisation, it is very much important to have an effective communication. In order to identify and clarify whether the planned procedures are implemented on time as planned, it needs to have the two-way communication. By undertaking a specific communication scheme, the management would be able to identify whether the planned processes are implementing according to the planned way and also it can be identifying any problems embedded with the implementation of the processes. According to the sample respondents, the effective communication has a significant impact on the success of ERP implementation.

Majority of the sample respondents told that there have been a number of effective communication methods used in their organisations in order to ensure the successful implementation of ERP within the organisation.

Following are some of the communication methods that the respondents stated as effective communication methods.
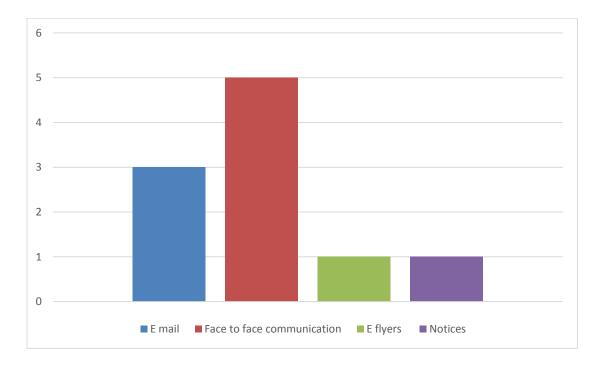

Figure 4-2: Effective communication

According to the graph which is shown above, the majority of the sample respondents stated that the face to face communication was identified as the most effective method

56

in their organisation. Other than the face to face communication, email, e flyers and notices are used by them simultaneously in order to give a message from one party to another.

The reason for selecting face to face communication as the most effective communication method for the sample respondents is because they think that the message transmission and the message reception is being done simultaneously. From the motivation of employees to the implementation of the processes, effective communication plays a significant role. With the analysis of the information given by the sample respondents, it was mentioned that communication plays a significant role in the successful implementation of the ERP system within the organisation.

4.9 Team composition

Team composition identifies the combinations of the team which has been designed for the successful implementation of ERP system. According to the ideas and the insights given by the employees, the right skills and the experience of the right members will directly influence the function of the organisation. Accordingly, it has to find the accurate mix of the employees. Also, the leader of the team should have to have a proper understanding of the skills and the abilities of the employees within the team. So, thereby the leader or the manager should have received knowledge of who is good for which skill. Also, they told that there should be a good combination of the team and that it should be big enough to handle the ERP system. Some of the sample respondents told that the team composition was the major factor which affects the ERP success. Everybody is committed to achieving a common goal and that in turn will help to achieve the team's goals and the objectives. When it comes to achieving the team's goals, it is required to work for the common interests rather than for the individual interest. The coordination of the individuals within the organisation is very much important to have uniformity of the processes implemented within the organisation. Also, they have stated that they are not in the process of selecting the team members for the team based on the seniority but because of the likeliness to undertake the challenges. According to them, the method of selecting the team members is the ability of the people to work in hard.in order to have a successful team, it is very much important to have a multi-talented team member.

The next question has identified whether there are a project manager and a project management team to overlook the ERP implementation process.
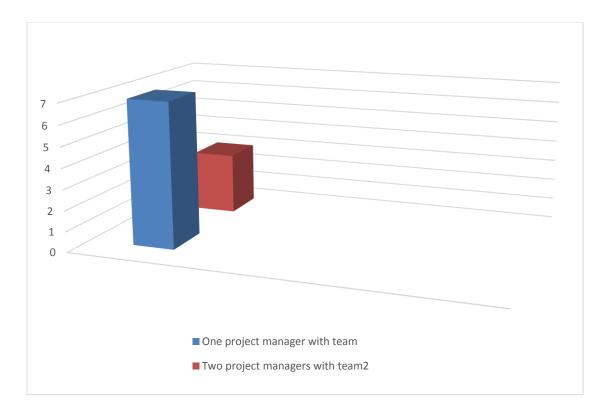

Figure 4-3: Team composition

According to the figure 4-3 which is shown above, 7 sample respondents stated that they have one project manager with the project team. Also, it has shown that only 3 sample respondents have mentioned that they have two project managers for the team. One has two project managers for implementation vendor side as well as on the organisation side. There are some positives as well as negatives embedded in having one or two project managers to a team. According to the sample respondents, there are two teams in an organisation which have been formed for the implementation of ERP system. One is the core team. The core team is comprised of the experts of different areas in the organisation Core team and they have to provide a complete guidance and direction to their subordinates who are on the other team. Then they can achieve the organisational goal simultaneously.

When it comes to the team selection criterions as said by the sample respondents, the considerable factors include the skill sets of individuals, ability to work, hard work, expertise in a particular area, technical knowledge of the individuals, IQ level of the individuals and the number of years experienced. According to the responses received

from the sample respondents, it is true that there is a high impact made from the team composition towards the success of ERP implementation.

4.10 Business Process Re-engineering

Almost all the sample respondents stated that the business process re-engineering can be considered as a critical success factor in order to implement the ERP system within the organisation. ERP implementation is not all about the IT implementation. It is a process implementation. It has to undertake a total knowledge regarding the existing business processes and has to identify the gaps involved in the existing procedures. Also, it needs to identify the relevant process needed for improvement for the existing processes and thereby it is required to do relevant modifications needed for the process.

When it comes to the modifications and the changes done for the existing business process, the sample respondents hold a positive idea towards the business process re-engineering and the ERP implementation. The changed processes which have been done towards the processes are identified by the sample respondents in the survey as follows.

- Develop and maintain a third-party outsourcing process.
- Implementation of SAP processes to the organisation
- Automated the financial entries and invoicing for one party
- Automated financial billing
- Reduce the length of the work process by eliminating unwanted processes
- Uniformity of the production process to the sales process.
- Overhead management
- Implementation of best practices in the international arena
- Introducing proper manufacturing processers, depreciation rates, inventory valuation and streamline the business processes
- Change the blending process by re-engineering the process adheres to SAP best practices
- Changed the data generating a process to match with the SAP practices.
- Practicing different costing system

With the consideration of the insights given by the sample respondents, it can be concluded that the business re-engineering process has a high impact on the ERP implementation of the company.

4.11 Other Factors

Apart from the other factors which have been directly identified within the survey, there were some factors that are identified by the sample respondents within the interviews are as follows.

Expertise and the knowledge of the consultants

"Knowledge, expertise and experience of the Consultants are one of the most critical things. If consultants are not aware how to configure the system, and if the configuration is not done properly, the whole implementation will become a failure, irrespective of having better users or buying better systems" Accordingly, the exposure of the consultants is the most important thing as it directly influences on the successful implementation of the ERP system of the company. Further, it was emphasised that no matter how much there's a cost incurred to the implementation of ERP implementation it has to identify the capability and the talents of the consultant and the experts to implement the system within the organisation.

Coordination of the team members

Also, they have told that the coordination of the team members and the management of the processes are very important than any other thing because it will directly influence the successful implementation of the ERP system.

Controlling

Other than that, the controlling holds a significant position in the ERP implementation whereas the controlling shows the specific direction and the guidance to the smooth functioning of the ERP system where it shows further areas for improvement. The importance of teamwork is highly recognised by the sample respondents and it is extremely important to pay attention to the employee performance which ensures the successful ERP system implementation.

4.12 Hypotheses Testing

Following are the results which have been taken from the Hypothesis testing. The Hypotheses are the basic assumptions which are based on the research ground. Based on the research findings which have been analysed and concluded above, the table 4-3 results for the hypotheses were made.

Table 4-3: Hypothesis testing

Hypothesis	Status
H_A1- There is a relationship between Project Management and Critical success factors in ERP implementation	Supported
H_01- There is no relationship between Project Management and Critical success factors in ERP implementation	Not Supported
H_A2- There is a relationship between User Training and Education and Critical success factors in ERP implementation	Supported
H_02- There is no relationship between User Training and Education and Critical success factors in ERP implementation	Not Supported
H_A3- There is a relationship between Change Management and Critical success factors in ERP implementation	Supported
H_03- There is no relationship between Change Management and Critical success factors in ERP implementation	Not Supported
H_A4- There is a relationship between Top Management Support and Critical success factors in ERP implementation	Supported

$H_0$4- There is no relationship between Top Management Support and Critical success factors in ERP implementation	Not Supported
H_A5- There is a relationship between Effective Communication and Critical success factors in ERP implementation	Supported
$H_0$5- There is no relationship between Effective Communication and Critical success factors in ERP implementation	Not Supported
H_A6- There is a relationship between Team Composition and Critical success factors in ERP implementation	Supported
$H_0$6- There is no relationship between Team Composition and Critical success factors in ERP implementation	Not Supported
H_A7- There is a relationship between Business Process Reengineering and Critical success factors in ERP implementation	Supported
$H_0$7- There is no relationship between Business Process Reengineering and Critical success factors in ERP implementation	Not Supported

4.13 Chapter Summary

In this chapter, a detailed analysis has been done in relation to the interviews conducted at the Capital Maharaja Company with 10 respondents. Initially, it has identified the Grounded Theory Analysis and under that, coding and categories, Memo Writing have been identified. Analysis has been done under two main paradigms namely the

demographic data analysis and other data analysis. Data which was collected have been analysed under the variables such as project management, user training and education, change management, top management support, effective communication, team composition and business process re-engineering. Based on the analysis, Hypotheses were tested and accordingly, all the seven hypotheses developed at the beginning of the study was supported and the Null hypotheses were rejected. This brings to the conclusion that project management, user training and education, change management, top management support, effective communication, team composition and business process re-engineering are the critical success factors that can be identified in a successful ERP implementation.

CHAPTER FIVE

5. DISCUSSION AND FINDINGS

5.1 Introduction

This chapter identifies a discussion of the findings, which have been made by the researcher in the survey. Then the conclusions were made by interpreting the obtained results with set theory. Then the recommendation was given based on the findings to further improve this kind of research studies & also, limitations of the study which has a negative impact on the obtained results. Each factor & their impact on successful ERP implementation were discussed further based on the obtained results. The chapter summary was included in the end part.

5.2 Importance of ERP in today's business models

According to the literature review, with the emerging new technology development which has been undertaken by today's business world, the importance and the need for integration of all business processes have come on board and as a result, the majority of the businesses has converted from its functional structure to the business process structure where all the units and the departments are working as a vertical line of the process in order to achieve the common business objectives. Further, earlier, in the functional business structure, the majority of the businesses have been entrusted with their own objectives and their own departmental objectives and as a result, they worked to fulfil their individual departmental interests. According to the study, now, all the departments have been amalgamated to a single value stream and each and every single task, performed by the departments are to achieve the common goals and the objectives of the organization. All of these will be done through an enterprise-wide business process which have shared one database and general management IT tools. With that need of amalgamation of data and information to a common platform and to a single administration, the ERP system has been introduced to the business world. The purpose of installing an ERP system for a business organization is to enhance the business performance by facilitating the integration process. A successful ERP system will ensure easier control, implementation, storing and monitoring the main business processes including the production, procurement and another completion process. Other than that, the successful business incorporation with ERP system is ensured of

an effective functioning of sales, marketing, human resources, and accounting and departments.

5.3 Implementation of ERP system

According to the study, successful ERP system implementation has a positive and direct influence on the organizational performance and at the same time unsuccessful ERP system implementation has a negative influence on the organizational performance. According to the literature review, ERP is a specific system that is likely to be very large, complex and also very expensive. In order to implement the ERP system, it requires a huge resource allocation and a commitment from the business organization end that cannot be recovered if the implementation goes as a failure. The time commitment can be identified as one of the major contributions that an organization needs to bear when it comes to the ERP implementation. According to the study, it requires allocating the valuable business time of the professionals, management as well as the employees in the implementation of ERP system within the organization. If this implementation was not a success, then the commitment from senior management & other resource personals is futile. If that amount of resources & time have been allocated for a new product / services or process improvement, more turnover might be generated. ERP implementation is considered as a business process re-engineering mechanism. So it converts the existing business process to a new business process. Not only the process itself, but it also changes the input, machines, materials, methodology & finally the organization's culture. Therefore, such implementation should be done very methodically & carefully by minimizing the impact of the above factors.

5.4 Problems with the ERP implementation

According to the study, ERP implementation was done at a multidimensional group of companies. The results varied according to the type of business analysis, master data and business process. Hence, the management had to analyse the common features such as finance and procurement and the unique features such as business processes in each business unit. There was no technical expertise at project initiation. Therefore, the company had to form an internal team known as a shadow team to work with the implementation team and allocate people to different areas in the project. The selection of the core team was a complicated process.

There was no proper infrastructure to install new hardware and this was a major consideration. The multitude of meetings and trainings that were required by each phase of the project required the refurbishment, upgrade and in some cases creation of new facilities.

Resistance to change had to be addressed carefully by changing the mindset of the users and getting them involved in supporting the new system. This had to be done through training, awareness on benefits of the new system and reassurance of job security. The project goal was to implement the new system at 19 companies within a span of 9 months. It was a tremendous challenge for the implementation and project management teams to allocate resources for the diverse types of companies.

5.5 The strategic plan of ERP system implementation is assured by the Project Management

According to the literature review, a proper project management will ensure a successful ERP system implementation. This will directly influence the performance of the business organization as well. In order to have a successful implementation of the ERP system, it is vital to have a specific and strategic project management plan which identifies the organization by considering the whole organization. In a proper project management, it should include a clear definition of objectives of the ERP system, development of the action plan which is in line with the strategic business plan of the organization, and at the same time, it should include a proper and careful tracking and monitoring mechanism.

According to the data analysis, a strategic project management plan should ensure all the necessities to be completed to achieve the successful implementation. At the same time, the strategic plan and the action plan include the schedules of the implementation process and this will ensure the successful completion of the ERP system project and it can easily evaluate the current status of the ERP implementation. If there is any gap between plan vs action, that can be easily identified & alternatives can be implemented to ensure implementation within the defined time frame. As the successful project management ensures a successful ERP system implementation, there is a significant relationship between the implementation of ERP system and the project management. If unable to follow proper project management activities, the total project becomes a failure. So, this is a key to successful ERP implementation within any organization.

5.6 360^0 degrees of competency in user training and education

According to the literature review, since the ERP system is a complex and risky system to implement within a business organization, it requires providing a sufficient training and the knowledge on the ERP system implementation for the parties who engage with the implementation process & also end users who use the system in a daily basis. According to the literature, it has been identified that the lack of sufficient training and education given to the employees will directly influence the failure of the ERP system implementation. According to data analysis, it has to ensure that proper training is given to the specific parties who are involved in the process and, other than that, it is very much important to provide an overall idea and a knowledge regarding the ERP system implementation process to the parties who are interested in internally and externally in the organization, but who are not directly involved with the implementation process of the ERP system. According to the literature of ERP system implementation, the utmost purpose of the user training and education is to make the ERP system's ease of their use and to make awareness among the people regarding the importance and the need of the ERP system.

ERP system technological installation can be done by external experts but the long-term usage of the system to achieve the organizational goals is purely based on the employees of the organization. Therefore, it needs to provide an extensive knowledge regarding the ERP system, its uses, its weak points, strengthening facts and etc.

5.7 Getting the employees as a part of the changing process.

According to the literature review, ERP system implementation is a very critical task that is directly influenced by the behaviour of the employees of the organization and their willingness to adopt to the new system. All users were comfortable working with the legacy system. The main challenge was to change user mindset to encourage adoption of the new system. Change management strategy plays a vital role in organizational-wide cultural and structural changes. Thus, it is required to educate and train employees in a number of ways and also make them familiar with the new system by project status updates. Users should be involved in the identification of limitations of the legacy system and educated on the importance of a new system to cover the new requirements. This feedback should be used in development of the new system and users should be made aware of how their feedback enabled to improve the system.

According to the plan, the Group used the 'Big Bang approach' to change the legacy system to the new system.

During the process of upgrading the legacy system, the company had to rebuild a server room with all the latest facilities to facilitate the project. The group had to replace old computers to achieve compatibility with the new system and make the users more productive. The network infrastructure had to be upgraded with high capacity WAN links to deal with the increased data flow.

With that change management aims to avoid rejections as well as helping acceptance. The majority of the scholars in the academic literature have depicted that, the best way of getting their contribution and the support for the successful implementation is to get the employees' participation toward the change process of the organization. They always like to be recognized under the organizational brand and they are always willing to be a part of the decision-making process of the organization. According to data analysis, the purpose of this is to get the employees' active participation and the contribution to the success of the project while providing the benefits for them at a win-win scenario. Once their expectations (both monetary and non-monetary) are being fulfilled, they will be able to make their maximum contribution towards the success of the organization. Getting the employee contribution toward the success of the ERP system implementation can be identified as the most important factor because if the employees are not willing to contribute for the success of the implementation process, the cost and time spent for this project does not ensure any gain or ROI.

5.8 Contribution of Top Management will ensure the success of ERP implementation in the long run

According to the literature review, most of the scholars have clearly identified that the contribution of the top management is very significant when it comes to the successful implementation of ERP system. According to the study, from design to the execution, ERP system implementation processes required the maximum cooperation and the contribution of all the parties of the organization. With the involvement of the top management, it will be easy and effective to get the maximum contribution from all the relevant parties of the business organization. According to the literature review, in the role of the top management, their contribution to the implementation of ERP system is very important because they will show the direct guidance and the strategic path for the

successful implementation of ERP system. Top management is responsible for making strategic decisions of the organization & they are driving the business according to those strategies. According to the study, they also closely monitor changes occurring in the outside environment which will have an impact on these organization activities. So, they can guide the ERP implementation team from time to time to eliminate such negative effects & ensure that the ERP implementation is a success. Other than the contribution of top management from the strategic direction, their responsibility is to provide the required resources for the successful implementation of the ERP system of the organization.

Other than that, as for the data analysis, they will be engaged in the process of monitoring the ERP system implementation process regularly & provide necessary information for external stakeholders which they have power over this organization. The top management will always try to ensure a proper implementation process of the ERP system within their organization because it will directly influence the overall performance of their organization.

5.9 Effective communication is very critical

According to the literature review, it has been clearly identified that the majority of the scholars who studied in that area have concluded that, the effective communication is a very important factor when it comes to the ERP system implementation. A new system implementation can always give rise to unwanted errors and troublesome situations due to ineffective communication within the project team. So, in order to avoid this and to ensure a successful implementation, it has to have a proper plan for communication. According to the data analysis, the majority of the sample respondents hold the idea that, they prefer direct communication (face to face communication) where it ensures the reception of the message to the person by the person who sent the message same time.

According to the data analysis, there should be a proper communication within the project team to ensure each & every activity of the project is communicated from start to end. If the communication undertaken in the ERP implementation process is ineffective, it is difficult to continue as a proper teamwork and uniformity of the process cannot be achieved.

At the same time, communication plays a significant role in notifying the objectives and the processes of the business organization for the parties who are involved in the process and it will help to show the specific direction for those parties on how the organization should be changed. Communication should not be a one-step process as it should occur continuously in order to have an effective and successful implementation of the ERP system.

5.10 The need for an effective team composition to a successful implementation of the ERP system

When it comes to the ERP system implementation of the organization, it touches all the areas of the organization. According to the literature, it has been concluded that the competency of the set of skills on the team members is directly influenced by the successful implementation of the ERP system within the organization. It should ensure the successful installation and the implementation of each and every functional area of the business organization as the ERP system will get the benefited for all the functional areas of the organization., Therefore, as for the data analysis the project team should have to include a better composition of the team members from all the divisions within the business organization. It is preferable to include one responsible person from each of the functional areas of the business separately. If it is so, the problems and the troublesome situations that can arise in installing the ERP system for a specific function of the organization will be solved as soon as possible because there is a person represented by the relevant division.

As depicted in the literature review, the team composition should receive a considerable and an adequate compensation as well as incentives. Since the ERP system implementation is a separate thing that is apart from the core work of the employees within their organization, it should provide significant motivational cues to the members of the team. Initially, it is better to promote the financial benefits and then it is better to promote the personal competencies that they can gain from being involved in the process of ERP system implementation. Other than that, it is better to promote non-financial benefits such as recognition programs, certifications, delivering responsibilities, career developments, empower employees, employer branding and so on.

During the project implementation, there was a project management team to overlook the project and also two project managers   one from the implementation team and the other one from company side to carry on the project. There were two types of team involved in implementing the project for each company within the organization. One was the core team and the other one was the shadow team. The core team was selected from each company to drive the implementation process according to the selection criteria. The shadow team worked with the core team and the implementation team to reduce the gap of the business process and the technology of the new system. Shadow team was the central team and was involved in all the company's implementations and this resource was based in the central Group IT of the organization.

5.11 Business Process Re-engineering as a strategic weapon in successful ERP implementation.

According to the literature review, implementing the ERP system is, "Re-engineering of the business processes involved in the process of redesign or rethink the existing business processes to achieve better results". When it comes to the successful ERP System implementation, it plays a significant role. The purpose of the redesigning processes or the rethinking the processes is to ensure a higher growth of the organizational performance. According to data analysis, that may be a change in the process to enhance the quality of the products or the services, or it may be an enhancement of the speed of the services or it may be best practices of the newly deployed system or it may be a cost-cutting strategy to be implemented to achieve greater results within the organization. According to the literature review, the idea of business process reengineering (BPR) is to re-evaluate and separate existing business firms. According to the study, this enables an organization to decrease costs and enhance profitability through more up to date, more effective procedures. Without changing the behaviour of the process, this redesign process cannot proceed. So, it definitely makes some inconveniences for process owners. This makes it imperative to measure your choice deliberately. A standout amongst the most evident unfriendly impacts of an organization's choice to re-engineer is a brought down worker spirit. This perspective should be remembered when attempting to settle on the choice to proceed with the action. Some business processes were manual processes., and most of these manual processes were aligned with the new system. SAP system has world class best practice methodology to remedy this type of obstacles. Companies, without much

hesitation change their systems and implemented SAP process to improve internal processes under top management supervision. The legacy system had the business process separate from the sales process. With the new system all the business processes were aligned with the system to maintain purchasing with approval to sales and invoicing.

5.12 Influence made from other factors for the successful implementation of ERP system.

Other than the above significant factors, there are some other factors that are needed to be considered when it comes to a successful ERP system implementation. Technology infrastructure is one of them. According to the literature review, in order to achieve effective ERP implementation, the organization should have an upgraded and high level of Information Technology infrastructure where it enables the effective implementation and processing of the ERP system which will enable and create the background of the ERP system implementation.

As depicted in the data analysis, the majority of the sample respondents told that it is very important to get proper consultants' knowledge and the service and it will directly influence on the successful ERP system implementation within the organization. Organization culture plays a vital role in ERP implementation. Employees with open minds and without resistance to change will facilitate an optimum environment for the redesign of any business processes.

5.13 Chapter Summary

In this chapter, based on the data analysis, the results were discussed. Also from the previous literature, some conclusions were formulated. According to the results, key factors which were identified & used for formulating a hypothesis were proven by the survey analysis results & also supported by previous studies. Other than the Project Management, User Training and education, Change Management, Top Management Support, Effective communication, Team composition and Business process re-engineering some other factors like IT infrastructure of the organization also have an impact on successful ERP system implementation.

CHAPTER SIX

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The purpose of the research study which has been conducted is to identify the critical factors of implementing an ERP system for a group of companies in Sri Lanka. Since ERP is an emerging technology in the world, most of the companies are finding the ways and means of adapting the ERP into the business process of their organizations in order to achieve effective and efficient performance development within the organization. Some of the companies have optimized the ERP system within the organization. Since the majority of the organizations are seeking to get the ERP system, they are bound to face many challenges when they install and get the ERP system functioning within the organization. Based on human nature, employees are resistant to change and still like to stay and practice the systems and the procedure that they have engaged so far. Introducing ERP system will directly influence the organizational culture as well as the business model of the organization.

Both primary and secondary sources of data have been used for the study while the primary sources of data have been used predominantly within the research study in order to make meaningful findings on behalf of the organization. Conceptual framework identified seven independent variables namely, Project Management, User Training and education, Change Management, Top Management support, Effective communication, Team Composition and Business Process Reengineering. Quantitative qualitative data has been used for the study, which was collected from individuals who worked in the companies which have already installed the ERP system. After conducting the literature review, the researcher conducted a Pilot study which was based on the same questionnaire but was scheduled prior to the master data collection.. The pilot study included 2 individuals and based on their responses, few amendments were made for the master questionnaire. The data collection has been conducted through 10 individuals via in-depth interviews which were conducted separately by the interviewer by going to the meeting them personally. For analysis purpose and to have uniformity within the data collection, the researcher has developed a few questions according to the conceptual framework which was designed by the researcher at the

beginning of the study. According to the questionnaire, it has included three to five questions per an independent variable in order to get the better insights of them. Although there are many companies in Sri Lanka, which have already implemented the ERP system, due to the difficulty of approaching all the companies, the researcher has identified a sample which included 10 respondents from one multinational diversified organization in Sri Lanka which is The Capital Maharaja Organization Limited. The respondents who delivered the responses to the questionnaire are working in the areas of Accounting, Project Management as well as the technical department of the company.

In this study, it has purely focused on the qualitative study rather than identifying the qualitative nature of data and information. In a research area such as this, it is very important to get the qualitative insights from the respondents in order to predict more findings towards the research area.

ERP is an emerging concept which has emerged so far within the organizations as a new concept which facilitates the growth of the organizational performance. Implementation of ERP is not just a result of a single task. But it is the result of a series of tasks that will become a reality within the organizations once it receives the support from all the stakeholders of the organization.

In order to conduct the research study, seven independent variables have been selected. The findings of the qualitative study are totally dependent on the information given by the respondents. That means the success of the research study is totally dependent on how well they have responded to the many areas that were selected by the interviewer. According to the study, the respondents who were selected from the Capital Maharaja Company gave significant support for the interviewer by providing true and valid information regarding the implementation of ERP within their organization. Majority of them have truly discussed the problems they had to face during their process of implementation. Also, they have identified some specific areas that make the implementation process troublesome. According to them, it is better to motivate the core employees towards the new implementation of ERP within the organization and thereby they have expected to get the support of all employees to the success of the implementation of ERP within the organization. Since the employees are the deciding factor on the success or failure of the project implementation, in order to get the

activities done, it is very much important to motivate employees positively towards the ERP implementation. In order to satisfy the employees who are working according to a specific process within the organization, it will be much difficult to get their support for a total change of the process. Based on the new project implementation the ways and the means of working patterns of the employees will be totally difficult. For that, it requires a substantial motivation, and based on the effectiveness of the motivation that the employees received, the success of the ERP implementation will be varied. Not only the employee commitment but also there are some other factors such as the management of the project activities, the training and the education, management of change, the support given by top management, as well as the effective communication that have an impact on the success or failure of the project. Because the organization is a system which includes a number of elements that need to consist in order to have a new implementation, the interrelation of those factors would be more helpful to achieve a good result. So, conducting such kind of qualitative studies will be more informative for the people who are waiting to implement the ERP system in the near future within their organizations. It has a significant importance of the study findings as this kind of study is timely and holds immeasurable value.

When it comes to the findings of the study, initially it has undertaken some findings regarding the demographic information that has been taken by the researcher. In that, the majority of the sample respondents represented the employment period of 2 to 3 years. The sample respondents of the study played the roles such as Process Lead and the leader of the core team; to map processes and coordinate users, fulfilling requirements, Role of CIO, Project accountant for the ERP, Organising master data, Routing audit as well as IT aspects of internal control. Core team member. Master data planning, Supervise 2 SAP modules; SD (Sales and distribution) and FICO (Finance control), Steering committee member, Project management-overlook the implementation and the Head of operations.

6.1.1 Project Management

When it comes to project management, it has been found that it is a critical success factor for ERP implementation and it will directly influence the success of the ERP implementation. According to the analysis, it has been predicted that, in order to have an effective implementation of ERP, it needs to have a project management which

identifies a plan and work according to the plan. The project will coordinate the total process of ERP implementation within the organization and this will connect the front end and the back end of the organization in order to fulfil the organizational goals and the objectives.

6.1.2 User Training and Education

According to the analysis, it has been found that the majority of the sample respondents have identified user training and education as an important and critical success factor for the successful implementation of ERP system within the organization. In that, the majority of the sample respondents use formal ways and means of training and delivering the system related education for the users and at the same time, some of the sample respondents use a mix of formal and informal training methods and also use some on the job training mechanisms. The methodology of using the training in the sample respondents' organization is firstly done by giving a comprehensive training and education for the core workers and after that, they have allowed the core workers to train the subordinates on ERP implementation.

6.1.3 Change Management

As per the analysis was done in the previous chapter, it was evident that the change management of the organization is also a critical success factor in ERP system implementation of the organization. As per the insights received from the sample respondents, it is very difficult to manage the change within the organization as the majority of the people are normally resistant to change from routine procedure to a new procedure or a system. This is an important consideration in which employees are needed to be addressed to have a better implication of ERP; unless change management is addressed, it will bring harmful effects for the entire procedure and the organization. Based on the respondents' insights, it was found that, in order to have better management of the change, first and foremost they are in the process of changing the employee attitude and the mindset favourably towards the implementation of the ERP system within the organization.

6.1.4 Top Management support

According to the analysis, the support given by the top management for the success of ERP system is very much important and found that it is a critical success factor and that

has a direct and high impact on the effective ERP implementation within the organizations. According to the findings, it was identified that it is very much important to get the top management support and the authority to implement the ERP system within the organization. It was evident that, since the top management is the ones who are engaged in the process of decision making within the organization, their contribution is essential in ERP implementation.

6.1.5 Effective communication

Communication is an essential part of each and every implementation which is undertaken by the organization. In ERP implementation also, the communication plays a significant role and it has been found that effective communication also plays a critical success factor of ERP implementation and it has a high impact on the success of the ERP implementation of the company. As identified in the research study, the majority of the sample respondents hold the idea that, it is very much important to have a two-way communication which ensures the reception and the feedback at the same time. Also, it has been found that it is very much important to identify whether the plan is implemented according to the planned way or not. So, effective communication will ensure the effective implementation of the ERP system. Majority of the respondents hold the idea that it is very much important to have face to face or direct communication as it ensures the reception of the message on time.

6.1.6 Team composition

Apart from the other variables that have been identified in the research study, the team composition has a significant impact on the ERP implementation. According to the ideas and the insights given by the employees, the right skills and the experience of the right members will directly influence the function of the organization. Accordingly, it has to find the accurate mix of the employees. Also, the leader of the team should have to have a proper understanding of the skills and the abilities of the members of the team. So, thereby the leader or the project manager should have received knowledge of who is good for which skill.

6.1.7 Business process re-engineering

It has been found that the business process re-engineering can be identified as a critical success factor for successful implementation of ERP system and there is a high and

significant impact towards the successful implementation of ERP system. According to the analyses, it was evident that ERP undertakes a redesign and re-engineering of the business process. So it has to change the existing business processes of the organization.

6.2 Recommendations

In order to have an effective ERP implementation, it is extremely important to form an effective project management strategy which emphasizes the long-term implication of the ERP system. The project should be well planned and there should be a reliable mode of communication which makes the necessary adjustments to the master plan when it is needed and required for evaluations.

Users or the employees are the key players for the success of an effective implementation of an organization. In order to get the maximum contribution from them, it is essential to give them a comprehensive training and the subject related education for the users of the system. First of all, it has to critically analyse the knowledge, abilities and the skills available for the specific employees who have been selected for the project team to implement the ERP system within the organization. Once the existing level of skills, knowledge and the abilities have been identified, it is very much important to analyse the requirement of skills, knowledge and the abilities of the employees for the implementation of ERP system within the organization. After identifying the existing level and the expected or required level of skills, knowledge and the abilities of the users, it is better to design a strategy for delivering the required training and education for the users. Once they receive the specific requirement of training and the education, it is better to provide the training and the required subject education for all the users who participate in the implementation of the ERP system within the organization.

It is better to provide motivation to have an effective participation in the training programs conducted by the employees within the organization. Also, it is very much important to ensure the delivery of relevant knowledge regarding the ERP implementation and that will directly influence the successful implementation of ERP.

It is also recommended to analyse the requirement and the standard of environmental factors as well as the other related factors to have a better agreement with the employees towards the implementation of the ERP system within the organization. Also, it is very

much important to communicate with the employees about the favourable and the positive environmental conditions which are solely developed for the sake of changing their mindset and the attitude towards the effective implementation of ERP system within the organization. Other than that, it can appoint some change agents which in turn will change the mindset of the people involved in these activities. Both financial and non-financial benefits should be given to the employees to promote the ERP system.

It is recommended to get the team members' support to develop and create the implementation design of the ERP system within the organization. To some extent, it will be able to get their involvement in the decision making process and this will directly and favourably influence on the successful implementation of the ERP system.

Getting the contribution of the top management is very much important in any implementation which is undertaken in the organization. It is very much worth if it can develop the proposal of ERP implementation with the benefits and the advantages that can be received for the personal and the organizational objective achievement. Once the top management support toward the project is ensured, it is better to start the project soon and to give the feedback and the standard of the project implementation to the top management because it will bring benefits for the project management team. The top management will create a positive attitude toward the team and they will recognize the need for their support for the team.

It is recommended to have continuous and productive communication modes from time to time with the feedback and the evaluations of ERP system implication. It is recommended to continuously conduct formal communication modes for communicating rather than informal ways of communication. Also, it is advisable to nominate two or three persons in the project team as the spoke persons for communication purposes in the project team. It should ensure the participation of all the members of the project team for the effective communication. It is better to develop an internal network among the members of the project team which will ensure instant communication.

In the process of ERP implementation, it should first identify the composition of the team needed for the successful ERP Project team. Then it should select the calibre members from the organization or outside the organization. Once the selection is made,

it is better to orient them for the ERP system instalment. Once the members of the ERP project team are selected, it is very much important to get them to coordinate with each other by getting them to know each other. It is recommended to have favourable relationships between each member of the team. In order to do this, some interactive sessions and also morale building sessions can be organized.

It is recommended to provide an overall idea towards the change of the business process to all the members of the project team. Once the idea of an overall idea and training, education for the team members has been delivered, it will be easier to implement the system as it connects with the team members' immense and recognized contribution. The business process should be changed according to the system with minimum customisation yet aligned with the business needs.

It is recommended to have proper data migration process from the legacy system to the new system so that at system cut-off date the final figures and clean master data is made available.

Implementation of ERP system within an organization is not just a matter of how well the professional experts handle and manage the instalment within the organization. It is very much important to get every one's participation in making the change within the organization. Once it has introduced the change for the organization, the success of the change implementation will depend on how well the people will support the change. In order to get their support, it requires motivating them by emphasizing the importance of being engaged with ERP to the employees' professional lives as well as the goal achievement of both employees' and the organizational goals. It can be concluded that, in order to have a successful implementation of ERP system within the organization, it should have to critically consider the factors such as Project Management, User Training and education, Change Management, Top Management support, Effective communication, Team Composition and Business Process Reengineering.

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Questionnaire

Critical Success Factors of implementing an ERP system for group of companies in Sri Lanka

Interviewee	
Company	
Occupation	
Location	
Date and Time	
Recorded (Yes/No)	
Complete (Yes/No)	
Additional Remarks	

1) Could you please tell a little bit about your company or Group?

a) Is the company machine intensive or people intensive?

b) Number of employees who will be using the system?

c) Their level of usage?
Very High ☐   High ☐   Average ☐   Low ☐   Rarely ☐

2) Could you please tell me about yourself and relationship with the company or group?

a) Duration of the current employment?

Less than one year ☐   1 - 2 years ☐   3 – 5 years ☐   More than 5 years ☐

b) Work experience in the industry (past employment)?

Less than one year ☐   1-2 years ☐   3–5 years ☐   5–8 years ☐   More than 8 years ☐

c) What were your roles during the ERP implementation?

3) What is your opinion about your Company/Group current ERP system?
Very good ☐　　Good ☐　　Useful ☐　　Not very useful ☐　　Very poor ☐

4) Was it a successful implementation?

Very successful ☐ Successful ☐　　Average ☐　　Successful in very few areas ☐ Complete failure ☐

Project Management

5) Do you think that project management was a critical success factor to implement the ERP system? If so, then why?

Yes　　☐　　No　　☐

6) Who managed this project during the implementation?

7) What is your opinion of the project management during the ERP implementation?

8) What kind of impact did project management have for successful ERP implementation?

User Training and Education

9) Do you think that user training and education was a critical success factor to implement the ERP system? If so, then how?
Yes　　☐　　No　　☐

10) What kind of impact did user training and education have for successful ERP implementation?
    If yes, how did it impact the success/failure?

11) What is the process you followed to train and educate users?

Change Management

12) Do you think that change management was a critical success factor to implement the ERP system? If so, then how?
    Yes　　☐　　No ☐

13) How did you plan the change?

14) What Change Management activities did you carry out during your ERP implementation?

15) How successful was your efforts in Change Management?

16) What kind of impact did Change management to successful ERP implementation?

Top Management Support

17) Do you think that top management support was a critical success factor to implement the ERP system? If so, then why?
Yes ☐ No ☐

18) How does top management support the ERP implementation?

19) What kind of impact did Top management support to successful ERP implementation?

Effective Communication

20) Do you think that effective communication was a critical success factor to implement the ERP system? If so, then how?
Yes ☐ No ☐

21) Did communication helped to successfully implement the ERP system? If yes, please can you give us some examples of how effective communication help to successful ERP implementation?
Yes ☐ No ☐

22) What kind of impact did Effective communication have for successful ERP implementation?

23) What are the most effective communication methods?

Team Composition

24) Do you think that team composition was a critical success factor to implement the ERP system? If so, then how?
Yes ☐ No ☐

25) Was there a project manager or project management team to overlook ERP implementation process?

26) What was the team selection criterion of the ERP implementation?

27) What kind of impact did Team Composition to successful ERP implementation?

Business Process Reengineering

28) Do you think that business process re-engineering was a critical success factor to implement the ERP system? If so, then how?

      Yes   ☐   No   ☐

29) Are there any changes to the existing business processes with the introduction of the new ERP system?

      If yes, what are the changes that were made to the business processes?

30) What kind of impact did Effective communication have for successful ERP implementation?

Additional Factors

31) Are there any additional factors that you consider as critical? If so, what are they and how did they contribute to the success?

<div align="center">

!!! Thank You !!!

</div>

Interviewees Detail Summary

Interviewees 1

Interviewee	Nalaka Seneviratne
Company	The Capital Maharaja Organisation
Occupation	Sector Finance Controller
Location	Union Place
Date and Time	14/07/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 2

Interviewee	Saman Perera
Company	The Capital Maharaja organization
Occupation	CIO
Location	Union Place
Date and Time	02/06/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 3

Interviewee	K. Sanjeev
Company	The Capital Maharaja Organisation Limited
Occupation	project accountant for the ERP
Location	Union Place
Date and Time	22/06/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 4

Interviewee	T. Pakeerathan
Company	The Capital Maharaja Organisation Limited – Audit Division
Occupation	Assistant Manager Internal Audit
Location	Dawson Street
Date and Time	30/06/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 5

Interviewee	Janaka Mohan
Company	The Capital Maharaja Organisation – Audit Division
Occupation	IT Audit Manager
Location	Colombo 2
Date and Time	14/07/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 6

Interviewee	Wasana Mallikahewa
Company	The Capital Maharaja Organisation Limited – Group IT Division
Occupation	Senior Consultant - ERP
Location	Union Place
Date and Time	19/07/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 7

Interviewee	Shalaka Perera
Company	PE Plus Private Limited
Occupation	Accountant
Location	Pe Plus Private Limited, Jaela
Date and Time	31/07/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 8

Interviewee	Sumith Kumara
Company	Pe Plus Private Limited
Occupation	General Manager
Location	Pe Plus Private Limited, Jaela
Date and Time	31/07/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 9

Interviewee	Eshini Mudalige
Company	The Capital Maharaja Organisation – Group Audit
Occupation	Group Director – Group Audit
Location	Colombo 2
Date and Time	11/08/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Interviewees 10

Interviewee	Naradha Gamage
Company	Harcros Chemical private limited
Occupation	Director / General Manager
Location	Dawson Street, Colombo 02
Date and Time	30/10/2017
Recorded (Yes/No)	Yes
Complete (Yes/No)	Yes
Additional Remarks	

Factors Selection