Factors affecting the implementation of ERP systems in organisations in the U.A.E.

العوامل المؤثرة في تطبيق انظمة تخطيط موارد المشروع

في المنظمات في الامارات العربية المتحدة

By
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Dissertation submitted in partial fulfilment of
MSc Project Management

Faculty of Business

Dissertation Supervisor
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November 2010

DISSERTATION RELEASE FORM

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Deema Raouf Sayegh	**90038**	**Project Management**	**1 NOV 2010**

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Abstract

Due to organisations wanting to remain competitive in their markets by having accurate data and making strategic decisions, Enterprise Resource Planning (ERP) systems were introduced. ERP systems grew rapidly particularly in the 1990's due to the Y2K scare, mostly, and also the technological growth assisted in this introduction where all data was considered accessible through computer systems. The emergence of ERP systems assisted managers in making speedy and strategic decisions. This research studies the benefits of ERP systems, their scope and their critical success and failure factors that need to be considered prior to the implementation of ERP systems to ensure successful project outcomes. This research specifically considers one kind of ERP system – ORION. It is a system that is used to integrate business processes across the different stakeholders in projects while ensuring efficient and effective organisations.

By studying different literature on this topic and through creating a conceptual framework that was used as a basis of the semi-structured interviews that were held, a total of eight critical success factors (CSF's) were derived where twenty-four sub-factors were associated with them. It also proposed six critical failure factors (CFF's) with fifteen sub-factors associated with them. The factors have been divided up into three project phases; pre-implementation, implementation and post-implementation. The CSF's are *Strategic visioning and planning* (*Factor 1*) and it needs to be considered as part of the pre-implementation project phase. *Factor 2 - Change Management, BPC & BPR, Factor 3 – Communication, Factor 4 - ERP strategy & Implementation Team, Factor 5 - Project Management, Factor 6 - Management Support &Involvement*, have been classified as part of the implementation phases and *Factor 7 - Performance Evaluation* and *Factor 8 - Organisational fit of ERP systems/technical support* have been classified as part of the post-implementation phases of an ERP project.

Findings of the critical failure factors (CFF's) have presented that Factor 1 - Not clear Strategic Visioning & Planning is a part of the pre-implementation project phase. Factor 2 - Poor Change Management, Factor 3 - Lack of Communication, Factor 4 -

ERP strategy & Implementation Team are part of the implementation phase while Factor 5 – Performance Measurement and Factor 6 - Lack of Organisational fit of ERP systems/technical support difficulties have been classified as being part of the post-implementation phases of ERP system implementations.

Recommendations for managers are based on findings from the case studies, where the CSF's are used as factors that are recommended to be considered when implementing ERP systems to ensure project success, while the CSF's have been presented as factors that managers should be aware of to avoid project failure.

Keywords: *Enterprise Resource Planning (ERP) systems, ORION, Project Phases, Critical Success Factors (CSF's) and Critical Failure Factors (CFF's)*

الخلاصة

بسبب ان التنظيمات تريد البقاء على منافسيتها في اسواقها عن طريق بياناتها الدقيقية وعمل القرارات الاستراتيجية فإن انظمة تخطيط موارد المشروع "إي ار بي" جاء تعريفها وقد نمت بسرعة وبالاخص في تسعينات القرن الماضي بسبب "واي 2 كي سكير" في الاغلب وكذلك بسبب النمو التكنولوجي الذي ساعد في هذا التقديم حيث جميع البيانات اعتبرت بأنها قابلة للدخول عن طريق انظمة الكمبيوتر. ان دخول انظمة تخطيط موارد المشروع ساعد المديرين لاتخاذ القرارات الاستراتيجية السريعة. هذا البحث يدرس مزايا انظمة تخطيط موارد المشروع ومجالها نجاحها وعدم نجاحها من العوامل التي ينبغي اخذها في الاعتبار قبل تطبيق انظمة تخطيط موارد المشروع لضمان ناتج ناجح للمشروع. هذا البحث يأخذ بالاعتبار بصورة محددة نظام واحد من تخطيط موارد المشروع – "اوريون" هو النظام الذي يستعمل ليوحد عمليات الاعمال من خلال اصحاب المصلحة المختلفين في المشروع بينما يضمن التنظيمات ذات الكفاءة والفاعلية.

بدراسة الجوانب المختلفة في هذا الموضوع عن طريق وضع هيكل بالمفهوم الذي استعمل كأساس للمقابلات المرتبة التي عقدت وعددها ثماني عوامل ناجحة ما نتج عنها 24 موضوع جانبي فإنها اقترحت كذلك ست عوامل فشل حرجية مع خمسة عشر عامل فرعي مرتبط بها. تم تقسيم العوامل الى ثلاثة مراحل للمشروع؛ ماقبل التطبيق والتطبيق وما بعد التطبيق. ان عوامل النجاح الحرجة المرتبطة بها هي نظرة استراتيجية وتخطيطية (عامل 1) وتحتاج لاعتبارها كجزء من مرحلة ما قبل تطبيق المشروع. العامل (2) تغيير الادارة، "بي بي سي" و"بي بي ار"، عامل (3) الاتصال، عامل (4) استراتيجية انظمة تخطيط موارد المشروع وفريق التطبيق، عامل (5) ادارة المشروع، عامل (6) دعم الادارة والانخراط فيها وقد صنفت كجزء من مراحل التطبيق والعامل (7) تقييم الاداء، والعامل (8) ادخال تنظيمي لانظمة تخطيط موراد المشروعات/ الدعم الفني وقد صنف كجزء من ما بعد مراحل التطبيق بمشروع تخطيط موارد المشروع.

مكتشفات عوامل الفشل الحرجة "سي اف اف" اعطت العامل (1) رؤية استراتيجية وتخطيط غير واضح هو جزء من مرحلة ما قبل تطبيق المشروع. العامل (2) تغير الادارة السيء، العامل (3) الحاجة للاتصال، العامل (4) فريق استراتيجية وتطبيق تخطيط موارد المشروع هما جزء من مرحلة التطبيق بينما العامل (5) قياس الاداء والعامل (6) الحاجة للتنظيم في انظمة التخطيط

لموارد المشروع وصعوبات الدعم الفني صنفت بأنها جزء من مراحل ما بعد التطبيق في تطبيقات نظام التخطيط لموارد المشروع.

التوصيات للمديرين تأسست على المكتشفات من دراسات المسألة حيث ان عوامل النجاح الحرجة "سي اف اف" استعملت كعوامل عند تطبيق انظمة التخطيط لموارد المشروع لضمان نجاح المشروع بينما عوامل الفشل الحرجة "سي اف اف" قد تم تقديمها كعوامل التي على المديرين ان يتنبهوا لها لتجنب فشل المشروع.

الكلمات الرئيسية : انظمة تخطيط موارد المشروع "إي ار بي"، "اوريون"، مراحل المشروع، عوامل النجاح الحرجة "سي اس اف" وعوامل الفشل الحرجة "سي اف اف".

Acknowledgment

This research was prepared in partial fulfilment of an MSc degree in Project Management at the British University in Dubai (BUiD). I would like to express my appreciation to the faculty, staff and the library for assisting me in completing this thesis. Specifically, my gratitude goes out to my dissertation supervisor, Dr.Arun Bajracharya for supporting and guiding me throughout this research.

I would also express my gratitude to Sayegh Establishment (business consulting services) and 3i-Infotech, vendor of ORION - ERP system and partners with Sayegh Establishment, for their support and assistance when required. This research would not have been made possible without the organisations and the interviewees that took time to assist me in collecting data for this research.

Dedication

I dedicate this thesis to more than one...

> But rather to some...
>
> *My Family*...

My father, Dr.Raouf Sayegh...

> *For his guidance and knowledge where every day I learn something new from him.*

My mother, Maha Sayegh...

> *For her continued support, encouragement and my constant champion throughout my studies and life.*

My sisters, Adelle, Shatha and Dayana...

> *Who I look up to and who support me unconditionally...*
>
> Especially Dayana...
>
> *For her patience, wisdom and for showing me that anything is possible with faith and determination.*

The final words are for my dearest friends – *who know who they are*...

> *Where every morning the first question was, 'what page are you on?' and the conversation would end with...'You can do it!'*
>
> *...those words pushed me to prove I CAN DO THIS!*

To all who read this...

> *Hope you enjoy reading it as much as I enjoyed writing it!*

Deema Sayegh

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Abbreviations

ERP – Enterprise Resource Planning

CSF – Critical Success Factor

CFF – Critical Failure Factor

P.M. – Project Management

BP – Business Processes

HR – Human Resources

BPR – Business Process Reengineering

BPC – Business Process Change

Chapter 1 – Introduction

1.1 Introduction/ Background

With the current emergence of Enterprise Resource Planning (ERP) systems since the 1990's, it has become common for many organisations to rely on them to ensure they remain competitive within their markets and industries. Research highlights that ERP systems grew largely towards the end of the 1990's due to the Y2K scare (Jacobs and Weston Jr., 2007).Business environments are continuously changing and it is realised that with ERP systems, organisations can make accurate and quick decisions based on the data that can easily be retrieved from these systems.

Nah et al. (2001, p.286) have highlighted that 'ERP systems hold the promise of improving processes and decreasing costs'. ERP systems are basically software where data is fed into them and extracted from them as well. They are fully integrated systems that combine the entire business processes. They primarily work on computers where data can be updated by the users of the system. Typically, an ERP system has limited users. The number of users is determined by the organisations where they also choose who they want to have access to them. User licenses usually vary from 1 – 100+. Organisations choose certain ERP systems depending on their requirements. Usually, ERP systems encompass data relevant to human resource management, procurement, inventory, financials and project management. They are used across departments and their benefits are great if their implementations are considered as successful. Al-Mashari et al. (2003) have explained that an ERP system is one that uses an application where organisational functions and database are integrated into one system as a user interface. They encompass organisation-wide processes whilst integrating the different modules to ensure constant updates on the system that can be accessed to make quick and strategic decisions. The different modules include procurement management, inventory management, financial & fixed assets, project management and human resource management & payroll (Newman and Westrup, 2005; Holland and Light, 1999; O'Leary, 2004).

With that, we tend to see the importance of having successful ERP implementations. If an ERP implementation tends not to create integration between the different

modules, when it was intended to do so, then the project could be considered a failure as it has not reached its requirements and the scope has not been met therefore, the benefits have not been realised. This research plans to highlight the different benefits of ERP systems along with the critical success and failure factors (CSF's and CFF's) associated with these system implementations to ensure that a project outcome is successful when considering all the factors that could impede on project performance or accelerate and improve project outcome when considered. For that, it is necessary to understand these factors to either avoid them or consider them during the planning phase of the project.

1.2 Research Issue/Problem

To ensure a successful ERP implementation project is the reason as to why this research has become of interest. The research studies the success and failure factors of ERP implementations where it assists in implementing successful projects.

1.3 Aim & Objectives

The ultimate aim of this research is to understand the critical success and failure factors of ERP system implementations in organisations that are based in the U.A.E.. With that, the objectives are as follows:

1. Study ERP systems in terms of highlighting their scope and benefits
2. Study the critical success and failure factors of ERP systems from different literature to create certain understanding
3. Through a multiple case study approach, form an understanding of what organisations in the U.A.E. have to report on their implementations
4. Propose a conceptual framework that can be used as a basis to ensure successful ERP implementation projects.

1.4 Research Questions

The research questions that have been drawn from the different literature studied and the different cases analysed are as follows:

1. How do the users of ERP systems perceive critical success and failure factors of ERP system implementations?

2. How do the critical success and failure factors influence the outcome of ERP system implementations?

3. What are the critical success and failure factors that should be considered prior to the commencement of ERP system implementations, specifically in the U.A.E..?

In the end of my research, a framework will be proposed that has been derived from the above questions where it is of high interest to ensure successful ERP system implementations.

1.5 Scope of Work

This research paper intends to draw out the critical success and failure factors of ERP system implementation in organisations, specifically, in the U.A.E.. For such to occur, it would be necessary to fist understand what ERP systems are, their scope, characteristics and benefits. By studying the different literature, we can form an understanding of ERP systems from which we would also gather the different CSF's and CFF's. From the different literature, a conceptual framework will thus be provided that will be used as the basis of this research. Different organisations that have implemented ERP systems will be interviewed following the multiple case study and qualitative approach for data collection. From the data gathered from the interviews, the conceptual framework will either be accepted as it is, it will be rejected as a whole, or the differences in research will be highlighted.

The different organisations that have been selected to participate in this research have been selected based on a few criteria. One of the criteria is that they have implemented a specific ERP system in their organisations. That specific system is ORION ERP system. A brief about ORION system is provided below.

1.6 ORION – An ERP system

ORION is a solutions offering system that is structured to meet an organisation's future needs in different processes that leads up to supply chain management, e-procurement and customer-relationship management (CRM). ORION intends on integrating business processes across the different stakeholders in project; suppliers, partners, employees and customers. That will help organisations in being more efficient and effective.

The industries that this system targets are as follows:

- General Trading & Distribution

- Chemical Distribution & Manufacturing

- Pharmaceutical Distribution & Manufacturing

- Food & Beverages Distribution & Manufacturing

- IT Distribution

- Services

The scope of the system, however, is divided into financials & operational. They each include the following:

Orion Financials	Orion Operations
• General Ledger • Accounts Receivable • Accounts Payable • Budgeting • Bank Reconciliation • Letter of Credit • Post – dated Cheques (PDC) Management • Fixed Assets	• Inventory Management • Procurement Management • Sales & Distribution • HRM & Payroll • Quality Management • Job Contracting • Sub Contracting

Table 1-1: Scope of ORION ERP system

Table 1-1 divides the financial segment from the operations segment of ORION. The financials deals with the financial and accounting aspect of the business where a full summary of an organisations financials can be presented. The operations segment deals with the everyday operations of an organisation such as its inventory, human resources, etc…

A typical ERP system is set up in a way that creates and assists the direct link between suppliers and customers in a way that is beneficial and effective for both

entities. Another way of looking at the ERP systems business process modeller, and specifically ORION, would be to consider Figure 1-1 below.

```
┌──────────────────────────────────────────────────────────────────┐
│                           ERP system                              │
└──────────────────────────────────────────────────────────────────┘
       ↑                       ↑                          ↑
┌──────────────┐      ┌──────────────────┐      ┌──────────────────────┐
│ Orion Desktop│      │ Business alerts  │      │ Document management  │
│ with different│     │ and on-demand    │      │ and integration      │
│ applications │      │ information      │      │                      │
└──────────────┘      └──────────────────┘      └──────────────────────┘
       ↑                       ↑                          ↑
┌──────────────────────────────────────────────────────────────────┐
│              ORION business process modeller                      │
│              (Administration and configuration)                   │
└──────────────────────────────────────────────────────────────────┘
                              ↑
┌──────────────────────────────────────────────────────────────────┐
│                     Core Business Functions                       │
├────────────┬────────────┬────────────┬────────────┬──────────────┤
│ Procurement│ Inventory  │ Financial &│ Project    │ HRM &        │
│ Management │ Management │ Fixed Assets│ Management │ Payroll      │
└────────────┴────────────┴────────────┴────────────┴──────────────┘
```
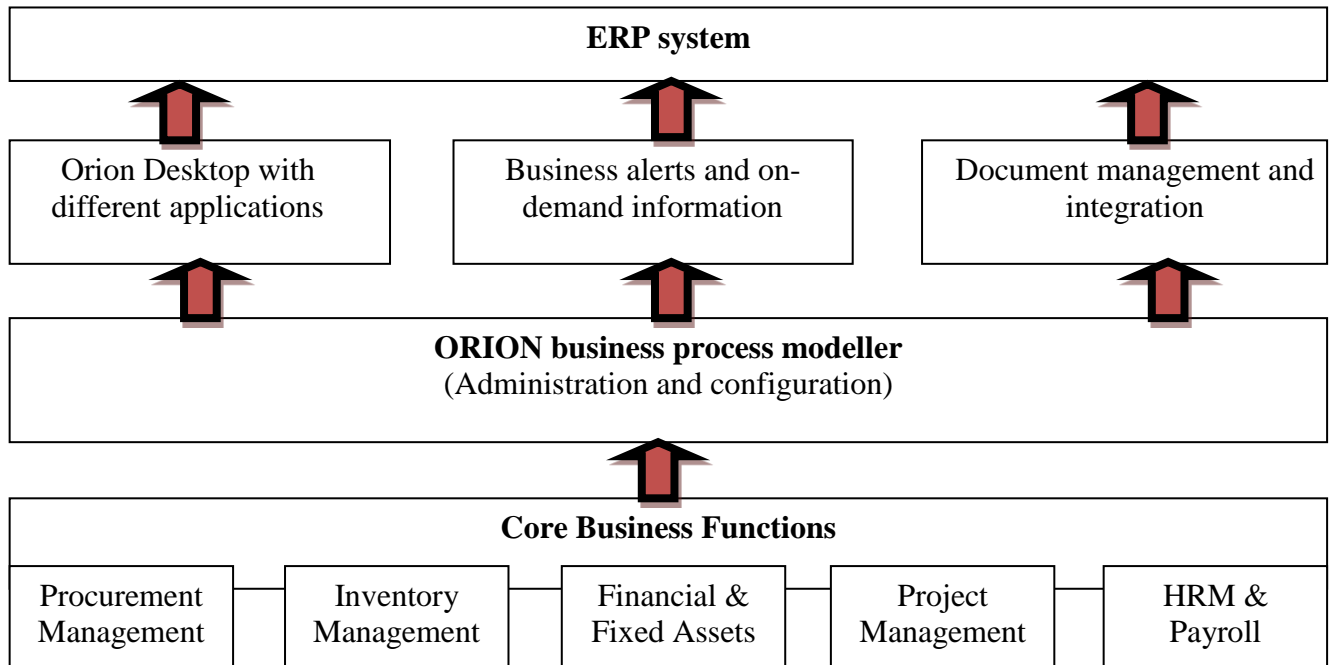
Figure 1-1: Business process modeller of ORION

Figure 1-1 presented how the core business functions of an organisation feed data into the ORION business process modeller which is the database that is monitored by administrators and configured in a way to suit the business requirements. The output would be providing information on the ORION desktop, business alerts and on-demand information and document management and integration. All these components are what make up the ORION ERP system and similarly with other ERP systems. If such is done successfully, benefits of deploying the ERP system will be realised.

1.7 Outline of this Research

The chapter to come will first take us through understanding the different literature. The *literature review* chapter (***chapter 2***) provides an understanding on the different researches previously done that act as a basis of this research. Having studied the different literature, we will then go to ***chapter 3*** that will present the conceptual

framework derived from the literature. We will later go through the research methodology chapter (***chapter 4***) where we will investigate the research method that the research has undertook, how data were gathered and how it will be analysed. The analysis will then be presented in ***chapter 5*** providing an interpretation of the data gathered. Finally, ***chapter 6***, *conclusions and recommendations*, will propose a framework that can be used prior to the commencement of ERP system implementations. It will also propose recommendations that can be used for further research.

Chapter 2 – Literature Review

2.1 Introduction

The literature review to come will present an introductory section of ERP systems, where an understanding on the systems characteristics and benefits will be gained. From there the scope of ERP systems will be looked at and one particular ERP system – ORION - will be discussed. How these systems can be implemented and the role of the project manager will also be explained where different process models will be presented. From there, the critical success and failure factors that are attached to ERP system implementations will be studied and a summary of the literature review will be provided.

2.2 Introduction into ERP systems

With the continuously changing business environment and in order for organisations to remain competitive in their industries, it is crucial for them to continuously improve their business tactics. Over time, many organisations have come to realise the need to make accurate and speedy decisions mainly on their resources. Systems that manage their information needs have become popular with time and they are referred to as Enterprise Resource Planning (ERP) systems. According to Jacobs and Weston Jr. (2007), who have done extensive research into the development of the ERP systems, reported that ERP systems emerged in the early 1990's. They grew during the mid 1990's, as a scare from the Y2K problem and the need for organisations to adopt a system that fully integrates their functions. It hit its growth peak after Y2K. The growth was due to the successful passing of the Y2K predicament along with the advances in technology that allowed for data merge within departments in organisations. Boonastra (2006, p.38) has defined ERP systems as 'software packages that enable the integration of transactions oriented data and business processes throughout an organisation'. Wang and Nah (2001: cited in Nah et al., 2001) have also added 'e-business' and 'supply chain management' as further promises that ERP systems provide. All aspects of ERP systems aim at integrating data within organisations so as to create a full database that can be accessed with ease. Direct, continuous updates allow for positive interaction between decision makers from different departments where information can be communicated and generated precisely and promptly. Organisations that have successfully implemented ERP

software have seen the benefits of it. Some of the organisations that have not had successful implementations have witnessed bankruptcy (Bhatti, 2005; Whang et al., 2003) and have developed a negative reaction towards ERP systems (Bingi et al., 1999).

This explains the severity of implementing the right methods required to achieve best performance and attract the benefits that have proved to be high in ERP systems. In doing so, it becomes necessary to understand, evaluate and assess the critical success factors (CSF's) as well as the factors that could hinder implementation; critical failure factors (CFF's). This is done to ensure that ERP systems enhance and ease an organisations business needs rather than threatening its wellbeing. The literature review to come will be a collaboration of different research that assesses CSF's and CFF's that are important to ensure a positive transformation into the use of ERP systems. Before that, we will look deeper into the characteristics, benefits, scope of ERP systems especially ORION system, the implementation of ERP systems, the role of the project manager and the different process models that are proposed to be used in the ERP implementation project.

2.3 ERP Systems Characteristics & Benefits

ERP systems are greatly known for their characteristics that qualify them as being highly dependable integration solutions for the core business solutions of organisations. They provide an all-inclusive system that covers all aspects of the business that can be easily accessed and shared across the different departments in organisations. They provide data for strategic decision making and have full access to organisation-wide information that is fully integrated into one system to facilitate rapid decision making, cost reductions, and greater managerial control (Holland and Light, 1999). Depending on the ERP system, different components of data can be accessed. According to Davenport (1998), there is a single central database where data is collected and dispersed into the different modules of an organisation where information on all the business activities across the organisation can be accessed internally and across multi-sites even if they were around the world. Davenport (1998) further explains that when information is inserted into the system by one user, any information related to that is directly updated accordingly. This is further explained in Figure 2-1.
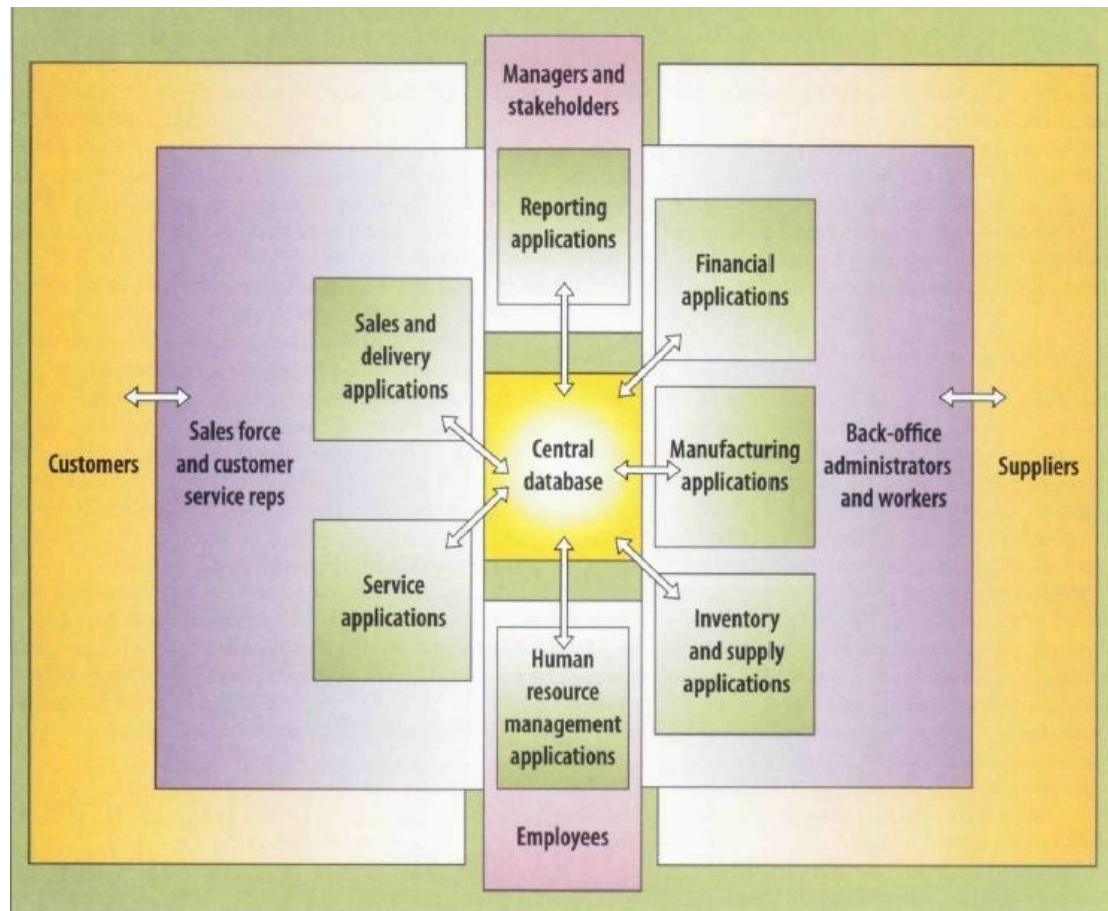
Figure 2-1: 'Anatomy of an Enterprise System' (adapted from Davenport, 1998: 124)

Figure 2-1 illustrates the flow of information in an ERP system and how certain data provides people with direct access to real-time information. The figure also illustrates the stakeholders that feed information into or extract information out of the ERP system. As depicted from the figures, the central database feeds information into the *sales and delivery applications*, *service applications*, *human resource management applications*, *inventory and supply applications*, *manufacturing applications*, *financial applications* and the *reporting applications*. Data is fed into these departments where it then becomes accessible by all other departments. On the one side, the *sales forces and customer service representatives* have certain access to certain data while on the other side, *the back-office administrators and workers* have access to other data that is relevant to their needs. It then becomes a process where the sales force and customer service reps feed information to the customer and vice-versa where the customer will provide information to the sales force that would need to be

fed into the system where data will be updated accordingly and the rest of the stakeholders can access such information. Likewise, the back-office administrators and workers provide data to the suppliers, about stock, for instance, and the suppliers then give them feedback on the quantity of that stock that they will need. The back – office will then input the quantity into the system and other departments can then have access to that information. That was merely used as an example to present inventory and supply chain management. Basically, that is how ERP systems work. Data is provided across different departments and extracted from the central database where that information can then be provided to the concerned people. In the end, the final stakeholders are either the customers or the suppliers and organisations deploy the ERP system to ensure competitiveness, robustness and efficiency in their work. Many organisations have realised the benefits that could be gained from the use of ERP systems. It is said that productivity and speed have increased within organisations that utilise ERP systems (Davenport, 1998; Holland and Light, 1999).

Al-Mashari et al. (2003) have highlighted that benefits of ERP systems are best realised when a business assesses its performance measurement after having implemented an ERP system within. It is expected that the benefits realised would be operational, managerial, strategic, IT infrastructure and organisation-wide. O'Leary (2004) adds that benefits realised are split into those that are tangible and intangible. These are described in Table 2-1.

Tangible benefits realised	Intangible benefits realised
~ Inventory reduction	~ Information/visibility
~ Personnel reduction	~ New improved processes
~ Productivity improvements	~ Customer responsiveness
~ Order management improvements	~ Cost reduction
~ Financial close cycle reduction	~ Integration
~ IT cost reduction	~ Standardisation
~ Procurement cost reduction	~ Flexibility
~ Cash management improvement	~ Globalisation
~ Revenue/profit increases	~ Y2K
~ Transportation/logistics cost reductions	~ Business performance
~ Maintenance reductions	~Supply/demand chain
~ On-time delivery	

Table 2-1: Tangible & intangible benefits of ERP systems

Table 2-1 has presented the tangible and intangible benefits that organisations realise. In terms of the inventory, personnel and IT reductions, among other benefits, that directly affect the cost of projects, these clearly are tangible benefits that organisations should realise after deploying a successful ERP system. Being flexible, their business performances, the integration of their work, among others benefits, are also considered as benefits realised except that they are not concrete items that can be touched to prove they exist.

2.4 Scope of ERP systems

An integrated system that accesses and disperses data across the different business units in an organisation, where timely and accurate information can be accessed, is the key and ultimate goal of implementing an ERP system within organisations. Different business units would be able to access the data in the central database which has proved to be efficient and effective if implemented well and having the implementation project being considered as one that is successful.

Selection of an ERP system for a certain organisation would depend on the industry it is used in. According to literature (Newman and Westrup, 2005; Holland and Light, 1999; O'Leary, 2004), business functions such as procurement management, inventory management, financial & fixed assets, project management and human resource management & payroll are the typical data components of ERP systems and specifically those of ORION, which is a specialised ERP system. Such is presented in Figure 2-2.
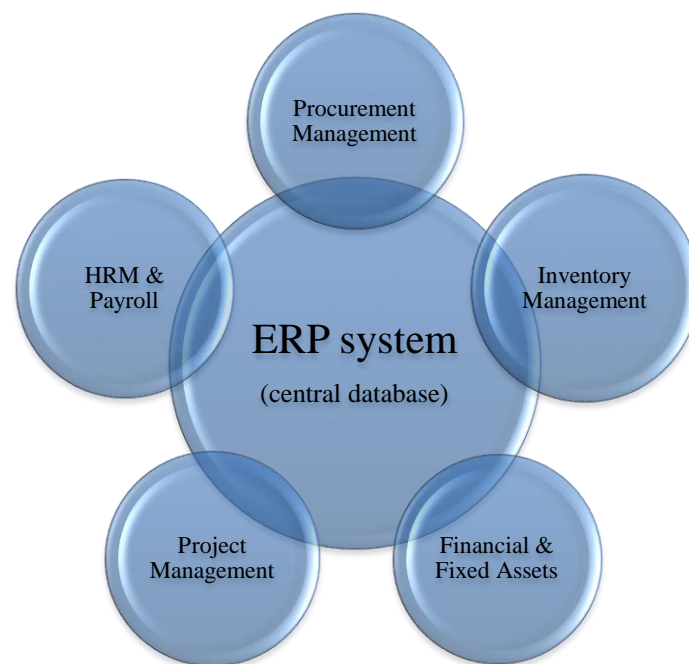
Figure 2-2: Typical Data Components of an ERP system as a central database – ORION (specific ERP system)

2.5 Implementation of ERP Systems

When implementing an ERP system within organisations, people need to realise that they will be investing a lot into it; financially and non-financially (Al-Mashari et al., 2003 and O'Leary, 2004). Financially, the costs that would be required include those of the hardware that runs licensed software along with the consultation fees required to ensure that knowledge is transferred from the ERP system provider to the end-user. The end-user would need to have a certain understanding of the ERP system as well as ERP project management since an ERP system is considered to be a project in itself (Whang et al., 2003). Therefore, financially, proper training would be required

to those who would be utilising it (Willis et al., 2001). Non-financially, time and effort would need to be dedicated into implementing and maintaining this system.

Without the proper support and understanding, implementation and post-implementation phases of the project are at risk of failure. Kapp (2001: cited in Whang et al., 2003) has studied and assessed a few organisations that endured the transformation into ERP systems and has concluded a few reasons as to why some ERP implementations fail. The main reason found through their research is due to not having proper and focussed training plans that prepare end-users for the system. Whang & Lee (2002) add to that by suggesting that organisations may not have a clear and focussed goal that directs them to ensure alignment with business strategies and opportunities. Implementing an ERP system requires dedication, goals, objectives and most importantly, for it to be treated as a project that receives devoted attention (Kansal, 2007). Not understanding the potentials of the ERP system and not dedicating enough time to integrate it well within the organisation, may lead to the failure of it. It needs to be recognised that 'integrate' is the keyword, where business processes and functions are integrated into the system to substantially adjust it. Not only is it important to successfully implement an ERP system, maintaining and continuously improving it, have the same significance.

Furthermore, according to Capaldo and Rippa (2009), the various reasons as to why some ERP implementation projects fail relate to the technical implementation aspect as well as the organisational aspect and failure to be attentive to both aspects could lead to negative risks in choosing the implementation strategy during implementation. According to them, if the factors relating to the technical and organisational aspect are not identified properly, they could lead to affecting the project outcome as issues may arise during implementation and it becomes difficult to deal with them if they are not already anticipated. Markus (2004) highlights that organisations usually implement ERP systems following two different strategies referred to as the "Big Bang" and the "Incremental" strategy. The *big bang* strategy deals with implementing the ERP system and going live in one go. No pilot approach is followed as opposed to the *incremental* strategy where the risk of implementation decreases since critical problems realised from stage one of the 'go-live' phase can be fixed for stage 2 prior to the go-live phase. It allows for a timely resolution of critical situations (Markus,

2004). As ERP systems have their benefits and failure to meet their success factors could lead to failure, the implementation strategy that an organisation chooses to deploy the ERP system also has it benefits and risks associated with it. Benefits of the *big bang* strategy include that the organisation adjusts to the characteristics of the system with minimal customisation to meet the maximum benefits of the system. Total integration of the system in a designated time period allows for the benefits that include going-live as early as possible. Of course, risks are also associated with that, and for that reason, the right people need to be a part of the implementation team (Bhatti, 2005). Benefits of the *incremental* strategy include a decrease in technical difficulties but also have fewer benefits since resources are engaged for a longer time period. This adds costs to the project.

To adopt an ERP system into an organisation, there are two main technical ways of doing so. Organisations can purchase and directly implement a standard ERP pack, with little digression from default settings, or they can customise an ERP pack to suit their requirements (Brehm et al., 2001). The implementation of an ERP system entails much planning and adequate research to ensure that the implementation of it runs smoothly and benefits of it are realised as opposed to criticised. To guarantee that the business procedures, technical aspect of the system and software are configured and integrated to align with the business processes is the key to having confidence of a positive transformation to the 'new'. Much research into the implementation of an ERP system has been done factoring out the CSF's and developing process models.

When it comes to configuring an ERP system, Davenport (1998) advises that an organisation needs to make compromises of finding the best way to balance the way they want to work and the way the system promotes you to work. When it comes to the ERP system selection, you need to know your requirements in order to properly assess the modules that you would need to install against those that are not necessary for your organisation. After that, each module is adjusted against certain configuration tables in order to present and reach the best fit possible with the business processes. The selection of the modules (refer to Figure 2-2) includes selecting the components that are most required from an ERP system implementation project and the

configuration tables allow each organisation to tailor a specific aspect of the system to the best way the organisation sees as necessary.

2.6 The Role of the Project Manager

Kansal (2007) has highlighted that project managers need to focus on the technical and financial aspect of projects. In order to be able to be involved in the ERP implementation project, project managers need to take into account the non-technical aspects of the project where they can assess it in terms of its critical success and failure factors. Much like any project, a project manager needs to consider a few aspects that are relevant to projects. These aspects include the project integration, scope, time, cost, quality, human resources, communication, risk and procurement (Project Management Institute [PMI], 2004). These aspects include taking into consideration the project size, staffing, deadlines, funding, organisational politics, scope creep, unexpected gaps and human resource issues such as employee resistance to change. As a project manager, these skills need to be possessed and certain knowledge, ability and experience needs to be portrayed in the implementation of ERP system projects.

Having a business and technological understanding is what is advised for project mangers that manage ERP system implementations(Weston Jr., 2001). Therefore, ERP project managers need to encompass certain qualities that assist in the understanding of the impact that ERP implementation projects have on organisations. Also, as implementing an ERP system in certain organisations is critical; the project manager needs to ensure a smooth transition from the *old way of doing things* to the *new way of doing things* (Holland & Light, 1999).

Project managers need to have other qualities such as being flexible to go with changes as the project progresses (Weston Jr., 2001). Certain human-related skills such as leadership tactics need to be adopted where employees are very important to manage to ensure a smooth transition (Robbins and Judge, 2009). They also pave the road for the project team, assist and guide them when needed. Of course, as any leader, motivation should be a quality they possess (Gray, 2001).

Weston Jr. (2001) has noted that implementing ERP projects entails having good project management experience and understanding of the certain skills and knowledge project managers need to possess. ERP project implementation needs successfully pass through the different project management phases in order to ensure success. The four planning and execution stages are: initiation & planning, execution, monitoring & controlling and closing process groups. In order to attain a successful outcome, project managers need to have the technical and business qualifications and need to have an understanding of the different process groups that projects go through to be achieved. Such is illustrated in Figure 2-4 and examines it against the *process of ERP system implementation* and *project management process groups* that has been adapted from several authors.

Figure 2-4 below represents a framework that has been adapted from several authors that is just used a tool to compare between the different projects life-cycles that have been drawn up by different researchers. The framework is just a representation of the life-cycles that draws a conclusion of the different studies compared against one another. It also categorises the different phases and divides them up into pre-*implementation, implementation* and *post-implementation* phases as phases to be considered during the ERP system implementation.

The framework entails that there are four phases for the process of ERP system implementation and four project management groups. The framework is meant to relate these different phases to each other in their own terminology where it illustrates the different phases of projects as studied differently by different researchers. These process models are then compared against the different ERP project phases that have been used in this research. The section to come will explain the different process models in further detail.

Process of ERP System Implementation [Adapted from Markus & Tanis (2000: cited in Whang et al., 2003) and Loh and Koh (2004)]

Project Management Process Groups (Adapted from Project Management Institute [PMI], 2004)
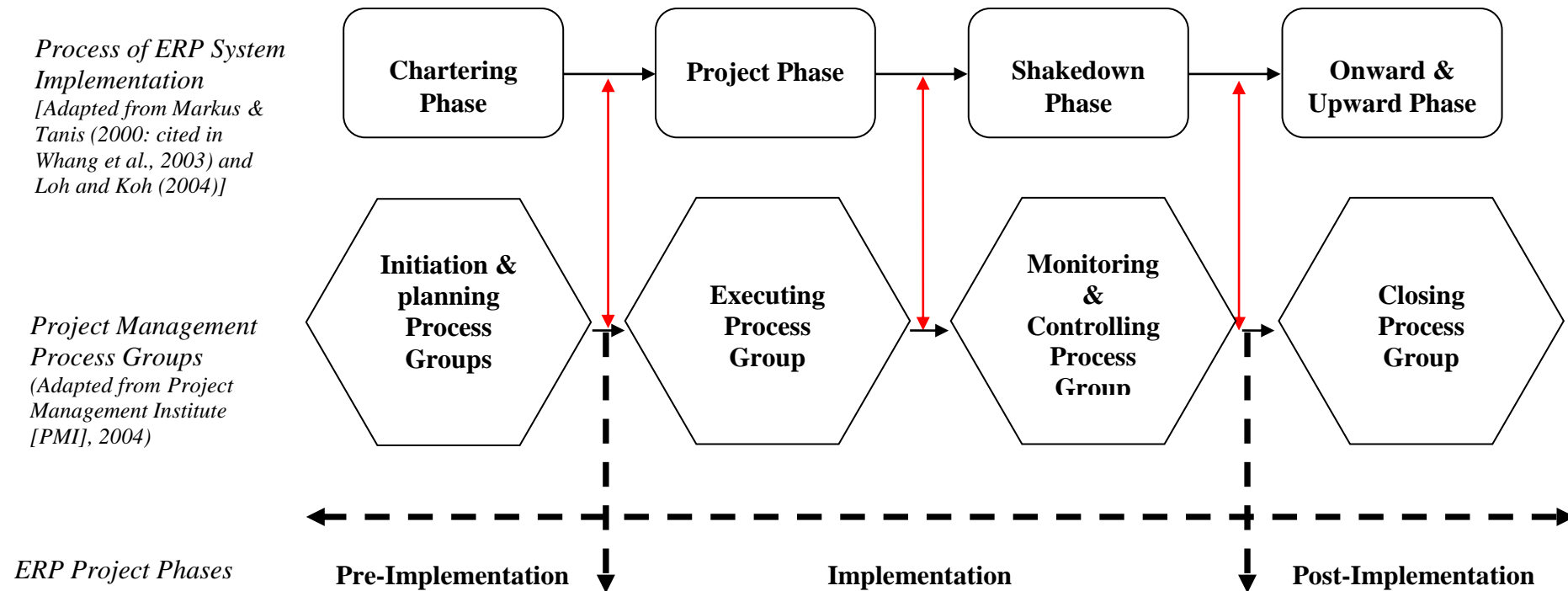
ERP Project Phases

Figure 2-3: Comparison between the different Process Models against the ERP project phases

2.7 Process Models

According to Weston Jr. (2001), firms that do not have any PM skills could find it difficult implementing and adapting to the ERP system. This is due to the planning and execution of internal and external activities. He maps the ERP implementation phases against the Project Management (PM) process groups highlighting that PM knowledge and skills would be required especially during four stages of the planning and execution; 'concept/initiation', 'development', 'implementation', 'close-out/operation and maintenance'. During the 'concept/initiation' phase is where the main decisions are made. The project manager and sponsor are chosen. Goals and objectives of implementing the ERP system are highlighted and top management support should be attained. If the scope is not clearly highlighted and people do not really understand the need for ERP systems and do not buy into it, then problems could arise at a later stage. Like any project, it is necessary to plan and agree on everything prior to implementation. The 'development' phase is when the conceptual ideas become more focussed and detailed to include the scope, schedule, quality, risk measures and plan, resource planning, and attaining different quotes from vendors to finalise requirements and costs. The 'implementation' phase is when the system is adjusted to suit an organisation's requirements. Training is usually provided during this stage and the system 'goes live' and is ready for use within an organisation. It is not unusual for bugs to appear at this stage or any minor faults. They can be immediately fixed but must be reported during the 'close-out/operation and maintenance' phase. Adding any enhancements that were not part of the initial planning phase would occur during this stage along with maintaining the system and monitoring it for any upgrades, if required.

Markus & Tanis (2000: cited in Whang et al., 2003) and Loh and Koh (2004) also categorised ERP system implementation into four phases leading up to the completion phase of the implementation process. The phases they have developed are: 'chartering', 'project', 'shakedown' and 'onward and upward'. The phases are similar to those highlighted by Weston Jr. (2001). The 'chartering' phase collects the data that support the business case, the need for an ERP system and it highlights any constraints that could arise in conflicts. The 'project' phase is the time when the system has been put in place and the end-users have been taught to access it. Phase three, the 'shakedown' phase is when the system is stabilised, bugs, if any, are

eliminated from it and operations are used and become the new routine of an organisation. The 'onward and upward' phase signifies maintaining and upgrading the ERP system as required. Results on the usage of the ERP system can be seen after this phase. The lifecycle of ERP systems is much like that of any other system, except when dealing with ERP's, much consideration and attention needs to be paid to critical success and failure factors (CSF's and CFF's) in order to ensure that the implementation process and procedure runs smoothly while attaining all the benefits that ERP systems have to offer.

Having drawn out the different stages of a project that project managers need to assess while working on ERP implementation projects, it would be important to highlight the factors that would need to be considered to ensure a smooth transition from the 'old' to the 'new'. These are the critical success and failure factors of ERP implementation projects.

2.8 Critical Success Factors (CSF's)

Achieving and working towards gaining the most from ERP systems is the ideal situation that is expected to be reached. The price of implementing ERP systems is high and the losses that will be realised if the implementation fails are also high. For that, prior to commencing any implementation of ERP systems, a few CSF's must be considered and studied that are meant to ensure the successful implementation of ERP systems in organisations. Understanding what success is and how it is defined is worth noting prior to intensely studying the different literature. Therefore, Gargeya and Brady (2005) have defined success as either being a complete success or having a few alignment problems. Achieving complete success means not having major glitches during the implementation and post implementation phases. Having just a few alignment problems refers to minor planned or unplanned outages within an organisation causing minimal inconveniences.

From the different literature researched, Luftman (1996: cited in Whang & Lee, 2002) divided the CSF's into two groups classified as *strategic fit* and *functional integration*. *Strategic fit* corresponds to the strategic execution which ensures that business processes are integrated into the ERP system implementation rather than being ignored. This process refers to the mapping of the business processes with the ERP system rather than looking at them separately. *Functional Integration* refers to embedding the processes into the ERP system whilst ensuring alignment with the organisations strategy for gaining the benefits of the system that allow for the achievement of the strategy. Similarly, Holland & Light (1999) and Esteves-Sousa & Pastor-Collado (2000) have divided the implementation process of ERP systems into two significantly important groups; *strategic* (5 CSF's) and *tactical* (7 CSF's). This division into groups is solely implemented to ease the classification of CSF's that lead to the successful implementation of ERP systems in organisations. According to Holland and Light (1999), factors that are considered *strategic* are 'legacy systems', 'business vision', 'ERP strategy', 'top management support' and 'project schedule and plans'. Factors considered as *tactical* consist of 'client consultation', 'personnel', 'business process change (BPC) and software configuration', 'client acceptance', 'monitoring and feedback', 'communication' and 'troubleshooting'. Esteves-Sousa & Pastor-Collado (2000), on the other hand, further divide CSF's into fitting under

either *organisational* or *technological* factors; therefore, factors are *Strategic-Organisational, Strategic-Technological, Tactical-organisational*, or *Tactical–Technological*. Basically, *strategic* factors are those that reflect on the business strategy prior to the implementation of an ERP system in organisations. *Tactical* factors refer to those success factors that are measured by the technical aspect of the implementation along with how resources employ the technical aspect. That only entails that the method that Esteves-Sousa & Pastor-Collado (2000) followed, divided factors into ones that should be considered at the business level and functional level whether they are organisational or technology-related issues. Both patterns, those of Holland & Light (1999) and Esteves-Sousa & Pastor-Collado (2000), have been developed to ensure strategic and technical alignment with an organisations business process as to reach the epitome of the benefits that ERP systems can provide to organisations. The difference between the two studies is that Holland & Light (1999) based their research on two case studies while Esteves-Sousa & Pastor-Collado (2000) based findings on in-depth literature reviews.

Esteves-Sousa & Pastor-Collado (2000) method presents the success factors that they have identified into four perspectives. It would be important to explain the model that they have distinguished themselves with. Explaining their *Strategic-Organisational* division of factors represents 'sustained management support', 'effective organisational change management', 'good project scope management', 'adequate project team composition', 'comprehensive business process reengineering (BPR)', 'adequate project champion role', 'user involvement and participation' and 'trust between partners'. *Strategic-Technological* factors refer to 'adequate ERP implementation strategy', 'avoid customisation' and 'adequate ERP version'. *Tactical-organisational* refer to 'dedicated staff and consultants', 'strong communication inwards and outwards', 'formalised project plan/schedule', 'adequate training program', 'preventive trouble shooting', 'appropriate usage of consultants' and 'empowered decision-makers' factors. The *Tactical–Technological* division refers to 'adequate software configuration' and 'legacy systems knowledge'. Most of these factors can be amalgamated under one topic, but the division of them as per technical or strategic, and at what level, allows for the distinguishing.

Furthermore, Bhatti (2005), through undertaking a thorough literature review of the critical factors that lead to successful ERP implementations, found that there are twelve main CSF's for the implementation of ERP systems; Change management', 'Communication', 'Team composition of ERP implementers', top management support', 'Project Management', 'Process redesign', 'User training', 'Technological infrastructure', 'Risk Management', 'User involvement', 'Use of consultant' and 'Clear goals and objectives'. Nah et al. (2001) and Nah et al. (2003), also based their findings on literature reviews from literature pertaining to the success factors of ERP implementation, and have examined eleven factors, each. They add 'legacy system integration', 'troubleshooting' and 'project champion' to Bhatti's factors and seem to disagree on the 'Risk Management', 'User involvement' and 'User training' factors as crucial factors that lead to successful implementations. Though from the literature reviewed between 2001 and 2003, 'the use of consultants' does not seem to be a factor that has been re-highlighted and 'ERP strategy' is actually a factor that was discovered during that time period. Nah et al.'s 2003 study was based on their 2001 study where the factors were verified by fifty-four managers at a firm. Such change in literature is evidence that there is the lack of depth and agreement in literature about the corresponding successful factors of ERP implementations. There is not one right way to implement ERP systems, and from the different literature, diverse factors may be highlighted, some which can have similar coding techniques or amalgamation under one factor. Also, different methodologies undertaken to perform a research study, conclude different results and highlight any discrepancies.

Nah and Delgado (2006) have observed seven CSF's though multiple case study analysis where two firms were assessed; 'change management', 'communication', 'team composition of ERP implementers', 'business plan and vision', 'project completion', 'project champions', and 'system analysis, selection and technical implementation'. However, Buckhout et al. (1999), who also embarked on multiple case study analysis, simply suggested that a 'clear business plan and vision', 'top management support' and 'strong ERP teamwork and composition' are the key factors for a successful implementation. Such opposes the method that Somers and Nelson (2004) followed where they have identified twenty-two factors that have been unified across industries. Their method was based on a literature review on one hundred and eleven firms. Somers and Nelson are considered to be gurus when it

comes to discussing the implementation and CSF's of ERP systems (Supramaniam and Kuppusamy, 2009). They divide their factors into two groups; *players* and *activities* that influence a successful ERP implementation. Of the twenty-two factors , eight are related to factors that must be met by *players*; 'top management support', 'use of steering committee', 'partnership with vendor', 'use of vendors' tools', 'use of consultants', 'project team competence', 'project champion', 'vendor support'. Thirteen of the factors are the *activities* that must be established to ensure positive implementation of ERP systems; 'interdepartmental cooperation', 'management of expectations', 'data analysis and conversion', 'dedicated resources', 'minimal customization', 'architecture choices', 'change management', 'user training on software', 'education on new business processes', 'business process reengineering (BPR)', 'careful package selection', 'clear goals and objectives', 'project management' and 'interdepartmental communication'.

Another method of categorising CSF's has been adapted by Sumner (1999: cited in Nah et al., 2001), where factors were ranked in order of criticality suggesting that receiving 'top management support' and having an 'effective BPR and minimum customization' are more critical than having a 'clear business plan and vision'. It was also added that it is necessary to have a competent 'project champion', 'effective project management', 'effective communication', ' teamwork and composition', 'change management program and culture' and 'monitoring and evaluation' of performance as key success factors. Al- Mashari et al. (2003), who based their research on a review of the existing literature much like Sumner, categorised their CSF's into three dimensions that are related to the stages of the ERP project implementation; setting-up, implementation and evaluation. The three dimensions included twelve factors relevant to the different project phase; 'Management and leadership', 'visioning and planning', 'ERP package selection', 'communication', 'process management', 'training and education', 'project management', 'legacy systems management', 'system integration', 'system testing', 'cultural and structural changes' and 'performance evaluation and management'. The study highlights that having top management with a clear vision is fundamental for the success of the project. Leadership and commitment have been recognised to be the most significant factors that could lead to a positive project outcome (Al-Mashari et al., 2003).

Different taxonomies have been adopted by different authors, but most factors identified cover the main issues highlighted by all.

Research undertaken by Huang et al. (2004) differs from that of Sumner's by adding the factors 'integration between legacy system and ERP system', 'clear ERP strategy' and 'training programme'. 'Project champion' is a factor that Huang et al. (2004) do not identify that differs from Sumner's study. Huang et al. based their research findings on a single case study and for that reason this slight discrepancy might not have been identified in the firm that was studied. Consequently, single case studies are not normally advised as opposed to multiple-case studies that present more robust data (Yin, 2009). Simplifying the factors identified, Bingi et al. (1999) have suggested that there are five factors affecting the implementation of ERP systems; 'top management support', 'strong ERP teamwork and composition', 'effective business process re-engineering (BPR) and minimum customisation', 'efficient change management program and culture' and 'efficient software development, testing and troubleshooting'. Their factors were derived from existing literature, much like the method followed by Sumner where the main factors have been commonly identified.

Ash and Burn (2003); Gattiker (2002); Hong and Kim (2002); Mandal and Gunasekaran (2003), Muscatello et al. (2003), among others, have highlighted critical success factors by undertaking case study research. They explored the nature and role of ERP implementation success factors through either single or multiple case study research. Among the results, 'client consultation and training' is amongst the most agreed factors by all followed by 'change management'. Not all the case studies concluded the same results though. Hong and Kim (2002), for instance, only concluded that CSF's were 'change management' and 'ERP strategy & the organisational fit'. They gathered such factors by having studied the organisational fit as a success factor and then discovered the direct link between it and ERP implementation. The analysis was done through a field research study of thirty four firms. Ash and Burn (2003) identify 'legacy system integration', having a clear 'business vision and objectives' and 'personnel and teamwork' among the most agreed factors agreed by researchers that undertook multiple-case study research. Mandal and Gunasekaran (2003) agree with the most agreed factors and add that

'personnel and teamwork', 'project management', 'ERP strategy and system', 'monitoring & feedback' and 'communication' are important critical success factors that have been identified by a large organisation where the single case study was undertaken. Gattiker (2002), who also executed his research following a single case study approach, noted that resistance to change creates unprecedented problems in organisations but did not highlight 'change management' as a critical success factor; 'Client consultation and training', 'top management support', 'ERP strategy', business vision and objectives', and legacy systems integration', were highlighted as CSF's.

Muscatello et al. (2003) took on a multiple case study approach, four cases to be specific, to study the successful implementation factors of ERP solutions. Of the critical factors identified were 'business vision and strategic goals', 'education and training', 'process re-engineering', 'project management' and 'top management involvement and support'. Brown and Vessey (2003) also took on a multiple case study approach where three cases were studies. They concluded that there are five main CSF's that influence the outcome of ERP implementation projects; 'top managers' commitment, support and involvement' in the project where project leaders are the 'project champions'. 'Vendor support and training' are vital along with 'change management' and 'project planning' skills through project management.

Stratman and Roth (2002) and Soja (2006) tested the success factors through surveys of 79 and 68 firms, respectively. Of the common factors they have found are, 'business vision and objectives', 'ERP strategy' that Stratman and Roth refer to as strategic IT planning, 'commitment and support from upper management', 'change management and readiness', 'ERP training', 'IT skills and infrastructure', 'project management/manager' and 'learning through feedback'. 'Business process skills is added to Stratman and Roth's (2002) list, while the factors of 'team effort and composition', 'co-operation with vendor', 'system reliability', 'minimal customisation', 'legacy systems', 'project completion as per a schedule' and 'financial budget' were introduced by the survey undertaken by Soja (2006). Again, we see that even the same type of study leads to some common and some new factors that lead to the successful implementation of ERP systems. Theoretically speaking, depending on

firms' individual experiences new factors might always be introduced and that is a means of adding knowledge to literature.

In a way, the factors proposed present that a clear plan should drive the implementation of the ERP system whilst ensuring that the plan is agreed and communicated to all employees within an organisation. From a technical aspect, the software needs to be trained on and tested prior to enforcing it within the organisation. It also needs to have a champion that will monitor every aspect of the transformation and ensure that business processes are integrated within the system. It would be advisable that the project champion is the project manager that has the appropriate skills to ensure adaptability of the employees and to appropriately assess the risks that underlie the transformation. These CSF's are vital to assist and ensure the transformation and implementation of the ERP system is a success and its benefits are attained as described and required. These CSF's imply that these factors would need to be considered when implementing an ERP system in an organisation in order for maximum benefits to be attained and for the process to be achieved meeting its initial objectives.

Each researcher has presented their findings in a different way. Several of the researchers amalgamated a few factors and combined them under one title, while some kept each concept as its own without combining it under a main title. Different research strategies were also followed. Different methodologies to derive their data were utilised. Some followed case studies, some literature reviews and some undertook surveys. Different studies presented different samples, different settings, different organisational backgrounds and culture. For that reason, not all CSF's were highlighted equally amongst the different researchers. Such identifies that depending on the organisation and the methodology followed, different factors may be identified. For that, from the literature review of several authors, this research highlights the different findings of CSF's that could be found in Table 2-2. Please note that detailed titles were given as factors rather than the amalgamation of topics.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Source	Holland and Light (1999)	Bhatti (2005)	Nah et al. (2001)	Nah and Delgado (2006)	Somers and Nelson (2004)	Huang et al. (2004)	Bingi et al. (1999)	Buckhout et al. (1999)	Sumner (1999)	Esteves-Sousa & Pastor-Collado (2000)	Ash and Burn (2003)	Gattiker (2002)	Hong and Kim (2002)	Mandal and Gunasekaran(2003)	Muscatello et al. (2003)	Nah et al. (2003)	Stratman and Roth (2002)	Soja (2006)	Al-Mashari et al. (2003)	Brown and Vessey (2003)	**TOTAL**
	Research Method and Sample	Multiple Case Study (2)	Literature Review	Literature Review	Multiple Case Study (2)	Literature Review on 111 firms	Single Case Study	Literature Review	Multiple Case Studies	Literature Review	Literature Review	Multiple Case Study (4)	Single Case Study	Field Research (34 firms)	Single Case Study	Multiple Case Study (4)	Literature Review	Survey (79 firms)	Survey (68 firms)	Literature Review	Multiple Case Study (3)	
1	Top Management Support	X	X	X		X	X	X	X	X	X		X			X	X	X	X	X	X	16
2	Personnel & Teamwork	X	X	X	X	X	X	X	X	X	X	X			X		X	X	X		X	16
3	Project Management	X	X	X	X	X	X			X	X				X	X	X	X	X	X	X	15
4	Change Management		X	X	X	X		X		X	X	X		X	X		X	X	X	X	X	15
5	Business Process Change (BPC), Business Process Reengineering (BPR) and Software Configuration	X	X	X	X	X	X	X		X	X					X	X	X	X	X		14
6	Business Plan, Vision and Objectives	X	X	X	X	X			X	X		X	X			X	X	X	X	X		14
7	Client Consultation and Training	X	X			X	X					X	X		X	X		X	X	X	X	12
8	Communication	X	X	X	X	X	X			X	X				X		X			X		11
9	ERP Strategy	X			X	X					X		X	X	X		X	X	X	X		11
10	Monitoring and Feedback	X	X	X		X	X			X					X		X		X	X		10
11	Legacy System Integration	X		X			X				X	X	X				X		X	X		9
12	Client Acceptance	X																				1
13	Troubleshooting	X		X			X	X									X			X		6
14	Risk Management		X																			1
15	User Involvement		X			X					X		X									4
16	Use of Consultants		X	X		X	X				X											5
17	Project Champion			X	X	X				X	X						X					6
18	Project Completion				X														X			2
19	Interdepartmental Cooperation					X																1
20	Data Analysis & Conversion					X																1
21	Management of Expectations					X																1
22	Use of Steering Committee					X																1
23	Partnership with Vendor					X					X									X		3
24	Avoid Customisation										X									X		2
25	Financial Budget																			X		1
	TOTAL	12	12	12	8	18	11	5	3	9	13	5	6	2	7	5	12	8	14	11	5	

Table 2-2: Critical Success Factors

2.9 Critical Failure Factors (CFF's)

Though much research has been undertaken to study the critical factors that promote successful ERP implementations, according to Buckhout et al. (1999), 70% of the projects are still failing to achieve what they were set out to achieve. With that, such failure rate calls for an understanding of the critical issues that affect the project outcome. Dealing with these factors suggests that failure factors be identified at an early stage to either attempt to avoid them, reduce them or acknowledge them and find a way to deal with them before they occur; contingency plans are useful. Therefore, this situation promotes the need to critically analyse and determine not only the CSF's but also the CFF's for researchers and implementers to understand what could go wrong in such a project. For that, the literature to come sets out to highlight the different CFF's as determined by researchers.

It would be important to note that the size of the organisations that are implementing ERP systems require attention separately (Chalmers, 1999; Mabert et al., 2003: cited in Loh and Koh, 2004). Another important element that needs to be considered prior to undertaking an ERP system implementation would be to consider the country where the implementation is occurring and the knowledge of the consulting organisation of a country's culture. This has been noted as especially important in countries where English is not the main language used for communication (Xue et al., 2005). Each factor that will be discussed needs to be considered as per the environment of the organisation undertaking the ERP implementation. On another note, much literature highlights that implementation of ERP systems fail due to managers not being aware of the importance of problems. They also do not have the project management skills to deal with problems that arise during project implementation (Wong, 2005; Somers and Nelson, 2004).

Prior to understanding the CFF's, it is important to define failure in order to know what it is we are trying to avoid from occurring. Therefore and according to Gargeya and Brady (2005), failure has two levels; complete failures and partial failures. Complete project failure refers to a project that was ruined prior to implementation for various reasons or a project that caused a collapse in the organisation post implementation. Complete failure can be identified by the generation of significant

long-term financial losses and damages to an organisation. Partial failure, on the other hand, can be described by the unsubstantiated adjustments made to the system that could cause disturbance in an organisation's daily operations.

Different literature and different studies highlight different CFF's. Markus et al. (2000: cited in Supramaniam and Kuppusamy, 2009), identified three main factors that may hinder the success of an ERP system implementation. The factors are 'poor planning or poor management', 'change in business goals during project' and 'lack of business management support'. Noudoostbeni et al. (2010) agree with these factors and also add that 'inappropriate training methods', 'hostile company culture', 'improper reporting structure', 'inappropriate level of management commitment' and 'political pressures' as other factors that lead to failures in projects. Political pressures merely relates to the external political environment and how that influences and organizations internal decisions, indirectly. These studies (Markus et al., 2000 and Noudoostbeni et al., 2010) relate to Wong et al.'s (2005) study in that all three have identified CFF's from undertaking multiple case study research. The results, though, are slightly different. One common factor found amongst all three researches is 'poor project management or planning'. Such proves from these specific studies, that project management skills and knowledge are essential to achieve a success rate rather than a failure one. Wong et al. (2005) highlight that the 'ERP system misfit', 'high turnover and attrition rates of employees', 'excessive customisation', 'poor consultant effectiveness', 'poor IT infrastructure', 'poor knowledge transfer', 'poor quality of BPR', 'poor testing', 'poor top management support', 'tight project schedule', 'unclear concept of ERP system from the user's perspective' due to inappropriate training provided, 'unrealistic expectations', and 'users resistance to change' are of the CFF's identified. Their data was validated through the triangulation process in which they gained an understanding of the ERP implementation process from participants and they then validated them from secondary resources such as emails, meeting minutes and other documents where they then received an approval on the CFF's identified from a project manager (Wong et al., 2005). Of the fourteen factors they have identified, three were common amongst the four case studies they researched; 'poor consultant effectiveness', 'poor project management effectiveness' and 'poor quality of BPR'. Furthermore, Markus et al.'s (2000: cited in Bagchi et al., 2003) study highlights that the choice of ERP system should be aligned with the

organisation's structure and operations. Thus, understanding the ERP strategy and the business implication is an essential feature to the success rather than failure of ERP system implementation.

Bhatti (2005) established that reasons for failure during ERP implementation is the 'lack of support from top management' and adds that 'resistance from employees' and 'poor selection of ERP systems and vendors' as harmful factors. Umble and Umble (2001) agree with these three factors and add another six; 'poor project management', 'lack of education and training', 'unrealistic expectations about implementation', 'inaccurate data', 'internal integration of processes of no value', and 'technical difficulties'. Further research undertaken by Umble et al. (2003), does not highlight 'resistance from employees', 'poor selection of vendors', 'internal integration', and 'poor selection of team members' as important failure factors which just proves that depending on the organisations, CFF's can differ. Instead, they suggest that 'Strategic goals are not clearly defined', 'team selection not great', and 'Multi-site issues are not properly resolved' as new failure factors that have been identified.

The most CFF's derived were those of Garg (2010). He mostly agrees with Umble and Umble (2001) and adds other factors; 'Poor middle Management commitment', 'over-reliance on heavy customisation', 'high attrition rate of project team members', 'inadequate resources', 'poor quality of testing', 'poor user involvement', 'inappropriate timing of go-live', 'poor consultant effectiveness', 'unrealistic expectations', 'too tight project schedule' and 'poor knowledge transfer'. In comparison with Garg (2010), Pairat and Jungthirapanich (2005) have identified 'poor reporting procedures', 'lack of monitoring and performance evaluation' and 'inadequate system testing' as factors that could also hinder project success. Tapp et al. (2003), on the other hand, suggested that 'inadequate education/training', 'poor leadership from top management', 'resistance to change', and 'unrealistic expectations' are adequate enough to assess the factors that promote failure in projects. These factors are mainly focussing on the people rather than the technology. Other researcher focussed on both, the human aspect and the technological aspect related to implementation. According to Momoh et al. (2010), and a factor that has not been mentioned as a failure factor by other researchers, 'lack of change management' is the most important factor that could hinder project success. They also

add that 'excessive customisation', 'dilemma of internal integration', 'poor understanding of business implications', 'requirements and poor data quality' 'misalignment of IT with the business', 'hidden costs', 'limited training' and 'lack of top management support' as other factors that should be noted as CFF's.

Considering an example of CFF's that arose due to conflict in understanding different cultures, Xue et al. (2005) researched the factors that led to the failure of five projects (multiple case study approach) in China. They have grouped the factors under three main groups; *culture, environment* and *technical issues*. They have highlighted that these are the main topics that have hindered project success in China. The factors identified have been noted as ones that are mostly significant to China and they might not apply to all the ERP implementation world-wide, but they are definitely worth noting just as a revelation. Under culture, they have noted that partnerships between ERP vendors and the ERP service company are crucial to the success of an ERP implementation project. They suggested that the ERP vendors should use local service providers that are familiar with the Chinese culture as to decrease problems that may arise due to cultural differences. They also highlight that training should be provided from the vendor to the service provider. As a second cultural factor, business process re-engineering (BPR) should be considered since the due to the Chinese culture which differs from the Western culture. Not only are the Chinese companies expected to ensure alignment of their regular business process (BP) to their ERP software, but they must also redesign their current BP's to suit the Western ERP's processes. This doubles the work for Chinese organisations and would need to be accounted for as part of the planning phase (pre-implementation) prior to the ERP system implementation. Also under culture comes a third point that is considered a general point for organisations to follow and is not only applicable in China. It relates to human resources (HR). In order for a project not to fail in its implementation, it would be important to ensure that top management understand the requirements of the BPR and ensure that project leaders understand the business strategies, plans and processes. HR is also expected to avoid unrealistic behaviours. Xue et al. (2005) also noted that user resistance is achieved due to users not familiarising themselves with the new system. ERP systems need to be adaptable to each country so that the language will not be an issue that causes resistance or failure. Environmental factors explained by Xue et al. (2005) also relate mostly to the Chinese government and culture where ERP

vendors and consulting partners should be familiar with so as to promote project success. 'Technical issues', as identified by Xue et al. (2005), relate mainly to language, and reporting systems that have been identified as barriers to successful project implementations.

Kansal (2007) have approached defining the CFF's by understanding from a single case study the factors that did not go as expected during project implementation. According to their research, they have taken all the negatives and turned them into positives to ensure project success rather than failure. The main factors they identified were 'lack of project management', 'lack of top management support', 'lack of change management plans', 'no clear goals & objectives', 'no user involvement & participation', 'weak organizational communication', 'weak external consultant relations', 'inadequate compatibility of technology', 'BPR & minimum customization', and 'low project team competence'. The reality is that in order to understand your failures, you would need to study and meet the success factors that would eventually lead you to successful projects. The method followed by Kansal (2007), puts this research at a point that understands the different failure factors that could lead to project failure. It is important that we change these failure factors into successful ones but that can only be done when a clear understanding of what has led to success is created.

Capaldo and Rippa (2009) identified the 'lack of having a clear strategy guiding the process of redesign' and 'early identification of technical and organisational capabilities' of the firm could lead to project failure. The critical failure factors they have identified were based on a case study that further validated literature they studied. The factors that should be considered as part of the technical aspect are 'software standardisation' and 'software integration'. Software integration relates to the attitude of closing off any gaps with legacy systems. In terms of the organisational aspect, 'BPR propensity' and 'end-users propensity' are the main factors and they relate to the tendency an organisation has to accept the ERP system in term of the business process reengineering and the users of the system. BRP propensity relays the process orientation of an organisation, its project management capability and its risk management capabilities related to BPR while end-user propensity relays the users

profiling in terms of their background and ERP experience, and the availability of change enablers such as top management commitment.

Another form of studying the critical failure factors could be done through understanding what the critical success factors are and how the lack of them could negatively affect a project's implementation. Ehie and Madsen (2005) followed this method and have undertaken an exploratory study through questionnaires at multiple firms to have an understanding of the factors that lead to successful ERP implementations. From analysing the factors that lead to successful implementations, it was understood that the lack of these factors may significantly contribute to the failure of the project. Of the eight factors derived, six were attributable to the success, if present, or failure, if not present, of an ERP system implementation. The factors identified are the 'lack of top management support', 'poor quality of BPR', 'consulting services' that do not provide appropriate training and support, 'poor project management', 'lack of understanding of business implications' and 'costs' that are not considered part of the budget as they are hidden.

Table 2-3 presents the CFF's that have been highlighted by the different literature.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL
	Source	Markus et al. (2000)	Bhatti (2005)	Noudoostbeni et al. (2010)	Momoh et al. (2010).	Tapp et al. (2003).	Garg (2010)	Umble and Umble (2001)	Umble et al. (2003)	Xue et al. (2005)	Pairat and Jungthirapanich (2005)	Kansal (2007)	Capaldo and Rippa (2009)	Wong et al. (2005)	Ehie. and Madsen (2005)	
	Research Method and Sample	Multiple Case Study	Survey of 53 firms	Multiple Case Study	Literature Review	Single Case Study	Literature Review	Literature Review	Single Case Study	Multiple Case Study	Literature Review	Single Case Study	Single Case Study	Multiple Case Study	Multiple Case Study	
1	Lack of Support From Top Management		X	X	X	X	X	X	X	X	X	X	X	X	X	13
2	Poor Project Management or Planning	X		X	X		X	X	X		X	X	X	X	X	11
3	Inappropriate Training Methods and Poor Education			X	X	X	X	X	X	X	X		X	X	X	11
4	Lack Of Understanding of Business Implications/Unrealistic Expectations				X	X	X	X	X	X	X	X		X	X	10
5	Misalignment of IT/Technical Difficulties			X	X		X	X	X	X	X	X		X		9
6	Poor Selection of ERP Systems and Vendors		X				X	X		X	X	X		X		7
7	Poor Change Management				X							X				2
8	Change in Business Goals during Project	X		X												2
9	Lack of Business Management Support	X		X	X					X	X					5
10	Resistance from Employees		X			X	X	X		X				X		6
11	Hostile Company Culture			X									X			2
12	Multi-Site Issue not Resolved								X							1
13	Political Pressures			X												1
14	Internal Integration				X			X					X			3
15	Excessive Customisation				X		X					X	X	X		5
16	Hidden Costs				X										X	2
17	Poor Middle Management Commitment/Understanding						X			X	X					3
18	High Attrition Rate Of Employees						X				X			X		3
19	Inaccurate Data						X	X	X		X					4
20	Inadequate Resources						X		X			X				3
21	Poor Testing						X							X		2
22	Inappropriate Timing						X									1
23	Tight Project Schedule						X							X		2
24	Poor Knowledge Transfer						X							X		2
25	Strategic Goals not Clearly Defined									X		X	X			3
26	Poor Quality of BPR												X	X	X	3
	TOTAL	3	3	8	10	4	16	9	9	8	10	9	8	13	6	

Table 2-3: Critical Failure Factors

2.10 Summary of the Literature Review

The literature review above has highlighted the different characteristics, benefits, scope, implementation, role of the project manager, process models, critical success factors and critical failure factors of ERP systems and their implementations. Different researchers using different methods have identified the success and failure factors inherited by ERP implementations. To ensure and fulfil the benefits of the ERP systems, it would be significant to understand the factors that impede on the system implementation so as to ensure that they are avoided or create risk management plans that can act as buffers in case a failure factor is convened upon, unexpectedly. Understanding what the critical success factors are can assist implementers in paving the way for a successful ERP system implementation. For that reason, many of the factors highlighted for both, the critical success and failure of the implementation can be considered as back-to-back factors i.e. *project management skills & techniques* are considered to be critical success factors, while the *lack of project management skills & techniques* could lead to project failure. Understanding the success factors and negating them is a method that can be used to ensure that most factors that lead to successful implementations could also lead to failure implementations if not considered during the planning phase of the project. As a summary and comparison of the different literature studied, Tables 2-5 and 2-6 identify the different research used to derive the factors from.

To compare between the different researches, and to understand the majority of identified and agreed upon factors by the different researchers, it would be vital to understand the key factors that lead to the successful or failed implementations of ERP systems. As presented in Tables 2-2 and 2-3, a total of twenty-five critical success factors and 26 critical failure factors have been identified by the different researchers. This does not pertain to the total number of factors identified by each of the authors, but rather to the total number of factors identified by all the authors, collectively.

REF.	Author(s)/publication year	Article Title	Journal	Research approach	Total CSF's identified
1	Holland and Light (1999)	A Critical Success Factors Model for ERP Implementation	IEEE Software	Multiple Case Study (2)	12
2	Bhatti (2005)	Critical Success Factors for the implementation of Enterprise Resource Planning (ERP): Empirical Validation'.	The Second International Conference on Innovation in Information Technology	Literature Review	12
3	Nah et al. (2001)	Critical Factors for successful implementation of enterprise systems	Business Process Management Journal	Literature Review	12
4	Nah and Delgado (2006)	Critical success factors for ERP implementation and upgrade	Journal of Computer Information Systems	Multiple Case Study (2)	8
5	Somers and Nelson (2004)	A taxonomy of players and activities across the ERP project life cycles	Information & Management	Literature Review on 111 firms	18
6	Huang et al. (2004)	Transplanting the best practice for Implementation of an ERP system: a structured inductive study of an International company	Journal of Computer Information Systems	Single Case Study	11
7	Bingi et al. (1999)	Critical issues affecting an ERP implementation	Information Systems Management	Literature Review	5
8	Buckhout et al. (1999)	Making ERP succeed: turning fear into promise	IEEE Engineering Management Review	Multiple Case Studies	3
9	Sumner (1999)	Critical success factors in enterprise wide information management Systems	Proceedings of the Americas Conference on Information Systems (AMCIS)	Literature Review	9
10	Esteves-Sousa & Pastor-Collado (2000)	Towards the unification of Critical Success Factors for ERP Implementations	10th Annual Business Information Technology (BIT) Conference, Manchester	Literature Review	13
11	Ash and Burn (2003)	A strategic framework for the management of ERP enabled e-business change	European Journal of Operational Research	Multiple Case Study (4)	5
12	Gattiker (2002)	Anatomy of an ERP implementation gone awry	Production and Inventory Management Journal	Single Case Study	6
13	Hong and Kim (2002)	The Critical Success Factors for ERP Implementation: an organizational fit perspective	Information & Management	Field Research (34 firms)	2
14	Mandal and Gunasekaran(2003)	Issues in implementing ERP: A case study	European Journal of Operational Research	Case Study	7
15	Muscatello et al. (2003)	Implementing enterprise resource planning (ERP) systems in small and midsize manufacturing firms	International Journal of Operations & Production Management	Multiple Case Study (4)	5
16	Nah et al. (2003)	ERP Implementation: Chief Information Officers' - Perceptions of Critical Success Factors	International Journal of Human–Computer Interaction	Literature Review	12
17	Stratman and Roth (2002)	Enterprise resource planning (ERP) competence constructs: Two-stage multi-item scale development and validation	Decision Sciences	Survey (79 firms)	8
18	Soja (2006)	Success factors in ERP systems implementations - Lessons from practice	Journal of Enterprise Information Management	Survey (68 firms)	14
19	Al-Mashari et al. (2003)	Enterprise resource planning: a taxonomy of critical factors	European Journal of Operational Research	Literature Review	11
20	Brown and Vessey (2003)	Managing the next wave of enterprise systems – leveraging lessons from ERP	MIS Quarterly Executive	Multiple Case Study (3)	5

Table 2-4: References of the Critical Success Factors identified from the literature

REF.	Author(s)/publication year	Article Title	Journal	Research approach	Total CFF's identified
1	Markus et al. (2000)	The Enterprise System Experience – from Adoption to Success	Zmud, R.W. (Ed.), Framing the Domains of IT Management: Projecting the Future through the Past	Multiple Case Study	3
2	Bhatti (2005)	Critical Success Factors for the implementation of Enterprise Resource Planning (ERP): Empirical Validation'.	The Second International Conference on Innovation in Information Technology	Survey of 53 firms	3
3	Noudoostbeni et al. (2010)	An Effective End-User Knowledge Concern Training Method in Enterprise Resource Planning (ERP) Based on Critical Factors (CFs) in Malaysian SMEs',	International Journal of Business and Management	Multiple Case Study	8
4	Momoh et al. (2010).	Challenges in enterprise resource planning implementation: state-of-the-art',	Business Process Management Journal	Literature Review	10
5	Tapp et al. (2003).	The Role of Project Acceptance in the Successful People Soft Human Resources Management System Implementation for the Kentucky Community and Technical College System	Ninth Americas Conference on Information Systems, AMCIS 2003 Proceedings	Single Case Study	4
6	Garg (2010)	Critical Failure Factors for Enterprise Resource Planning Implementations in Indian Retail Organizations: An Exploratory Study	Journal of Information Technology Impact	Literature Review	16
7	Umble and Umble (2001)	Enterprise resource planning systems: a review of implementation issues and critical success factors	proceedings of the 32nd annual meeting of the decision sciences institute	Literature Review	9
8	Umble et al. (2003)	Enterprise resource planning: implementation procedures and critical success factors	European Journal of Operational Research	Single Case Study	9
9	Xue et al. (2005)	ERP implementation failures in China: Case studies with implications for ERP vendors	International Journal of Production Economics	Multiple Case Study	8
10	Pairat and Jungthirapanich (2005)	A chronological review of ERP research: An analysis of ERP inception, evolution and direction	2005 IEEE International Engineering Management Conference.	Literature Review	10
11	Kansal (2007)	Systemic Analysis for Inter-Relation of Identified Critical Success Factors in Enterprise Systems Projects	Contemporary Management Research	Single Case Study	9
12	Capaldo and Rippa (2009)	A planned-oriented approach for EPR implementation strategy selection	Journal of Enterprise Information Management	Single Case Study	8
13	Wong et al. (2005)	Critical failure factors in ERP implementation	www.pacis-net.org	Multiple Case Study	13
14	Ehie. and Madsen (2005)	Identifying critical issues in enterprise resource planning (ERP) implementation	Computers in Industry	Multiple Case Study	6

Table 2-5: References of the Critical Failure Factors identified from the literature

Tables 2-4 and 2-5 have highlighted the different articles and journals used while Tables 2-2 and 2-3 have identified the CSF's and CFF's acknowledged by the different researchers. They also identify the research method and sample that the researchers undertook to identify the factors. Five research methods were followed for the identification of the CSF's; literature review (8 researchers), multiple-case study (6 researchers), single-case study (3 researchers), field research (1 researcher) and survey (2 researchers). Such gives a total of twenty researchers studied. Four research methods were followed for the identification of the CFF's; literature review (4 researchers), multiple-case study (5 researchers), single-case study (4 researchers) and survey (1 researcher). Such gives a total of fourteen researches. A deeper understanding is provided below where the factors identified have been analysed.

Chapter 3 - Conceptual Framework Chapter

3.1 Introduction

Of all the literature that has been reviewed, (20 refereed journal articles discussing the CSF's and 14 refereed journal articles discussing the CFF's), case study approach (single & multiple), survey approach, or literature review approach, have been followed as the primary research approaches for the different researchers undertaken and studied in this research. Of all the factors that have been highlighted, this research, specifically, has created a conceptual framework model that has amalgamated the factors highlighted from the different previous researches identified. Tables 3-1 and 3-2 are the results of the different literature reviewed.

	Factors							
	Pre-Implementation	Implementation					Post-Implementation	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Strategic Visioning & Planning	**Change Management, BPC & BPR**	**Communication**	**ERP strategy & Implementation Team**	**Project Management**	**Management Support &Involvement**	**Performance Evaluation**	**Organisational fit of ERP systems/technical support**
Sub-factors	**1.1** Business Plan, Vision & Objectives	**2.1** Change Management Plans	**3.1** Communication methods	**4.1** ERP Strategy	**5.1** Project Management skills & techniques	**6.1** Top Management Support	**7.1** Monitoring & Feedback	**8.1** Legacy System Integration
		2.2 BPC, BPR and software configuration	**3.2** Management of Expectations	**4.2** Personnel & Teamwork	**5.2** Risk Management	**6.2** Project Champion	**7.2** Troubleshooting	**8.2** Data Analysis & Conversion
		2.3 Client Consultation & Training	**3.3** User Involvement	**4.3** Use of Consultants	**5.3** Project Completion	**6.3** Use of Steering Committee	**7.3** Financial Budget	**8.3** Avoid Customisation
		2.4 Client Acceptance	**3.4** Interdepartmental Cooperation	**4.4** Partnership with Vendor				

Table 3-1: Conceptual framework of Critical Success Factors and their sub-factors

Factors							
Pre-Implementation	Implementation					Post-Implementation	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Not clear Strategic Visioning & Planning	**Poor Change Management**	**Lack of Communication**	**ERP strategy & Implementation Team**	**Poor Project Management**	**Lack of Management Support & Involvement**	**Performance Measurement**	**Lack of Organisational fit of ERP systems/technical support difficulties**
1.1 Strategic Goals not clearly defined	**2.1** Poor Change Management	**3.1** Lack of understanding of business implications/unrealistic expectations	**4.1** Poor selection of ERP systems and vendors	**5.1** Poor project management or planning	**6.1** Lack of support from top management	**7.1** Poor testing	**8.1** excessive customisation
1.2 Change in business goals during project	**2.2** Resistance from employees		**4.2** High attrition rate of employees	**5.2** Tight project schedule	**6.2** Lack of business management support	**7.2** Hidden costs	**8.2** Multi-site issue not resolved
1.3 Inappropriate timing	**2.3** Inappropriate training methods & poor education		**4.3** Inadequate resources		**6.3** poor middle management/commitment & understanding		**8.3** misalignment of IT/technical difficulties
	2.4 Hostile company culture						**8.4** Inaccurate data
	2.5 Poor knowledge transfer						**8.5** lack of Internal integration
	2.6 Poor Quality of BPR						**8.6** political pressures

Table 3-2: Conceptual framework of Critical Failure Factors and their sub-factors

An in-depth study and an understanding of each factor were done where it was possible to clearly understand the factors highlighted by the different researchers. From the understanding, it became possible to classify and group the factors together under one main factor. The grouped factors are referred to as sub-factors that support and feed into the main factor by going into detail and explaining the essence of its nature. The tables have been divided into factors and the sub-factors that represent them. All the factors identified from the different literature have been considered and an explanation of each is presented below. They have been divided into the different project phases; *pre-implementation, implementation* and *post-implementation*.

3.2 Critical Success Factors Identified

<u>Project Phase:</u> *Pre-implementation*

<u>Factor 1:</u> Strategic Visioning & Planning

Strategic visioning & planning has been identified as a factor that is meant to be considered during the pre-implementation project phase. It should be clearly identified and highlighted to assist in positive project completion. Visioning and planning requires the articulation of business needs and the organisation's vision where clear goals and objectives are identified prior to commencing the ERP system implementation. A clear link between the organisations goals and what they expect of the ERP system should be made. Ensuring alignment with business needs should also be clearly recognised. Conducting strategic rationalisation for implementing an ERP system in an organisation should be the outcome of this phase and explains the factor. A vision and plan forward should be provided and understood by all in order to achieve a successful project. Therefore, *business plan, vision & objectives,* is the sub-factor that supports this factor.

<u>Sub-Factor 1.1:</u> Business Plan, Vision & Objectives

Creating a *business plan, vision & objectives* is considered to be a sub-factor of *strategic visioning & planning*. In order to have a strategic vision and plan, it would be necessary to have a business plan, vision and objectives that guide the organisation's strategic view of implementing an ERP system within. According to Al-Mashari et al. (2003), goals identified should be measurable in order to ensure that this stage is acts as a basis of the ERP system implementation. Ensuring alignment with business strategy should also be considered. Planning

should incorporate plans that involve the different aspects of the project such as risk management and quality management (Mandal and Gunasekaran, 2003).Well planned implementations at an early stage can assist in guiding the project team and ensuring that they are on track during the implementation period. This phase is a predecessor of the implementation phase and by pre-planning, the implementation becomes easier to handle since people are guided by the vision.

Project Phase: Implementation

Factor 2: Change Management, BPC & BPR

Change Management, BPC & BPR refers to an organisation clearly publishing and working with a system that incorporates change management plans, business process change measures and business process re-engineering patterns. These change measures feed into the project during implementation and could support the team undergoing the change from the 'old' to the 'new'. Not only is the team supported but the business's ongoing performance also is. Facilitating the changes and understanding the processes that are to be transformed into the new system are key characteristics to ensure that this factor is met and project success is deemed inevitable. *Change management plans*, *BPC, BPR and software configuration, Client Consultation & Training* and *Client Acceptance* are the different sub-factors identified that further explain and add emphasis to this factor.

Sub-Factor 2.1: Change Management Plans

Nah et al. (2001) express that this concept refers to having a clearly defined change management program and plans that guide the program. Al-Mashari et al. (2003) have explained that this factor prepares and organisation for a change where *change management plans* are created and used a stools to support the organisation and its people in making the change from the 'old' to the 'new'; old being pre-ERP system in an organisation. Such plans prepare an organisation to deal with issues that could arise during project implementation that are related to securing and achieving a positive project outcome when dealing with changes within an organisation. The major change here, in this context, is the change from the old ways things were done and the new way of doing them with the introduction of the ERP system.

Sub-Factor 2.2: BPC, BPR and software configuration

As ERP systems are usually introduced in organisations to improve and simplify the work of its business processes, BPR is essential to link the old business processes to the new way of doing things. This process is considered to be a long one that needs to be closely monitored. It is opted that old business processes are re-engineered into the new system rather than having processes that do not fit within the system but are still used (Scheer & Habermann, 2000: cited in Al-Mashari et al., 2003). According to Bhatti (2005), organisations should change their processes to suit the ERP system so as to decrease the customisation needed. BPR basically describes how the business will operate after the system has been implemented within. Software configuration refers to the degree of customisation that is undergone to include all the old business processes in the new system.BPC refers to the business process change and how that is done to adapt the old processes to the new requirements. All these are identified as changes that an organisation undergoes to incorporate the ERP system.

Sub-Factor 2.3: Client Consultation & Training

Client Consultation & Training has been considered to fit under the factor *Change Management, BPC & BPR* as it deals with the human aspect of dealing with the change from the old way of doing things to the new way, which is the ERP system. Consulting the client on their specific requirements is a process that is usually undertaken by the consulting team or the vendor; whoever is implementing the ERP system. According to Holland and Light (1999), this process includes questioning the employees about their requirements and their expectations from the system. Requesting information from employees, who are basically the client, avoids misconceptions and avoids problems that could arise at a later stage. Providing training is a critical aspect of an implementation. That is mostly due to the end-users being able to use the system after the implementation team have left the site and handed the project over. Stratman and Roth (2002) refer to this as developing the IT skills of the users. This is considered important and qualifies as dealing with change management since this is a change that needs to involve the end-users to ensure the benefits of the system are realised.

Sub-Factor 2.4: Client Acceptance

This sub-factor should be considered as the outcome of the *client consultation and training* sub-factor as it deals with receiving *client acceptance* on the system. Holland and Light (1999) explain this factor as being one that deals with receiving client acceptance by ensuring that the end-users (clients) are involved during the system implementation where they highlight their requirements, test the system and provide feedback to the implementation team to ensure maximum benefits of the system are achieved. They also propose that through testing and training on the system along with the new business processes, their acceptance can be achieved (Holland and Light, 1999).

Factor 3: Communication

Communication refers to the levels of communication that occurs amongst the different people involved in the project (Mandal and Gunasekaran, 2003). Ensuring there are clear communication channels amongst the employees and especially the implementation team could endure project success where cooperation and understanding is of the essence. Being able to understand the requirements and communicate clearly the roles and responsibilities of the project team are of the few aspects that are considered as crucial to project success and that is why this factor has been considered as a critical success factor. As part of the sub-factors that are associated with this factor, *communication methods, management of expectations, user involvement* and *interdepartmental cooperation*, are ones that have been identified by different literature. The outcome of this factor is to ensure that any communication gaps are closed off amongst team members.

Sub-Factor 3.1: Communication methods

According to the literature review approach followed by Esteves-Sousa and Pastor-Collado (2000), communication should be two kinds; 'inwards' and 'outwards'. *Inwards* refers to the project team and the implementers involved in the project while *outwards* refers to the organisation as a whole. Communication should be inter-crossed between those two facets of the human spectrum. Information sharing between the project team qualifies as inwards while sharing this information with the whole organisations qualifies as outwards. *Communication methods* that fail to engage the employees in the information sharing tools where processes,

systems benefits, reporting scheme etc. are shared amongst all those concerned, is considered to be a critical success factor that can add value to the project and enhance its success rate. Such does not exclude the importance of communication between the vendors/business consulting team. It is vital that the organisation needs are clearly communicated to them to ensure that the proposed system can and will provide the organisation its requirements, otherwise the system could be considered a failure.

Kirkman and Mathieu (2005 cited in: Gurtner et al 2007) stated that teams tend to rely on technological means for communication purposes. Even if a team is co-located, they tend to use technology-based or virtual tools to communicate such as e-mail, videoconferencing, telephone & telephone conferencing and group decision support systems. Co-located teams, more commonly though, use face-to-face communication styles such as weekly meetings where all the team is present. Minutes-of-meetings have also been highlighted as a communication tool that people follow and communicate with.

Sub-Factor 3.2: Management of Expectations

According to Ginzberg (1981: cited in Somers & Nelson, 2004), to achieve successful ERP system implementations, one must ascertain the successful management of user expectations. Such entails and adds to the communication amongst the employees, who are the end-users and the implementation team. It is the development of what users expect to get of the system to ensure that benefits are achieved and attained.   From the pre-implementation to the post implementation stages, expectations should be managed to ensure a positive project outcome and that entails a critical success factor for the ERP system implementation (Somers & Nelson, 2004).

Sub-Factor 3.3: User Involvement

User involvement is basically what the previous sub-factors elucidated. Communicating user requirements, their expectations through their involvement is basically why communication has been recognised as a factor that leads to successful ERP implementation projects. Hartwick and Barki (1994: cited in Gattiker, 2002) explain that users that are involved in ERP implementation projects are considered to be included in the communication loop and their business needs and

requirements of the system should be considered. With users' involvement in explaining their process needs, the implementation team can ensure that the system can produce and suits their business needs where the use of it can demonstrate the value of the system. Overall, the ERP system is there to ease the work and improve business practices and procedures. Therefore, the involvement of users and communicating their needs is crucial to ensure that successful projects are possible to accomplish.

Sub-Factor 3.4: Interdepartmental Cooperation

Not only is it important to ensure that users needs and requirements are properly communicated, but it is also crucial to ensure that different departments' needs are properly communicated as well. Therefore, *interdepartmental cooperation* is also crucial as a communication line to be considered so as to close off any gaps or problems that could occur across the different departments. The probability reaching the maximum benefits of ERP systems can be increased by ensuring interdepartmental cooperation pre-, during and post- implementation. Such portrays the strong coordination of effort and goal achievement (Willcocks and Sykes, 2000: cited in Somers & Nelson, 2004).

Factor 4: ERP strategy & Implementation Team

Having an ERP strategy and an implementation team in place could also result in a positive project outcome. The ERP strategy is used as a guide for the implementation team where following a certain implementation strategy is considered a crucial success factor. Al-Mashari et al. (2003) highlight that having a balanced strategy will lead to serve the purpose it is meant to serve at the different levels of the implementation. *ERP Strategy, Personnel & Teamwork, Use of Consultants* and *Partnership with Vendor* are the sub-factors that have been identified by different literature that further explain and support the CSF *ERP strategy & Implementation Team.* The outcome of this factor should be the presence of an ERP strategy and having a strong implementation team.

Sub-Factor 4.1: ERP Strategy

Several researchers have highlighted the importance of having an ERP strategy in place that is used as a guideline for the implementation of ERP systems in organisations (Holland and Light,

1999; Huang et al., 2004; Somers & Nelson, 2004). Following a pre-determined phased approach that determines the case-specific implementation needs can lead to the positive outcome of a project. Clearly identifying and highlighting the different steps and procedures that will be followed during the different cycles of a project is a concept that is considered as one that is critical to the success of a project. Of course, ensuring alignment with the organisations strategy is a must.

Sub-Factor 4.2: Personnel & Teamwork

The necessary skills to probe for details of successful ERP implementations begins with having the right people on the team and ensuring that teamwork is encouraged and supported. Not only is it important to choose certain people to be a part of the implementation, it is also important to choose the people with the necessary skills to do so (Nah et al., 2001). Bingi et al (1999) have highlighted that the team should be a mixture of people that have business and technical knowledge. These criteria are considered important and critical to ensure project success (Sumner, 1999). Therefore, the right people with the necessary skills are needed to ensure that project success could be achieved.

Sub-Factor 4.3: Use of Consultants

Consultants have a crucial part in the implementation of ERP systems. Their role is to assist and guide the implementation process through sharing their knowledge and expertise of the system to the end users and specifically the client project team (Esteves-Sousa and Pastor-Collado, 2000). Their role is important throughout the implementation process and also post-implementation.

Sub-Factor 4.4: Partnership with Vendor

Having a partnership with the vendor is crucial in its nature where technology and constant upgrades are available and having a certain partnership with a vendor could encourage continuous system updating and support (Soja, 2006). When organisations implement the ERP system within, their expectations need to be met. With technology, and as ERP systems are amidst the technological circle, updates and system upgrades are in the continuous run. Having a certain partnership with the vendor of the specific ERP system could ensure that these upgrades and updates are being incorporated in the system implemented. For that to occur, and to

continuously be competitive, it is advised for organisations to have a certain partnership with the vendor where they can be incessantly efficient in incorporating any system changes or upgrades (Somers & Nelson, 2004). Such factor adds to the achievement of a successful project where the vendor support and partnership is crucial during the implementation process and post-implementation.

Factor 5: Project Management

Project management, in the context of ERP systems implementation, refers to the ongoing management of the implementation process where the scope, cost, time, quality, and risk aspects of projects are considered by project managers. Monitoring, controlling and planning projects in a desirable manner are the essence of reaching the ultimate goal of attaining project success. Project management encompasses all aspects that deal with projects and how one needs to deal with them to ensure a positive outcome. Project management does not only deal with the planning of project stages but it also deals with the human aspect and how humans are best suited to meet project requirements. It mainly deals with managing, leading and monitoring the project. *Project management skills & techniques, risk management and project completion* are the sub-factors that have been identified by the various researchers that have proved to have a direct effect on the success of a project under the factor of *project management.*

Sub-Factor 5.1: Project Management skills & techniques

Project Management encompasses the aspect of applying skills, techniques, tools and knowledge to project activities in order to meet project requirements and ensure a positive outcome on project completion and handover. Project Management areas cover the *integration* aspect of projects, *scope, time, cost, quality, human resources, communication, risk management* and *procurement.* In order for projects to be managed efficiently and effectively, these nine areas need to be covered. These areas are referred to as the knowledge areas (Project Management Institute [PMI], 2004). PMI further explain that project management has five process groups; initiation, planning, executing, monitoring & controlling and closing. These process groups refer to the life cycle of projects and the different knowledge areas that need to be incorporated within each phase (Project Management Institute [PMI], 2004). Usually, if a balance is created between

all the knowledge areas, and all the factors are closely monitored, there is a high chance that a project will run smoothly and have a positive outcome.

Sub-Factor 5.2: Risk Management

As part of the project management knowledge areas and aspects that need to be covered and considered by project managers, risk management becomes of extreme importance especially since every project has risk factors attached to it. According to Bhatti (2005), project risks of ERP implementation projects are described as uncertainties that could cause a project to deviate from the original plan. Since ERP systems implementation deal drastically with technology, there are high uncertainties attached to it. The constant change in technology and the tremendous upgrades of systems cause individuals to consider such risks and have risk management plans available in case such risks are faced during project implementation. The idea of such plans is to decrease the impact of the occurrence of risks or unplanned incidents and to identify the risks before they occur so as to create contingency plans in case of occurrence.

Sub-Factor 5.3: Project Completion

Project completion occurs as the *closing process group* in project management. The success of the implementation is referred to as the completion of a project where goals and project scope have been addressed within the planned time and budget while ensuring user satisfaction has been achieved throughout the process (Lyytinen, 1988: cited in Soja, 2006).The completion of a project is considered to be an integral part of the implementation project, where it is at this level of the project management that the project outcome is observed.

Factor 6: Management Support &Involvement

Approvals and decisions are usually attained from people at managerial levels. Their support and input adds value to the decisions taken within organisations. Such people could be the owners, senior management, team leaders, etc... They are to advise the team and make decisions. Having their input during the ERP system implementation adds value to the project since, in the end, the implementation of ERP systems assists them in analysing reports and understanding the company's standing through the click of a button. Literature has identified that the key roles of attaining a successful project would be to have certain managerial levels involved in projects.

Having *top management support, project champion* and *use of steering committee* as part of the implementation team explain the essence of the factor *management support & involvement* and support it as being its sub-factors that attribute to project success.

Sub-Factor 6.1: Top Management Support

Top management support was one of the most widely cited critical success factor. This concept refers to having committed, supportive and involved leadership from the top managerial levels of organisations. Muscatello et al. (2003) emphasised the role of top management as being ones that anticipate and highlight any gap in projects that could deviate from the project goals and objectives. Their role is critical in providing support and expertise. Therefore, business and technical backgrounds would be necessary for them to add value to the project.

Sub-Factor 6.2: Project Champion

Though not cited as much as top management support, but the need to have a *project champion* on board is considered to be important where this individual will lead the team. According to Mandal and Gunasekaran (2003), such individual should possess leadership skills and styles where guidance can be provided to the team. Sumner (1999) adds that it would be important for such individual to have business, technical and managerial skills as well.

Sub-Factor 6.3: Use of Steering Committee

A *steering committee* on board a project provide in-depth involvement in the system selection, monitoring of the project and the management of the consultants (Somers & Nelson, 2004). The impact of having a steering committee amidst the project team allows not only for the project champion to be in charge and guide the project, but also for a committee to assist in doing so. The potential of ERP implementation projects succeeding increases with the addition of such a committee as a critical success factor.

Project Phase: Post - implementation

Factor 7: Performance Evaluation

As part of the post-implementation phase of a project lifecycle, *performance evaluation* is a method used to measure the outcome of a project. The performance of an ERP system implementation is usually measured by determining whether the project was a success or a failure. In order to measure the performance of a project, attention needs to be given to the details of the implementation where the project is continuously being managed, monitored and controlled. Any glitches need to be resolved immediately and that becomes the responsibility of the project manager to ensure alignment with the original project plan. *Monitoring & feedback, troubleshooting* and *financial budget* are the sub-factors that further explain the *performance evaluation* factor and can be used to assess the outcome of a project as one that is successful if they were considered during the project implementation phase.

Sub-Factor 7.1: Monitoring & Feedback

Monitoring & feedback can be considered to be a factor that is part of the project management notion such as identified by Al-Mashari et al., (2003). It could also be considered separately as its own tactical factor as identified by Holland and Light (1999) and Nah et al. (2001) where they have identified that milestones and targets are important to be used to keep track of progress. Monitoring and feedback refers to the sharing of information on the processes between the team to monitor and provide feedback to the implementation team regarding whether or not requirements and needs have been met as promised and planned for.

Sub-Factor 7.2: Troubleshooting

ERP implementations take into consideration the amounts of unforeseen circumstances that need to be assessed as they rise. For that, *troubleshooting* skills are required to handle unexpected crises situations (Mandal and Gunasekaran, 2003). Al-Mashari et al., (2003), Bingi et al. (1999),Holland and Light (1999) and Nah et al. (2001) highlight that such skills are ongoing and required skills needed during the implementation process.

Sub-Factor 7.3: Financial Budget

Soja (2006) suggests that having a pre-determined *financial budget* dedicated to the project is important and needs to be considered where a certain amount is set aside and assured for the project. This is one way of assessing the overall implementation outcome, where the financial

budget can be compared to the planned budget and such is considered to be a way of measuring the success of the project. For that, it has been considered as a critical success factor that determines the project outcome as one that is successful or a failure.

Factor 8: Organisational fit of ERP systems/technical support

As another phase in the post-implementation project life-cycle, it is essential to measure the outcome of a project. By understanding how the system fits within the organisation and with the technical support received post-implementation, one can assess the project outcome. For that reason, the *organisational fit or ERP systems/technical support* is a factor that assumes the role of critical success factors. *Legacy system integration, data analysis & conversion* and *avoid customisation* are the sub-factors identified from different literature that if considered during project implementation, they can increase the chance of reaching a successful project outcome.

Sub-Factor 8.1: Legacy System Integration

Much of the success of an ERP system implementation project is devoted to ensuring that the previous way of doing things (old processes) are properly integrated into the new system (ERP system). This is what *legacy system integration* refers to and it can be explained by having a proper incorporation and transfer of business processes from the old to the new. According to Holland and Light (1999), legacy systems determine the amount of change that an organisation would need to undertake in order to successfully implement the ERP system. The project team would need to evaluate and assess the existing system and identify the problems that may arise when undergoing the change. Depending on the complexity of the existing systems, the legacy system integration can be determined and the potential problems could be assessed.

Sub-Factor 8.2: Data Analysis & Conversion

Somers & Nelson (2004) stipulate that an essential requirement to assess the outcome of an ERP system implementation would be to assess the availability of having accurate data that have been converted from the old to the new system. Depending on the system compatibility and methods used prior to the IT interface, the level of *data analysis and conversion* can be determined. Data in the system is critical in assessing the functionality and outcome of the project where data is the base of the ERP system and without data, the system will not function.

Sub-Factor 8.3: Avoid Customisation

At a technological level, Esteves-Sousa and Pastor-Collado (2000) advise organisations to *avoid customisation* of the ERP system. Utilising the standard and built-in functionalities of the system would be recommended. Such is advised to minimise the effort that is put into the customisation. Soja (2006) also supports such factor by proposing the use of the pre-set and pre-defined system patterns that are embedded in the system. Reasons for such are related to decreasing the time and effort that is usually given to customisation and also to avoid problematic situations when upgrading the system at a later stage.

3.3 Critical Failure Factors Identified

Project Phase: Pre-implementation

Factor 1: Not Clear Strategic Visioning & Planning

As part of the pre-implementation phase, it has been suggested by a few of the researchers that not having clear strategic visioning and planning could be a critical failure factor that could affect the well-being of a project and its final outcome. This does not necessarily entail that not having a clear vision and plan will lead to project failure, but it is a factor that should be considered and understood prior to commencing an ERP system implementation. From the different literature that has been studied, it has become evident that *strategic goals not clearly defined, change in business goals during project* and *inappropriate timing* are the sub-factors that feed into the factor - *not clear strategic visioning and planning*.

Sub-Factor 1.1: Strategic Goals not clearly defined

According to Umble et al. (2003), who suggested that ERP implementations require having a clear vision of what they expect to get out of such system where the main focus should be on the relevant key people and the aim should be to satisfy the customers, empower the end-users and ease the work for the suppliers that the organisation deals with for at least a period between three and five years. The ERP system should be one that is focussed and should have a vision of the future needs that the organisations need including the requirements that need to be met to satisfy them over a certain period of time (Kansal, 2007). ERP systems have benefits that include

ensuring a fully fledged system that can directly update the users on certain processes, and that outcome should be met in order for the project to be considered a successful one. Having a clear vision and plan will assist the project in succeeding, and it has been suggested that the lack of guidance through visioning and planning could negatively affect the project.

Sub-Factor 1.2: Change in business goals during project

Changing the business goals during project implementation has been highlighted as one that could lead to the failure of a project or is a factor that should be considered in order to avoid failure and aim for success (Capaldo and Rippa, 2009). Goals, expectations, end-product should be clearly defined on the on-set of a project, and if changes during implementation have been undergone, then that could raise the flag for meeting critical failure factors which at all times, need to be avoided or carefully assessed.

Sub-Factor 1.3: Inappropriate timing

Garg (2010) has highlighted that a critical failure factor that could lead to negative outcome of ERP implementation projects is due to *inappropriate timing* of going live, or using the system. Of course, there needs to be a certain period that is provided for testing, ensuring the data quality meets the users' expectations, ensuring the compatibility of the hardware and software and providing the users' the right amount of ERP knowledge they would need to fully access the system. This factor has only been identified by one of the researchers (refer to Table 2-3) as having such criticality to it, whereas other researchers explain that the above mentioned facets of going-live should be considered separately. This is not to say that this factor does not deserve its own attention, but it is to note that the inappropriate time, in this context, refers to the going-live stage and is mentioned under the *Not Clear Strategic Visioning & Planning,* as it is advised that these issues need to be considered at an early stage, prior to the commencement of the implementation to ensure that while planning for the project, certain time is dedicated prior to the going-live phase. Also, a clear vision and planning needs to be available prior to the commencement of implementation to understand how they system is going to 'go-live'; pilot (incremental strategy) phases or all-at-once (big-bang strategy). This has been noted as a critical failure factor due to the absence of it not leading to successful implementations.

Project Phase: Implementation

Factor 2: **Poor Change Management**

It was earlier highlighted that the CSF - change management - could lead to project success and the opposite of that is poor change management. It is highlighted as a factor where the lack of it or the poor management of change could lead to a failure project. *Poor change management, resistance from employees, inappropriate training methods & poor education, hostile company culture, poor knowledge transfer* and *poor quality of BPR* are sub-factors that have been examined and amalgamated under the critical failure factor, *poor change management*. These sub-factors explain in detail the reasons as to why poor change management can be the cause of project failure.

Sub-Factor 2.1: **Poor Change Management**

Change management deals with many issues such as having the correct change management plans in place to ensure that when the change in an organisation occurs, many issues are dealt with such as the human aspect, stakeholder needs and most important, organisational changes. The ERP system needs not be considered as a technical change within the organisation. It also needs to be considered as one that will introduce many changes to the organisation as a whole in terms of reporting structure and staff levels. At one point, it might no longer be necessary to have certain staff dedicated to certain tasks as with the ERP system in place, their jobs will be futile and for that reason, people avoid the change. Momoh et al. (2010) have observed that communication in this matter would be essential to avoid arising conflicts that need to be addressed as and when they arise.

Sub-Factor 2.2: **Resistance from employees**

Depicted from literature, employees tend to resist change (Bhatti, 2005; Garg, 2010; Tapp et al., 2003; Umble and Umble, 2001) as it eradicates them from their comfort zone and proposes a threat to it. People tend to prove that change is not needed as opposed to directly accepting and adapting to it. Such *resistance to change* is common and it has its pros and cons. Looking at resistance to change as having a positive demeanour, we can say that it provides a certain degree of stability and predictability of employee behaviour which is reassuring because it attests that no

radical decisions will be made that would lead 'chaotic randomness', Robbins and Judge (2009: p.656). According to Hultman (1979: cited in Mento et al., 2002), if individuals do not resist change or question it, it becomes difficult to assume that the changes proposed will be successful when implementing them as the process of questioning and raising concerns is the mere essence of learning to be more effective, agile and efficient.

Resistance to change can also have a positive impact in the sense that it provokes debate on whether a certain change is good or not. Ideas from non-decision makers can be heard and suggestions on how the change can be easier dealt with or whether it is required can be made on the notion of it being better communicated by those who resist it. Such is to say that prior to implementing changes; organisations should consider the voices of the employees and specifically the change agents, or people that take the responsibility for managing change activities (Robbins and Judge, 2009). This factor, in specific, if not attended to and carefully administered, could lead to project failure as the ERP system implemented may be of no use if employees continue to resist using it.

Sub-Factor 2.3: **Inappropriate training methods & poor education**
The downside to the resistance of change is that it causes delays in work progress as it influences employee adaptation. Ways to overcome such resistance to change would be to properly and formally educate and communicate (Robbins and Judge, 2009) the change measure that will be embarked on by employees within the organisation. Training employees can be used as a change management tool that would assist employees in adapting to change and understanding the importance of it (Koh et al., 2009). It could avoid obstacles that could arise later if the change initiative is not explained and understood. Participation is another measure taken to ensure that employees do not oppose a certain change. When one has been given the chance in participating to come to a decision where change is the outcome, you could rest assured "...that they will not oppose it as their participation can reduce resistance, obtain commitment and increase the quality of the change decision" (Robbins and Judge, 2009:658). Of course, it must be a given that this certain individual has the expertise to participate in the decision-making process. While providing training and educating the employees, project failures could be prevented. Yet, it needs to be given importance as a critical failure factor.

Sub-Factor 2.4: Hostile company culture

There are a number of ways to define the culture of an organisation and a number of ways to approach it. No common consensus of one common definition has been reached yet, but generally, most literature refers to organisation culture being the notion that every firm has its own set of shared norms amongst the employees that distinguishes it from any other firm. How an organisation deals with its work to achieve superior results, whether it depends on past success or accepts to deal with change to improve on the past is what determines an organisation's culture; be it one that has the qualities of being innovative and risk taking, one that pays attention to detail, one that is outcome, people or team oriented, one that is aggressive or one that sustains stability and status quo (Robbins and Judge, 2009). A *hostile company culture* is one that is aggressive in a sense that creates barriers for people to accept change and for that reason, understanding the company culture and tackling it in a way to accept changes within needs attention so as to avoid a failure ERP implementation project.

Sub-Factor 2.5: Poor knowledge transfer

Knowledge transfer is important to ensure that employees understand the change that is being introduced and accept to use it as the new way of doing things. Knowledge transfer is usually expected from the vendor or business consulting team that are required to train the end-users on the ERP system. When knowledge is poorly transferred to them, they tend to resist the change initiative and not acquire sufficient skills to use, maintain and support the ERP system (Garg, 2010). This, ultimately, affects the project in a negative manner and could be a reason that leads to project failure which entails and highlights it as a critical failure factor during ERP implementations.

Sub-Factor 2.6: Poor Quality of BPR

Poor quality of BPR could lead to incorrect system configuration problems due to the business processes not being successfully reengineered to fit with the ERP system. A mapping analysis needs to be conducted by the consulting team to ensure that the business processes of organisations are mapped with the software configuration (Wong et al., 2005). As this is a major

change in processes, having poor quality BPR could lead to the failure of ERP implementation projects.

Factor 3: Lack of Communication

Communication that fails to inform and engage employees in discussing the potential benefits that the ERP system could have, if dealt with correctly, can lead to the lack of team buy-in and acceptance which will eventually lead to a failed initiative and project. Communication where benefits, possible pitfalls, needs, requirements and progress updates, need to be available during the ERP system implementation to ensure that all criteria and procedures are clearly explained and understood by the team members and also the end-users. The lack of communication could result in project failure especially if needs are not communicated efficiently and effectively. *Lack of understanding of business implications/unrealistic expectations* is a sub-factor identified from the different literature that explains what attributes to the project failure.

Sub-Factor 3.1: Lack of understanding of business implications/unrealistic expectations

A big chunk of communication is given to being able to properly and effectively communicate the business implications, needs and requirements that are expected to be produced from the ERP system (Xue et al., 2005). Not having the correct expectations or expecting too much because the end-result was not communicated properly could lead to project failure as before the implementation even commences because one will not receive what they are expecting as it may not be do-able to begin with. Therefore, through communicating the expectations, one can understand the final project outcome.

Factor 4: ERP strategy & Implementation Team

Having an ERP strategy that is well explained to the implementation team could be a reason as to why a project could succeed. The lack of it could explain why a project could fail. Noting this factor as one that is a critical failure factor allows the team to understand the severity of having a strategy in place and that is followed by all. *Poor selection of ERP systems and vendors, high attrition rate of employees* and *inadequate resources* are among the sub-factors that have been identified from the different literature that feed into *ERP strategy &implementation team* factor. These are the sub-factors that need to be clearly understood to resist project failure.

Sub-Factor 4.1: Poor selection of ERP systems and vendors

There are different types of ERP systems. Depending on an organisations needs, a specific system needs to be selected. If an ERP system works with one organisation, it does not necessarily imply that it will work for all organisations. Depending on the organisations requirements and expectations, a certain ERP system should be selected. Selecting an inadequate or inappropriate system for a certain organisation could be the cause of project failure as the benefits will not necessarily be seen or used (Pairat & Jungthirapanich, 2005). In this case, it is up to the vendor to ensure that the system selected is one that will provide an organisation with the benefits they expect to get out of it. Education and knowledge sharing plays a major role here as well, but *poor selection of ERP systems and vendors* needs to be viewed and assessed as a critical failure factor alone. The vendors and consulting team become a part of the implementation team and their roles and responsibilities are drastic.

Sub-Factor 4.2: High attrition rate of employees

Employees, whether part of the implementation team or end-users, tend to suffer from high work stress and workload when being introduced to the ERP system (Wong et al., 2005). Due to that, employees tend to resign from their jobs or feel as though they have no value at their current tasks. This relays why a certain project could be considered a failure one due to the constant shifting of employees, hence leading to pointing it out as a critical failure factor that needs certain attention allocated to it.

Sub-Factor 4.3: Inadequate resources

Being able to ensure and dedicating certain people to the ERP project needs to be something that is considered as a crucial aspect that could lead to project success and the inadequacy of it could lead to project failure (Kansal, 2007). The resources selected need not only refer to human resources but also to other tangible resources. Not giving the appropriate amount of time with the right people could result in project failure which is why it has been highlighted as a critical failure factor that needs attention.

Factor 5: Poor Project Management

Project management effectiveness is the key to ensuring that ERP projects succeed as opposed to fail. The lack of having the right skills could lead to project failure due to the scope not necessarily being properly identified or the time not allocated well, or cost not estimated correctly. Inadequate project management skills could therefore be a reason of project failure and hence it being highlighted as critical failure factor. *Poor project management or planning* and *tight project schedule* are two sub-factors that further explain the factor, *poor project management*. They explain the reasons that could lead to project failure due to having poor project management.

Sub-Factor 5.1: Poor project management or planning

Control is an important project management skill that needs to be considered. Failure to plan, lead, manage and monitor the project has led some research to believe that the lack of *project management or planning* is the reason why ERP implementation projects fail (Wong et al., 2005).

Sub-Factor 5.2: Tight project schedule

Not giving the ERP system implementation project adequate time from the planning to the 'go-live' stage could lead to project failure. Enough time and a proper schedule needs to be allocated to each phase of the implementation to ensure that all the requirements are covered and attended to (Wong et al., 2005; Garg, 2010). Having a *tight project schedule* produces the risk of losing data, not putting the correct data in, not being able to test the system, etc... This factor needs to be given special attention by the project manager to ensure that the schedule fulfils and secures all requirements.

Factor 6: Lack of Management Support &Involvement

Insufficient management support, involvement and commitment could lead to internal political problems within the organisation that could hinder project success and the implementation process. For that reason, it is important to ensure that management support is achieved and they are involved in the identification of the cause of implementing the ERP system. *Lack of support from top management, lack of business management support* and *poor middle*

management/commitment & understanding are the sub-factors identified from different literature that further explain and add on to the factor *Lack of Management Support &Involvement.*

<u>Sub-Factor 6.1:</u> **Lack of support from top management**

Support from top management refers to financial, moral and political problem resolutions of instances that could occur in the organisation. Having limited financial support could cause the project to stop due to insufficient funds that top management have not approved. Moral support needs to be given to the employees so they understand their value and do not feel as though their efforts are useless. If problems were to arise, top management should be there to resolve disputes before they get out of control. Therefore, in its essence, the *lack of top management support* can be the cause of failed projects as their presence and approval are of high worth and value.

<u>Sub-Factor 6.2:</u> **Lack of business management support**

The lack of understanding the business implications and requirements is basically what the lack of business management support refers to (Momoh et al., 2010). Not having the clear understanding of the business implications and where the ERP system will take the business could be the reason as to why a project could fail and therefore it becomes highlighted as a critical failure factor.

<u>Sub-Factor 6.3:</u> **Poor middle management/commitment & understanding**

Middle management refers to the managers in the middle, between the top managers and the rest of the team. They are the ones that lead and guide the project from a very project-oriented view that does not necessarily refer to financials. If they are not aware of the project needs and requirements and if they are not committed to the project, there is a high chance of the project to fail since their role is crucial in driving the project from a technical aspect (Momoh et al., 2010).

<u>Project Phase: Post - implementation</u>

<u>Factor 7:</u> **Performance Measurement**

As part of the post-implementation phase and before the 'go-live' phase, performance of the ERP system should be measured to evaluate whether its benefits have been achieved or not and

whether the project succeeded or failed. As part of the *performance measurement*, it has been noted that the *poor testing* of the system and *hidden costs* that creep up into the project have been recognised to evaluate the project as a failed one. Hence, they have been noted as critical failure factors that one would need to pay attention to whilst implementing an ERP system.

Sub-Factor 7.1: Poor testing

Garg (2010) has pointed out that when the processes of an ERP system are not tested prior to the 'go-live' date, there is a high chance that some processes might not be adequately integrated and could cause failure of the project. To reduce the risk, it would be necessary to test the system before 'going live'.

Sub-Factor 7.2: Hidden costs

Hidden costs have been noted by Garg (2010) as costs that have been left out of the project such as the costs of "...planning, consulting fees, training, testing, data conversions, documentation, replacement staffing, and the learning curve performance drop" (p.7). The reason as to why they are referred to as hidden costs is attributed to them being taken for granted. When these hidden costs have not been taken into consideration, the Return on Investment that the organisation was anticipating may not be achieved (Garg, 2010).

Factor 8: Organisational fit of ERP systems/technical support

When an ERP system is introduced into organisations, it would need to fit in and include all the existing business processes of an organisation. Being able to fit into an organisation, the business processes need to change slightly to ensure that the ERP system can absorb it all. For that, technical support is of great importance because at this point, the technical aspect of the system meets with the business processes and proper integration needs to be ensured. If this integration does not occur, then the benefits of the ERP system might not be attainable especially given that it needs processes to be executed. The ERP system not fitting into the organisation could lead to project failure. *Excessive customisation, multi-site issue not resolved misalignment of IT/technical difficulties, inaccurate data, lack of internal integration* and *political pressures* are all sub-factors that have been described as critical failure factors that could lead to having the *lack of organisational fit of ERP systems/technical support difficulties*.

Sub-Factor 8.1: Excessive customisation

It has been argued by many researchers that customisation of an ERP system tends to increase costs, have longer implementation time and maybe decrease the ability of benefiting from the vendor's existing software maintenance and upgrades (Capaldo and Rippa, 2009; Garg, 2010; Kansal, 2007; Momoh et al., 2010; Wong et al., 2005). Capaldo and Rippa (2009) have added that using the standardised software and adopting it without interfering with the way it was been standardised would decrease the customisation criticalities that could arise at a later stage. Also, the organisation should adjust its characteristics to meet those of the system and not vice-versa (Capaldo and Rippa, 2009). Excessive customisation might lead to project failure in the short term and long term of the project life and it has been advised that it should be avoided to avoid project failure.

Sub-Factor 8.2: Multi-site issue not resolved

Though this factor has not been cited by many researchers, attention needs to be given to it as it is one that is extremely relevant to multi-site ERP system implementation and the negative aspects of it that could lead to project failure. The reasons why an ERP system implementation across multi-sites could fail is due to the degree of process and product consistency across the different sites and the need to have centralised control over the different information, system setup and usage (Umble et al., 2003). The different cultures of the different sites could also lead to problems in the implementation where different sites deal with different situations differently (Umble et al., 2003). It is also advised to follow a phased approach by selecting a pilot site where the system can be implemented first where the management team can learn from the situations of the first site and recover them in the other sites (Umble et al., 2003).

Sub-Factor 8.3: Misalignment of IT/technical difficulties

Misalignment of IT and facing certain technical difficulties has qualified as a failure factor in the sense that if the IT system (ERP system) does not work according to the expected outcomes, then the project would fail. As an example, Xue et al. (2005) have highlighted that the ERP system installed in a certain organisation in China has failed due to the misalignment of the system and failure to find a common ground with the Chinese way of doing things. The language of the

system being in English should not be a problem if it were implemented in English-speaking countries but when implemented in non-English speaking countries, issues should be adjusted accordingly to best suit the organisations' needs and requirements to ensure attainment of full benefits.

Sub-Factor 8.4: Inaccurate data

Umble et al. (2003) point out that accurate data is absolutely required for a system to function as an integrated system where any incorrect information will produce wrong information throughout the organisation and at all levels of the data reporting structure. It is, therefore, advisable that consistent and accurate data be fed into the system so as to avoid long term fatal mistakes resulting in the failure of the ERP system implementation project.

Sub-Factor 8.5: Lack of internal integration

As an ERP system acts as a central database where anybody can access information they require, the lack of internally integrating the system could be the main reason why a system as such would fail. Cross departmental integration needs to be in place to ensure a positive project outcome and to ensure that ERP system benefits are recognised (Momoh et al., 2010).

Sub-Factor 8.6: Political pressures

Political pressures have been explained as external pressure received from competition, for instance (Noudoostbeni et al., 2010). With such political pressure, an organisation might implement a system not realising that it is an incorrect system for it or an inadequate one, and without getting the full support of the management. Thus, such leads to the failure of the system as its benefits are not recognised and the implementation of it is not necessarily required but it went through anyway, as a response to the external political pressures.

3.4 Summary of CSF's and CFF's

With that, we have now seen and understood the criticality of the CSF's and CFF's that have been amalgamated by the researcher according to their factors and sub-factors that are relevant and can be grouped with each other. Having explained them all, this research will now provide

further conceptual framework where major CSF's and CFF's that have been identified from the literature review have been pointed out.

3.5 Summary

This chapter took us through an in-depth study to create an understanding of the conceptual framework proposed in this research. A detailed explanation about each factor and its sub-factors was provided to be able to create a general understanding of the critical success and failure factors that either hinder or successfully sustain an ERP implementation system as a project undertaken throughout an organisation.

Having created a basis from the different literature, a conceptual framework was developed that will be tested as part of the research this research intends to undertake. The intention of this research is to support the framework, oppose it or add new knowledge to it. The approach followed to undertake the research and the results will be investigated in another chapter.

Chapter 4 - Research Methodology

4.1 Research Purpose

A research for academic purposes is usually undertaken to further enhance knowledge on a topic of interest to the researcher. The purpose of research could be classified as being either *exploratory, descriptive* or *explanatory* (Saunders et al., 2007). These methods can be used against the research strategy of a case study to assist in *explaining, describing, illustrating* and *enlightening* the research as a means of adding knowledge to research through the case.

Exploratory studies are most beneficial if one needs to clarify their understanding of a certain predicament (Saunders et al., 2007). According to (Robson, 2002: cited in Saunders et al., 2007:133), such study is utilised to assist one in finding out "what is happening; to seek new insights; to ask questions and to assess phenomena in a new light" (p.59). Three ways of undertaking exploratory studies as described by Saunders et al. (2007), would be to either study different literature, interview professionals in the topic of choice or to conduct focus group interviews. All lead to the input of gathering information from trusted and qualified sources.

Descriptive studies would be used in order to "portray an accurate profile of persons, events or situations" (Robson, 2002:59: cited in Saunders et al., 2007:134). A descriptive study can be considered as an extension of the exploratory study where it is actually necessary to begin the research by having a clear picture of the concept proposed. It is also appropriate for situations where a problem is clearly identified and the intention of the research is not to present the link between causes and symptoms.

Explanatory studies are valuable when studies are meant to establish causal relationships between different variables. Examining a situation or a problem to explain the relationship between variables would be the outcome of an explanatory study (Saunders et al., 2007). Yin (2009) adds that to answer 'how' and 'why' questions, following an explanatory study as a means to get answers is used especially for the case study research method. Wanting to know how a certain event was completed and the effects it had on people or communities signifies that of the explanatory study approach.

For purposes of this research, the exploratory studies would be how it commences where assessment of ERP implementations in light of the critical success or failure factors would be highlighted to understand the best and most beneficial way of implementing ERP systems in organisations. It is also following a descriptive process where it is important to understand certain concepts on the data that would be collected prior to collection. The output of this research would also be focused on explanatory studies where understanding the cause and effect of variables are of importance to the researcher. Therefore, all three methods would be implemented, but most of all, explanatory studies would be the outcome that would achieve the basis of this research paper.

4.2 Research Approach

Research approach can be divided into a quantitative or qualitative approach. Following the quantitative method involves counting and measuring using numbers to explain certain answers. They give out descriptive data such as *means* and inferential as in they draw significant relations between variables (Gillham, 2000). Qualitative methods are also descriptive and inferential but differ from quantitative in that they are considered to gather soft data rather than hard data. That simply signifies that the information gathered from qualitative data needs to be interpreted by the researcher since information gathered from people is what the result is.

Qualitative data refers to "all non-numeric data or data that have not been quantified and can be a product of all research strategies" (Saunders et al. 2007: 470). It is practical when the researcher wants to transform data that has been observed or reported without the use of numbers, only words. Using the qualitative approach of analysis is usually undergone when the sample size of the study is small-scale.

Noting the success and failure factors in ERP implementation projects through multiple case studies, and comparing them with existing literature is the method that will be followed. Therefore, investigating certain factors in depth and providing a better understanding of them in my research area rather than providing a causal relationship without generalisation is the purpose and hence, a qualitative approach supports the approach I plan to undertake.

4.3 Research Method and Strategy

According to Saunders et al. (2007), no research strategy can be considered as superior or inferior to another. The research strategy that should be chosen should be one that will ultimately be guided by the time available to undertake the research, the research question, its objectives and the extent of existing literature or knowledge on the topic. The different methods to tackle this would be to experiment, use surveys, undertake a case study, action research, grounded theory, ethnography or use archival research. This research aims at utilising multiple case study assessment.

A research methodology and the research strategy are primarily dependent on the research question itself. A research method that this research decided to use is the case study method. A *case,* as explained by Gillham (2000), can have many meanings or interpretations. It can be an individual, group of people, society, community, organisation, etc... *Cases* would be two or more of each *case*. A *case study* is an investigation of a *case* that seeks to find data about the certain *case* where it can be elucidated into words answering certain questions or a research question.

Yin (2009) highlights that using a case study strategy is mostly beneficial to answer questions that relate to how and why questions. He also explains that with case studies, a researcher does not have control over behavioural events and focuses on present or recent events as opposed to historic ones. A case study has been defined as 'a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002:178: cited in Saunders et al., 2007:139). The goal of a case study is to expand and analytically generalise theories where input of observation can be added to research (Yin, 2009).

The use of case studies in this research will particularly add knowledge of individual and organisational occurrence that will add to the research by portraying real life events and processes utilised. It will be used to add to the findings from the different literature, where gaps, if any, can be highlighted, presented and be used as a basis of knowledge for the researcher and anyone interested in the topic.

Case studies can either be single or multiple. A single case study will focus on one organisation from a single industry. Multiple case studies, however, allow the researcher to present data on more than one organisation either from the same or different industry. Results can then be compared where the level of validation increases (Saunders et al. 2007). Multiple case studies are considered to be more robust than single case studies. The reason why multiple case studies are more robust according to Yin (2009) is that data is gathered from more than one source where either similar or contrasting results can be found. This adds to the research as it adds to the research question of whether it agrees or goes against existing research/literature.

The purpose of this research is to answer 'how' and 'why' questions. Therefore, following the case study method will assist in gathering the information required to support this research. Multiple case studies have been looked at and data has been collected, analysed and compared with existing literature. In the case of multiple case studies being studied, the findings would either highlight any differences or gaps in identifying success and failure factors in the implementation of ERP systems in organisations.

4.4 The case study as a research method

Using the case study method as the research method and linking it to the research strategy requires consideration of at least four different application strategies (Yin, 2009). The first and most important is to *explain* any causal links that arise from the real-life study of a certain case. Second would be to *describe* the real-life scenario as it really is when the study was undertaken. Third would be to *illustrate* the real-life setting, and the certain study that answers the research question, by evaluating the situation through description of the scenario. Fourth would be to *enlighten* and add new knowledge gained from the case study; either adding new knowledge from the outcome of the study or agreeing with old knowledge is the main product

To embark on a case study as a research method, Yin (2009) advises of a six step method to be followed; *plan, design, prepare, collect, analyse* and *share*. The case study is viewed as a method that is challenging and prior to following such method to collect data, its limitations and strengths should be highlighted.

In terms of limitations of the case study research method, it has been noted as one that could have lack of hard and factual reasoning since it does not necessarily follow systematic procedures like any other method and with the sloppiness of certain researchers, findings and conclusions are usually influenced (Yin, 2009). It has also been noted that case studies provide little basis for scientific generalisation and that is why a single case study is not usually preferred (Yin, 2009). A third complaint is that they take time to complete and result in much information. This does not necessarily have to be the case for all case studies though (Yin, 2009). A fourth complaint has been noted especially in education research where people try to come up with causal relationships for 'true experiments' where the emphasis is based on a "treatment" and a particular "effect" (Jadad, 1998: cited in Yin, 2009:16).

In terms of the strength of case studies, it has been noted by Yin (2009) that such study offers important data that describe contemporary events as they are through direct observation and interviews of those people involved in the scenario that answers the research question. Case studies are a unique form of observation to add knowledge to a certain topic. It could add new knowledge, agree or disagree with existing knowledge. In-depth observation from real-life events add to case study research. It has no boundaries, which assists in adding new knowledge to a certain topic. From different experiences, people will share their experiences. It relies on multiple sources of evidence that will further develop existing studies.

4.5 Data Collection Method

Evidence in case studies can be found through "direct observation of the events being studied and interviews of the persons involved in the events" (Yin, 2009:11). An interview is a purposeful discussion that occurs between people that assists in gathering valid and reliable data of current situations that are relevant to the research question (Saunders et al. 2007). Other forms of evidence include documentation, archival records, direct observations, participant observation and physical artefacts. For purposes of this dissertation, interviewing was the primary source of data collection. Direct and participant observation were also utilised as complementary methods to interviews. Direct observation refers to the researcher observing the actual case in the place of its existence (Yin, 2009). Data is collected as a form of assessing occurrences and behaviour during certain time periods. Meetings, small informal conversations and field visits pave the way

for observation as a data collection method. Participant observation refers to the researcher taking part in the case and not being as passive as a regular observer.

This research has followed the data collection principle which is using multiple sources of evidence. Yin (2009) refers to this as investigating the problem and the selection of a single source of evidence which could be interviews. In this research, the method of data collection followed is mainly through interviews. Yin (2009) further states that for case studies the process of triangulation is recommended. Gillham (2000) explains this process as one that approached different people with different standpoints and states that if we get the same responses from all the respondents, then we have achieved the process of triangulation and the data is validated. If, though, we get different responses, then we would need to further investigate the reason as to why such differences occurred. Furthermore, Yin (2009) explains that using multiple sources of evidence develops *converging lines of inquiry,* which is a process of triangulation that is more convincing and accurate when it is based on different sources of information attainment. *Investigator triangulation*, to be exact, is the process of triangulation that this research follows and tends to establish as validating the data received from interviewees. In this research, three interviewees for each case have been interviewed. For each case, one of the interviewees needed to be the project manager of the ERP system implementation project, so as to validate the data received from the other interviewees.

As this research is based on interviews being taken at organisations where my organisation, *Sayegh Establishment*, business consultants and ORION implementers, implemented the ERP systems, some background as being a participant observer and a direct observer can be given to complement the interviews that have taken place. Given that a few organisations did not agree to participate in the interview process, I contacted the vendor of the product, *3i InfoTech* where they managed to provide details of organisations that have implemented ORION in their organisations. As I am not of technical background, as an observer, my role is more of a project manager role. Input can be flagged on the processes and factors that can be derived from the project management aspect. Interviews are the main source of gaining knowledge on the technical and managerial features.

Interviews are "guided conversations rather than structured queries" (Yin, 2009: 106). Interview questions, used as tools of guiding a conversation, have a thematic and dynamic aspect to them (Kvale and Brinkmann, 2009). They are thematic in the sense that they are producing certain knowledge and dynamic in that there is an interpersonal relationship created between the interviewer and interviewee.

Interviews can be highly structured, semi-structured or unstructured (Saunders et al. 2007: 312). They can be standardised or non-standardised (Healey, 1991; Healey and Rawlinson, 1993, 1994: cited in Saunders et al. 2007:312). They can be *in-depth* interviews or *focused*. They are very similar in concept, except that a focused interview focuses on interviewing a person for a short time, at once, having a set of questions prepared where certain facts are just required to be substantiated. This is when reality verifies the literature and confirms the pre-established factors as significant.

Structured interviews use questionnaires that are based on pre-determined and standard set of questions. They are standardised in the sense that questions are given to interviewees and they are expected to answer as per the question referring to pre-coded answers. Semi-structured interviews are non-standardised where the researcher will have a list of questions and themes relating to the research topic allowing for variance to occur from one interview to another. Through an interview process, data has been collected by taking notes that have been cross-checked against a pre-coded set of answers (themes derived from the literature). Unstructured interviews are informal that are used as an exploration tool where the interviewee is given the opportunity to discuss issues openly and freely and as they come. In a sense, semi-structured interviews and unstructured interviews are similar in that they are both non-standardised. Semi-structured interviews allow the interviewer to change the order of the questions depending on the context of the situation and interviewee. Depending on the flow of the conversation of certain interviews, additional questions were raised to fulfil the requirements of the research. Semi-structured interviews that are non-standardised are used in qualitative research in order to conduct exploratory discussions to disclose and understand the what, how and why types of questions (Saunders et al., 2007). Through interviews, one can establish making a connection between the case study and the research that intends on adding new knowledge. *Exploratory,*

descriptive or *explanatory* categories can be used to identify the type of interview one would like to take in order to gather information.

For the purpose of this research, semi-structured, non-standardised and focussed interviews have been conducted that answer and elaborate on the questions that deal with the 'why' and 'how' in the context of the factors relevant to successfully implementing ERP systems. A certain set of questions were pre-prepared and ready for answering by the relevant interviewees. Pre-coded answers (themes from the literature) assisted in ensuring that all factors were discussed and feedback was given, where fit (refer to appendix E). Such data assisted in fulfilling my research objective. Furthermore and to some extent, some questions were kept open-ended as to allow for flexibility and highlight information not thought of earlier.

4.6 Candidate Cases Selection Criteria

According to Yin (2009), a preparatory step for a researcher who is designing their case study research prior to data collection, would be to select the final case(s) that will be a part of the case study. Cases are chosen depending on the research question. Sometimes, depending on the researcher, some case studies might be studied because the research question was based on a topic that the researcher has access to its data. For instance, the researcher could be working in an organisation and the research question could have been developed because of a certain idea that was provoked by the scenario at the organisation. Sometimes, there might be many case studies that a researcher can choose from and it becomes difficult for the researcher to screen the important ones. Yin (2009) advises that in such scenario, the researcher screens the final candidate case studies prior to commencing data collection to avoid any problems that occur during the data collection process. Problems could include that the researcher find out that the selected case does not suit the requirements of the research question. A set of operational criteria should be in place prior to candidate selection where if the pre-set criteria are met by the potential candidates then they should be considered as part of the research. According to Saunders et al. (2007), choosing the candidates or sampling, as they refer to it, saves times and should be especially considered when the research has a tight schedule. Data becomes more manageable and concise, meaning that it is specifically related to the research topic. They go on to further explain the techniques available to undertake the sampling. It is studies in slightly

more detail than just explicitly stating that pre-set operational criteria need to be checked off prior to commencing the data collection procedure. Saunders et al.'s (2007) divide their techniques into two and they are 'probability or representative sampling' or 'non-probability or judgemental sampling'. Probability or representative sampling utilises a form of random selection of samples as opposed to non-probability or judgemental sampling do not depend on random selection of potential cases. Saunders et al. (2007) divide non-probability sampling into 4 methods; *quota, snowball, self-selection, convenience* and *purposive. Quota* sampling refers to the selection of non-random cases as per a certain fixed quota. *Snowball* sampling is mostly used when one is trying to find a population that is difficult to get to. One person informs another about the research and through that, more cases can be attained. The *self-selection* method refers to allowing each case to explain why they would like to take part in the research. Through advertising or a form of media, people contact the researcher and data is collected from those who responded. The *convenience* method refers to the haphazard selection of individuals to take part in the research. Random individuals are usually chosen in the most convenient way, to participate. Usually, walker-bys are stopped and questioned. The *purposive* or *judgemental sampling* technique allows researcher to make their own selection of their case study population based on their judgement of the research needs and requirements.

This research focuses on data collection through the use of *non-probability or judgmental sampling* where the *purposive* method is followed and selection of the case study population is purely based on the cases that are informative. Five organisations were selected where a total of eight cases can be reported on. Each of the organisations selected have implemented and utilised ERP systems for at least a period of six months. This method also agrees with Yin's proposed method of candidate selection, in the sense that certain pre-selection criteria were checked when organisations were being selected to assist, through interviews, in this research. The criteria followed in this research are:

1. All organisations have implemented one type of ERP system – ORION – at least in one of the cases they have presented.

2. Sayegh Establishment, business consultants and ORION implementers, have implemented ORION in the organisation. In the case where that is not applicable, the

vendors who are the partners of Sayegh Establishment were contacted to provide details of other organisation that are willing to participate in this process.

3. They have all used it for at least six months.
4. They are all still using the system.
5. They are all based in the U.A.E..

4.7 Candidate Cases

Initially, the candidate cases were selected according to the implementation of the ERP – ORION software that were implemented by Sayegh Establishment (http://www.sayegh.ae/) – a business consulting organisation based in the U.A.E.. When only two organisations responded and accepted to participate in the research, the interviewer approached the vendor of the software (3i-infotech - http://www.3i-infotech.com) and requested they provide details of other organisations that have implemented the system within their organisations.

Therefore, seven organisations have been approached in order to provide feedback in the interview process. Of the seven, only five accepted to participate. Of the five organisations, a total of eight cases were investigated and studied. The different organisations were first contacted via telephone where an explanation was given to the interviewees about the process that would be undertaken. Later, an e-mail was sent that further explained the reason for the interviews and the set of questions that were to be asked were also attached in the same e-mail. Once interviewees responded and agreed to be interviewed, meetings were scheduled according to their agendas. At the interviews, the interviewer requested that the interviewee sign a paper that proves their acceptance in participating and also that protects their confidentiality. Appendix B provides a copy of the document sent to the interviewees that were contacted as customers of Sayegh Establishment. Appendix C provides a copy of the document that was sent to the 3i InfoTech's customers. Appendix D provides a copy of the interview questions that were proposed during the interviews. Appendix E provides a copy of the questions cross-referenced with the pre-determined factors. The interviews lasted between 45-90 minutes, depending on the amounts of times the interview was interrupted. An uninterrupted interview took 45 minutes.

A summary of interviewees and cases studied is provided in Table 4-1 while a more detailed summary of the case studies is provided in Table 4-2.

	Organisation Referencing System				
	Organisation A	Organisation B	Organisation C	Organisation D	Organisation E
	Interviewee 1 (A1) (P.M)	Interviewee 1 (B1) (P.M)	Interviewee 1 (C1) (P.M)	Interviewee 1 (D1) (P.M)	Interviewee 1 (E1) (P.M)
Position	Business Development Manager	ERP Operations Manager	IT Manager	IT Manager	IT + Financial Controller
Interviewee 2	Interviewee 2 (A2)	Interviewee 2 (B2)	Interviewee 2 (C2)	Interviewee 2 (D2)	Interviewee 2 (E2)
Position	Senior IT Consultant	IT manager	Financial Controller	Sales Manager	IT Technical Consultant
Interviewee 3	Interviewee 3 (A3)	Interviewee 3 (B3)	Interviewee 3 (C3)	Interviewee 3 (D3)	Interviewee 3 (E3)
Position	Financial Officer	Commercial Manager	Production Manager	Sales Executive	Sales Executive
Notes	Case 1: EPICOR Software	Case 1: ORION Software	Case 1: ORION Software	Case 1: ORION Software	Case 1: ORION Software - Advantage (for 15-50 user licenses)
	Case 2: ORION Software	Case 2: ORION Software Upgrade			Case 2: ORION Software - Enterprise (for 50+ user licenses)

Note: P.M = project manager

Table 4-1: Summary of interviewees and cases studied

Table 4-1 provides a summary of the interviewees that participated in this research. Their names and the organisation names were kept confidential. The positions and notes on the organisation have been provided for explanation and reference when required. Below, a summary about each organisation is provided.

Organisation A

Organisation A is one of the leading establishments in the telecom industry specialising in mobile phones trading. Their business deals with selling top brands of hand held phones such as Nokia, Blackberry, iPhone, Sony Ericsson and other brands. It has a market share in almost all the product lines it handles due to their highly competitive marketing team and the after-sales service they provide for their customers within the U.A.E.. They have been in the market for

almost three decades. Their goal is to keep being one of the leading companies in their field by providing the best products and services to their valuable customers and they attain to further sustain that by upholding its large market share infrastructure. They have selected and worked with two ERP systems, where one was considered a failure project while the other a success. Refer to Table 4-2 for further details on the organisation.

Organisation B

Organisation B is a group of companies that deal with trading, manufacturing and job contracting. It is a family owned organisation that is based in the U.A.E. and operates in several countries with a number of associates in different parts of the world. Their commercial activity in the U.A.E. can be traced back to 1912. They are committed to supporting its growth with constant investment into activities to sustain a manageable growth. Their vision is to be an elite conglomerate group with a clear focus on each business. They have implemented one ERP system in their organisation – ORION but have presented two cases; the first being the implementation while the second being an upgrade. Both cases were reported as successful projects. Refer to Table 4-2 for further details on the organisation.

Organisation C

Organisation C is a lighting and manufacturing company that has been working in the global market since 1930. They understand the importance of investing in engineering, quality and production facilities for the specific local market requirements. Their strategic vision is to continue expanding their global network. With 300 + employees in the U.A.E. office, and with 70-75 user licenses, organisation C has shown gratitude for the use of ERP systems. They have reported one case that was a successful implementation project. Refer to Table 4-2 for further details on the organisation.

Organisation D

Organisation D is a group of companies of retail business outlets which are located all over the United Arab Emirates (U.A.E..). They deal with professional cameras, digital photography devices and equipments, leather products like wallets, bags, and belts etc, multi media accessories, games, mobile phones, PDA phones, Apple Ipods, Iphones, and Ipads. With 100+

employees in the U.A.E. and 18-20 users of the ERP system, organisation D has explained that their project was considered a success. Refer to Table 4-2 for further details on the organisation.

Organisation E

Organisation E is one of the U.A.E.'s premier conglomerates with a retail presence across various segments including trading, home solutions and consumer electronics, antiques and souvenir, frames, optics and several other products and services. They are specialised in retail and wholesale. The group caters to a wide cross-section of multinational consumers across the UAE with a strong presence in shopping malls and other prime locations. Their vision is to provide their customers with innovative products and services consistently, and with a zeal and passion that is second to none. Having identified two successful ERP implementation projects, organisation E has given specialist insight into how their business grew with the assistance of the ERP system – ORION. Refer to Table 4-2 for further details on the organisation.

	Organisation A		Organisation B		Organisation C	Organisation D	Organisation E	
Location	Dubai, U.A.E.		Dubai, U.A.E.		Sharjah, U.A.E.	Dubai, U.A.E.	Dubai, U.A.E.	
Industry	Mobile Phones Trading		Trading, Manufacturing, job contracting		Lighting & Manufacturing	Retail	Retail & Wholesale	
Annual Sales (AED)	230000000		N/A		N/A	N/A	150000000	
# of Employees in Organisation	300+		2000+		300+	100+	400	
# of Users of ERP System (User licenses)	30-40		70-75		15	18-20	100	
# of People Interviewed	3		3		3	3	3	
	Case 1	**Case 2**	**Case 1 - implementation**	**Case 2 - Upgrade**	**Case 1**	**Case 1**	**Case 1**	**Case 2**
Successful or failure project?	Failure	Success	Success	Success	Success	Success	Success	Success
ERP Implementation Start Date	January, 2006	January, 2007	May, 1999	May, 2007	February, 2008	March, 2009	January, 2003	January, 2006
ERP Implementation Finish Date	July, 2006	July, 2007	January, 2000	January, 2010	Modular Implementation - August, 2008	December, 2009	January, 2004	December, 2006
Comments	1st ERP system in place	2nd ERP system in place	1st ERP system in place	upgrade of existing ERP system - stopped working for 18 months due to technical difficulties	1st ERP system in place	3 month delay in work due to internal technical difficulties caused by the existing network	1st ERP system in place	2nd ERP system in place due to increase in required licenses
Total Implementation Period	9 months	6 months	6 months	31 months (including 18 month stop), 13 months of actual work	6 months	9 months	12 months	11 months
Planned Implementation Period	6 months	6 months	6 months	6 months	6 months	6 months	12 months	12 months
Months/years of working with system	1 year prior to case 2 system implementation	~3 years	7 years	9 months	~2 years	10 months	~6 years	~5 years

Table 4-2: Detailed summary of case studies

4.8 Data Analysis

The reason for data analysis is to draw empirically based conclusions (Yin, 2009). One strategy that can be followed in doing so is referred to as 'relying on theoretical propositions' (Yin, 2009). This method utilises the theory derived from literature that has led to the case study. Propositions from the literature are drawn out and they act as the theoretical direction that guides the case study analysis. Certain data from the case study, which refer to the research question, can be used while others, non-relevant, can be ignored.

To examine, categorise, tabulate, test are some techniques of analysing data. According to Yin (2009), there are five analytical techniques to analyse data; *pattern matching, explanation building, time series analysis, logic models* and *cross-case synthesis*. Pattern matching is an analytic technique that is strongly pushed to be used for analysis. It is when a pattern of theory develops that is based on existing theory and a conceptual framework produced. The research question questions the framework's validity and the analysis of the data is considered to be findings that agree, disagree or add new knowledge to the framework derived from literature. If the data analysed concurs with the existing theory, *internal validity* of existing literature is reinforced.

The explanation building process follows a series or iterations where an initial theoretical statement is made and different cases are compared against an initial case where the statement is thus revised and the process is continuously repeated until results are satisfactory to the researcher. Time-series analysis creates patterns that are followed over different times. Results are compared over different time periods and analysis occurs accordingly. Logic models are defines as models that follow the pattern of cause-effect-cause-effect, where a dependent variable (event) of an early stage becomes the independent variable (causal event) for the next stage (Peterson & Bickman, 1992; Rog & Huebner, 1992; cited in Yin, 2009). This process tends to create a pattern between the literature and the observed events. Cross-case Synthesis technique works when multiple cases are being analysed especially when it is a two-case case study. Of course, the more cases there are, the more robust the findings (Yin, 2009).

Basically, analysing data is based on developing and applying a certain coding method that will break the data down into results that are tested against the independent variable being the success and failure factors of *ERP implementation*. The dependent variables are factors that affect the outcome of the independent variable. These factors have been derived from the literature and this research tends to use a pattern matching technique where findings will agree, disagree or add knowledge to existing literature. A coding scheme has been derived where the questions developed for the interviews are cross-matched to the resulting factors.

4.9 Validity & Reliability

In any research, it is vital to present its *validity* and *reliability*. Given that qualitative research is a 'soft' research, the idea of ensuring its validity and reliability are of the essence and should not be ignored or dismissed. Validity, according to Kvale and Brinkmann (1999), infers that data received or analysed is based on the truth, and is presented correctly. They also define reliability by highlighting that is concerned with ensuring the findings of the research are consistent, dependable, and if the research was to be done all over again, by other researchers, the same results and findings would be gathered. Validity and reliability are considered to be measures for the quality of research designs. The process of triangulation has been used for data validity where *converging lines of inquiry* is the process used in this research.

According to Yin (2009), there are four tests that researchers can undertake to ensure validity and reliability are not ignored throughout the case study; *construct validity, internal validity, external validity and reliability. Construct validity* is referred to when data is being collected. Yin (2009) advises that 'multiple sources of evidence' are used and that it would be important to establish a 'chain of evidence'. *Internal validity* is concerned with the data analysis phase where it is advised to follow any of the analysis methods described earlier, such as pattern matching. Yin (2009) highlighted that such test is mainly used for explanatory case studies where 'how' and 'why' questions are investigated and answered. *External validity* is the third test that deals with validity of a certain study. Yin (2009) stated that such test deals with generalising beyond the immediate case study. It is mainly used during the research design phase. Case studies rely on analytic generalisation where a researcher is attempting to generalise a certain set of results to a broader theory (Yin, 2009). Theory is the keyword that is to be used as a basis of the research

design. *Reliability* is concerned with the data collection phase where it is advised that case study protocol be used.

To ensure validity in this research, the following has been done at every stage of the tests highlighted by Yin:

- *Construct Validity*: Interviews were the main source of data collection. Interviews that have been done include three employees for each case to ensure that different ideas and backgrounds all have the same opinion in regards to the interview questions. All interviewees were part of the ERP implementation projects that took place. This also adds to the data triangulation construct validity which addresses several sources of evidence referring to the same topic. Other sources of evidence, such as observation and having been a part of the implementation process myself, add to the research validity as a complimentary source and not one that will be analysed.

- *Internal Validity*: Since this research follows an explanatory method, it is a tool that was used to ensure validity during the data analysis phase where pattern matching was the technique followed. The aim was to ensure that the data gathered from interviews matches the data derived from the literature.

- *External Validity*: Since this research is not attempting to generalise a theory, but rather to ensure concurrence and add knowledge, if possible, then this form of validating data during the research design phase does not add value to this research.

- *Reliability*: Interviews scheduled were only with those that were a part of the implementation phase and have used the system afterwards. They had background knowledge which was important to ensure that information they share is reliable. Interviews were set at their offices, to ensure that a certain comfort zone was maintained where the stress factor could be reduced. The interviews were conducted in English, and through note-taking, data was recorded.

Chapter 5 - Data Analysis, Findings & Interpretation

5.1 Introduction

Having held interviews as a research approach, this chapter will give us an understanding of the different data that was presented by the interviews. We will commence by analysing organisations A and B in detail. The CSF's and CFF"s highlighted by the interviewees will be discussed. In these scenarios, both organisations had two cases to report on and the sections will be divided by first explaining the first case and then by explaining the second case. A comparison section will be presented that identifies the commonalities and differences that have been highlighted differentiating the cases from one another (within the same organisation). Each section will provide tables that are used for explanatory reasons identifying the factors that have been noted by the interviewees. These tables have been adapted from Tables 2-3 and 2-4, representing the critical success and failure factors, respectively, derived from the literature.

Due to the word limitations of this research, organisation C, D and E have been analysed in the same manner, but the findings that will be presented will only be summaries of each. Of all the organisations interviewed, organisations A and B have been of interest to the researcher and have chosen to be analysed in detail due to the contents that have been presented by the interviewees.

Organisation A is of particular interest since it had two cases to report on. One case reported on a failure ERP system implementation while the second case reported on a successful ERP implementation. For that, the researcher took interest in identifying the reasons behind such discrepancy where a comparison of the scenarios will be presented in the analysis. What did the organisation do the second time round at implementing the ERP system that made it a successful project has been studied, analysed and interpreted. Why case 1 failed will also be highlighted and how the team worked better the second time round by learning from the scenarios of the first implementation is of particular interest.

Organisation B has also been identified by the researcher as it is viewed as one that is worth analysing in detail and reporting on due to it also reporting on two ERP implementations. In this scenario, both cases were reported on as successful, but the researcher took special interest in

analysing it in detail and reporting on it since the second implementation was a system upgrade of the first case (first ERP implementation project). As the second case was an upgrade of the ERP system, the team has reported on the scenarios that they would recommend people to avoid when implementing ERP systems. For that, the researcher took interest in identifying these factors and reporting them as it adds to knowledge of ERP system implementations. The knowledge gained here is beneficial for future ERP implementations.

5.2 Interview Analysis – Organisation A

With organisation A, it must be noted that two case studies were reported on separately. One was for an ERP system implementation that was considered to be a failure project and the other was of a successful ERP system implementation. First, it would be important to analyse why the first project was considered to be a failure. For that, an analysis of the CSF's and CFF's identified by the interviewees will be undergone. Then, we will analyse the same for case 2 where from that we will provide a short summary of the differences highlighted between the two cases that made case 1 a failure but case 2 a success. Further clarification will be provided in the conclusions chapter of this research. Table 5-1 highlights the CSF's identified by the interviewees in both cases while Table 5-2 highlights the CFF's identified.

| Phase | Ref. | Factors | Sub-Factors | Organisation: A | | Organisation: A | | Organisation: A | |
| | | | | Interviewee: 1 | | Interviewee: 2 | | Interviewee: 3 | |
		Critical Success Factors		Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
Pre-Implementation	1	**Strategic Visioning & Planning**	**1.1** Business Plan, Vision & Objectives	X	X	X	X	X	X
Implementation	2	**Change Management, BPC & BPR**	**2.1** Change Management Plans	X	X	X	X	X	X
			2.2 BPC, BPR and software configuration		X		X		X
			2.3 Client Consultation & Training		X		X		X
			2.4 Client Acceptance		X		X		X
	3	**Communication**	**3.1** Communication methods	X	X	X	X	X	X
			3.2 Management of Expectations		X		X		X
			3.3 User Involvement	X	X	X	X	X	X
			3.4 Interdepartmental Cooperation	X	X	X	X	X	X
	4	**ERP strategy & Implementation Team**	**4.1** ERP Strategy	X	X	X	X	X	X
			4.2 Personnel & Teamwork	X	X	X	X	X	X
			4.3 Use of Consultants		X		X		X
			4.4 Partnership with Vendor		X		X		X
	5	**Project Management**	**5.1** Project Management skills & techniques	X	X	X	X	X	X
			5.2 Risk Management						
			5.3 Project Completion		X		X		X
	6	**Management Support &Involvement**	**6.1** Top Management Support	X	X	X	X	X	X
			6.2 Project Champion	X	X	X	X	X	X
			6.3 Use of Steering Committee	X	X	X	X	X	X
Post-Implementation	7	**Performance Evaluation**	**7.1** Monitoring & Feedback	X	X	X	X	X	X
			7.2 Troubleshooting	X	X	X	X	X	X
			7.3 Financial Budget	X	X	X	X	X	X
	8	**Organisational fit of ERP systems/technical support**	**8.1** Legacy System Integration		X		X		X
			8.2 Data Analysis & Conversion		X		X		X
			8.3 Avoid Customisation						

Table 5-1: CSF's identified by interviewees in organisation A

				Organisation: A		Organisation: A		Organisation: A	
				Interviewee: 1		Interviewee: 2		Interviewee: 3	
			Critical Failure Factors	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
Phase	**Ref.**	**Factors**	**Sub-Factors**						
Pre-Implementation	**1**	**Not clear Strategic Visioning & Planning**	**1.1** Strategic Goals not clearly defined						
			1.2 Change in business goals during project						
			1.3 Inappropriate timing						
Implementation	**2**	**Poor Change Management**	**2.1** Poor Change Management						
			2.2 Resistance from employees	X		X		X	
			2.3 Inappropriate training methods & poor education	X		X		X	
			2.4 Hostile company culture	X		X		X	
			2.5 Poor knowledge transfer	X		X		X	
			2.6 Poor Quality of BPR	X		X		X	
	3	**Lack of Communication**	**3.1** Lack of understanding of business implications/unrealistic expectations	X		X		X	
	4	**ERP strategy & Implementation Team**	**4.1** Poor selection of ERP systems and vendors	X		X		X	
			4.2 High attrition rate of employees	X		X		X	
			4.3 Inadequate resources						
	5	**Poor Project Management**	**5.1** Poor project management or planning						
			5.2 Tight project schedule				X		X
	6	**Lack of Management Support &Involvement**	**6.1** Lack of support from top management						
			6.2 Lack of business management support						
			6.3 poor middle management-commitment & understanding						
Post-Implementation	**7**	**Performance Measurement**	**7.1** Poor testing	X		X		X	
			7.2 Hidden costs	X	X	X	X	X	
	8	**Organisational fit of ERP systems/technical support**	**8.1** excessive customisation						
			8.2 Multi-site issue not resolved						
			8.3 misalignment of IT/technical difficulties	X		X		X	
			8.4 Inaccurate data						
			8.5 lack of Internal integration	X		X		X	
			8.6 political pressures						

Table 5-2: CFF's identified by interviewees in organisation A

5.2.1 Case 1 Analysis – Organisation A

As depicted in Tables 5-1 and 5-2 above, and according to the interviews conducted with three people that were a part of the implementation teams of both systems (case 1 and case 2), one main reason that case 1 failed is related to not receiving the proper vendor support. They started off by having a vision *"to be competitive in their market through the use of an exchange facility that is properly integrated"*, as per the comment of interviewee 1, business development manager. They had a plan, vision and business objectives. Considering this point, it is suggested from the literature and research undertaken by other qualified researchers, the presence of this factor in an ERP implementation project is bound to lead to a successful outcome and project and the lack of it could lead to a failure project. Such aligns with the conceptual framework proposed for this research, and **CSF 1.1** *– Business plan, vision & objectives* is the factor that is identified for case 1 of organisation A.

It has become evident that the client (organisation A) was not satisfied with the first ERP system and considered it to be a failed project. For that reason, they approached another vendor to receive their system and support (case 2). The main reason identified that led to the change from one system to another as highlighted by interviewee 1 is that *"we did not receive the appropriate vendor support, if any at all, where they did not pass sufficient knowledge of the system on to our team and to top it off, we did not receive the appropriate training"*. Interviewee 2 added on to that comment by saying *"they expected us to read the manuals they passed on to us thinking that it would be enough for us to learn about the software"*. It becomes apparent from these comments that organisation A has faced problems with the ERP system and vendor selected, and with that, the points are agreeable with the critical failure factors (CFF's) derived from the literature and existing research undertaken; **CFF 2.5**-*Poor Knowledge transfer*, **CFF 2.3** *– Inappropriate training methods & poor education* and **CFF 4.1** *– Poor selection of ERP systems and vendors*.

Interviewee 3, being the IT manager that was a part of the implementation team added that *"it is extremely important for the ERP team from the clients' organisation to be technically qualified to be able to understand the ERP system"*. Interviewee 1, being the business development manager and one with software and technical background agreed to that by saying *"I, with a*

technical background, found dealing with this system a bit difficult, I can only imagine how others, with no technical background, found it". These comments align with **CFF 8.3** – *misalignment of IT/technical difficulties* and they support **CSF 4.2** – *Personnel & teamwork* as being very important and critical in such project.

Through the process of triangulation, it was also noted that **CSF 2.1** – *Change management & plans, CSF 3.1* – *communication methods,* **CSF 3.3** – *user involvement,* **CSF 4.1** – *ERP strategy,* **CSF 3.4** – *interdepartmental cooperation,* **CSF 5.1** – *project management skills & techniques,* **CSF 6.1** – *top management support,* **CSF 6.2** – *project champion,* **CSF 6.3** – *use of steering committee,* **CSF 7.1** – *monitoring & feedback,* **CSF 7.2** – *troubleshooting* and **CSF 7.3** *financial budget,* were factors considered during the pre, during and post implementation periods of case 1.

Among the failure factors that have been identified that caused project failure in case 1 is **CFF 3.1** – *lack of understanding of business implications/unrealistic expectations*, where the team felt that they had unrealistic expectations as they thought the support from the vendor would be present. Their expectations were failed which led to the project failure as a consequence. The project did not meet their business needs, as the vendor was not there to support them in integrating their business processes and for that, organisation A failed to realise the benefits of the ERP system in place.

Due to not having received the proper vendor support, employees felt tired and lost interest in attempting to work with the system. According to interviewee 1 *"we lost a few of our oldest team members in the process because they could not deal with the system"*. That testimony explains, identifies and agrees with **CFF 4.2** – *high attrition rate of employees*. All three interviewees also noted that their employees resisted the change (**CFF 2.2**) which is a factor identified from different literature. Given that the company culture was one that was not prepared for the change and that they were intimidated by it, **CFF 2.4** – *Hostile company culture* has been highlighted as a failure factor by the team.

All three interviewees also agreed that *poor quality of business process re-engineering* (**CFF 2.6**) was there where they highlighted that the system did not deal with the existing business processes. They changed everything in a complex manner that made it difficult to resolve. They

also agreed that case 1 had *poor testing* (**CFF 7.1**) of the system and *lack of internal integration* (**CFF 8.5**) due to the low support received from the vendor, and they managed to work that out at the second system when they chose an appropriate and supportive consulting team and vendor. All three interviewees agreed that there were hidden costs *(CFF 7.2)* in case 1 due to the *"...consulting team did not draw a clear picture for us",* said interview 1, the project manager. With that, it has become evident that the team faced difficulties with the IT and had technical difficulties due to the lack of support they received from the vendor. Such highlights and agrees with **CFF 8.3 -** *misalignment of IT/technical difficulties.*

Having understood the CSF's and CFF's that organisation A faced with case 1, we will now take a look and understand the factors that became evident with case 2.

5.2.2 Case 2 Analysis – Organisation A

In case 2, interviewees also highlighted that **CSF 1.1** *– Business plan, vision & objectives* were present. Through the process of triangulation, and used in both cases, it was also noted that **CSF 2.1** *– Change management & plans,* **CSF 3.1** *– communication methods,* **CSF 3.3** *– user involvement,* **CSF 4.1** *– ERP strategy,* **CSF 3.4** *– interdepartmental cooperation,* **CSF 5.1** *– project management skills & techniques,* **CSF 6.1** *– top management support,* **CSF 6.2** *– project champion,* **CSF 6.3** *– use of steering committee,* **CSF 7.1** *– monitoring & feedback,* **CSF 7.2** *– troubleshooting* and **CSF 7.3** *financial budget,* were factors considered during the pre, during and post implementation periods of case 2. These are the same factors that were also present in case 1.

In the case of depicting the failure factors highlighted by case 2, two of the three interviewees highlighted that it had *hidden costs* (**CFF 7.2**) attached to it. Interviewee 3, the financial officer, had a different outlook to that and said that *"the costs were not hidden as much as they were unexpected, but as a financial officer, I always have provisional margins pre-planned, in case of unexpected expenses".* As this factor has only been noted by two of the three interviewees, it will not be considered as one that will be accepted since it does not meet the process of triangulation requirements where all three interviewees are required to agree with it.

Two of the three interviewees highlighted that case 2 had a *tight project schedule (CFF 5.2)*. This was not highlighted by the first interviewee therefore it does not follow the process of triangulation; especially that the project champion (manager) was the one that did not highlight such point. The same goes for **CFF 7.2**, as it was only highlighted by two of the three interviewees. In terms of other factors that have been highlighted and agreed by all three interviewees, it is important to note the following:

- *CSF 2.2 - BPC, BPR and software configuration*
- *CSF 2.3 - Client consultation & training*
- *CSF 2.4 - Client acceptance*
- *CSF 4.3 - Use of consultants*
- *CSF 4.4 - Partnership with vendor*
- *CSF 5.3 - Project completion*
- *CSF 8.1 - Legacy system integration*
- *CSF 8.2 - Data analysis & conversion*

The team felt that the second case was considered a successful one for the reason that the business consulting team assigned to implement the ERP system for them were helpful, knowledgeable and available to support them. Such aligns with the above mentioned **CSF's 2.3, 4.3** and **4.4**. Also, with the second implementation, the team managed to learn from the first one in terms of gaining client acceptance *(CSF 2.4)* by understanding the end-users needs and requirements. With the assistance of the consultants, the team also managed to integrate their old system into the new one *(CSF 8.1)* and they also managed to analyse the data and convert it *(CSF 8.2)* properly to meet the new system requirements. That also explains that the team felt they met the change of their business processes through business process re-engineering and configuration of the software *(CSF 2.2)* to meet their requirements. With these results and the support, the team felt that they have completed the project successfully *(CSF 5.3)* as they had hoped for where the benefits of the system have been realised.

5.2.3 Comparison between Case 1 & Case 2 Analysis – Organisation A

A comparison between case 1 and case 2 of organization A will be presented where the common and different factors will be identified to provide an explanation as to why case 1 failed but case 2 succeeded.

5.2.3.1 Commonalities identified

CSF 1.1 – Business plan, vision & objectives was present in both cases which explains that success factor 1 - **Strategic Visioning & Planning**, of the pre-implementation phase is applicable to both cases. Case 1 in organisation A had such factor, but yet it failed as a project. Therefore, the presence of this factor alone does not necessarily mean that a project will succeed, and the absence of it, does not also suggest that a project will fail. Other factors play an important role and they should be considered and understood.

Having the right team *(CSF 4.2 – personnel & teamwork)* in place seems to have been a method followed by both cases within the same organisation and through the process of triangulation, it has been noted by all the three interviewees that this point is definitely one that could lead to project success and the lack of it could lead to project failure. Again, these factors alone do not represent projects' outcomes, and other factors need to be considered as well.

Other success factors that are common in both cases as identified by the interviewees are:

- *CSF 2.1 - Change Management Plans*
- *CSF 3.1 - Communication methods*
- *CSF 3.3 - User Involvement*
- *CSF 3.4 - Interdepartmental Cooperation*
- *CSF 4.1 - ERP Strategy*
- *CSF 5.1 - Project Management skills & techniques*
- *CSF 6.1 - Top Management Support*
- *CSF 6.2 - Project Champion*
- *CSF 6.3 - Use of Steering Committee*
- *CSF 7.1 - Monitoring & Feedback*
- *CSF 7.2 - Troubleshooting*
- *CSF 7.3 - Financial Budget*

No common failure factors have been identified.

5.2.3.2 Differences identified

In terms of considering the CSF's identified in organisation A that have differentiated case 1 from case 2 and made case 2 a success, as important factors identified by the interviewees, case 2 had created *a partnership with the vendors* (***CSF 4.4***) and made *use of its consultants* (***CSF 4.3***). Other success factors are as follows:

- ***CSF 2.2 - BPC, BPR and software configuration***
- ***CSF 2.3 - Client Consultation & Training***
- ***CSF 2.4 - Client Acceptance***
- ***CSF 3.2 - Management of Expectations***
- ***CSF 5.3 - Project Completion***
- ***CSF 8.1 - Legacy System Integration***
- ***CSF 8.2 - Data Analysis & Conversion***

In terms of highlighting the failure factors, ***CFF 3.1*** *– lack of understanding of business implications/unrealistic expectations* was considered by the team and they ensured that they managed it properly prior to the case 2 implementation. For that, and according to interviewee 2, *"the first implementation allowed us to learn from our mistakes. Even though we had proper planning and a great team put together, we needed to clearly understand the exact situation we would be out in. We made sure that our consulting team and vendor understood our exact needs and they informed us what they can do and what they cannot. Only that way did we manage to prevent problems from arising"*. That testimony explained the reaction taken by the client team when their first implementation failed. With them doing so, they managed to eliminate the chances of failure and the chance of reaching the level identified as ***CFF 4.2*** *– high attrition rate of employees*. They also managed to deal better with the failed situation of case 1 where employees resisted the change (***CFF 2.2***). They knew better by selecting the proper vendor, system and knowledgeable trainers. Also, *"we managed to avoid the intimidated company culture by explaining well to them that this new system is simpler to deal with and that a team*

would be available to support them and answer their questions", said interviewee 3 when asked '*how did the organisation as a whole react to this 'second system' change?*'.

Other failure factors that have been identified in case 1 and not case 2 are as follows:

- *CFF 2.3 - Inappropriate training methods & poor education*
- *CFF 2.4 - Hostile company culture*
- *CFF 2.5 - Poor knowledge transfer*
- *CFF 2.6 - Poor Quality of BPR*
- *CFF 4.1 - Poor selection of ERP systems and vendors*
- *CFF 7.1 - Poor testing*
- *CFF 7.2 – Hidden costs*
- *CFF 8.3 - Misalignment of IT/technical difficulties*
- *CFF 8.5 - Lack of internal integration*

Factors that have not been considered in the findings due to them not meeting the process of triangulation are as follows:

Case 1:

All interviewees have agreed to all the above factors. No discrepancies are highlighted.

Case 2:

- *CFF 5.2 - Tight project schedule*
- *CFF 7.2 - Hidden costs*

With reference to the data analysis, Tables 5-3 and 5-4 below illustrate the CSF's and CFF's, respectively, that have been identified through the interview process that was undertaken.

Phase	Ref.	Factors	Sub-Factors	Organisation: A All Interviewees	
		Critical Success Factors		Case 1	Case 2
Pre-Implementation	**1**	**Strategic Visioning & Planning**	**1.1** Business Plan, Vision & Objectives	X	X
Implementation	**2**	**Change Management, BPC & BPR**	**2.1** Change Management Plans	X	X
			2.2 BPC, BPR and software configuration		X
			2.3 Client Consultation & Training		X
			2.4 Client Acceptance		X
	3	**Communication**	**3.1** Communication methods	X	X
			3.2 Management of Expectations		X
			3.3 User Involvement	X	X
			3.4 Interdepartmental Cooperation	X	X
	4	**ERP strategy & Implementation Team**	**4.1** ERP Strategy	X	X
			4.2 Personnel & Teamwork	X	X
			4.3 Use of Consultants		X
			4.4 Partnership with Vendor		X
	5	**Project Management**	**5.1** Project Management skills & techniques	X	X
			5.2 Risk Management		
			5.3 Project Completion		X
	6	**Management Support &Involvement**	**6.1** Top Management Support	X	X
			6.2 Project Champion	X	X
			6.3 Use of Steering Committee	X	X
Post-Implementation	**7**	**Performance Evaluation**	**7.1** Monitoring & Feedback	X	X
			7.2 Troubleshooting	X	X
			7.3 Financial Budget	X	X
	8	**Organisational fit of ERP systems/technical support**	**8.1** Legacy System Integration		X
			8.2 Data Analysis & Conversion		X
			8.3 Avoid Customisation		

Table 5-3: CSF's identified for organisation A cases

Phase	Ref.	Factors	Sub-Factors	Organisation: A All Interviewees	
		Critical Failure Factors		Case 1	Case 2
Pre-Implementation	1	**Not clear Strategic Visioning & Planning**	**1.1** Strategic Goals not clearly defined		
			1.2 Change in business goals during project		
			1.3 Inappropriate timing		
Implementation	2	**Poor Change Management**	**2.1** Poor Change Management		
			2.2 Resistance from employees	X	
			2.3 Inappropriate training methods & poor education	X	
			2.4 Hostile company culture	X	
			2.5 Poor knowledge transfer	X	
			2.6 Poor Quality of BPR	X	
	3	**Lack of Communication**	**3.1** Lack of understanding of business implications/unrealistic expectations	X	
	4	**ERP strategy & Implementation Team**	**4.1** Poor selection of ERP systems and vendors	X	
			4.2 High attrition rate of employees	X	
			4.3 Inadequate resources		
	5	**Poor Project Management**	**5.1** Poor project management or planning		
			5.2 Tight project schedule		
	6	**Lack of Management Support &Involvement**	**6.1** Lack of support from top management		
			6.2 Lack of business management support		
			6.3 poor middle management-commitment & understanding		
Post-Implementation	7	**Performance Measurement**	**7.1** Poor testing	X	
			7.2 Hidden costs	X	
	8	**Organisational fit of ERP systems/technical support**	**8.1** excessive customisation		
			8.2 Multi-site issue not resolved		
			8.3 misalignment of IT/technical difficulties	X	
			8.4 Inaccurate data		
			8.5 lack of Internal integration	X	
			8.6 political pressures		

Table 5-4: CSF's identified for organisation A cases

5.2.4 Summary of Organisation A Case Analysis

In terms of considering the CSF's identified in organisation A that have differentiated case 1 from case 2 and made case 2 a success, as important factors identified by the interviewees, case 2 had created *a partnership with the vendors* (**CSF 4.4**) and made *use of its consultants* (**CSF 4.3**).

From the analysis, it became evident that in case 1, organisation A did not have proper *change management, communication, ERP strategy & Implementation team* along with *Organisational fit of ERP systems/technical support* and for that, in case 2, they managed to tackle these issues to achieve a successful project. In case 2, they have put in more effort in the *project management* side, which may be an issue that has assisted the project in succeeding. *Performance management* was considered a failure in case 1 which was not highlighted as a necessarily being successful in assisting the project to succeed. Therefore, it would be safe to suggest that *Factor 2 (Change Management, BPC & BPR)*, *Factor 3 (Communication)*, *Factor 4 (ERP strategy & Implementation Team)* and *Factor 8 (Organisational fit of ERP systems/technical support)* are the key differentiators that assisted case 2 in succeeding and the lack of them were main reasons for the failure of the case 1 project at organisation A.

5.3 Interview Analysis – Organisation B

Interviewees at Organisation B have also given some specific insight into two ERP implementation projects that they have implemented in their organisation. The situation here differs from that of organisation A in that both implementation projects were considered successful but some gaps were made apparent when they came to upgrade their ERP system a few years after they implemented their system. In this scenario the same vendors and the same ERP system are examined at different times and presenting an upgrade. The key findings, as suggested in Table 4-2 above, are that the first project was planned to finish within six months and the implementation finished as planned, where in the second case, six months of implementation time were planned, when in reality it took thirteen months. Granted that there were a few internal organisational obstacles faced, but certain insight showed that other factors caused this delay in project time. In this situation, as both projects were considered successful but one finished later than planned, it would be essential to derive the factors that caused this

delay by comparing the two cases. Table 5-5 below, highlights the CSF's identified by the interviewees in both cases while Table 5-6 highlights the CFF's identified.

| Critical Success Factors | | | Organisation: B | | Organisation: B | | Organisation: B | |
| | | | Interviewee: 1 | | Interviewee: 2 | | Interviewee: 3 | |
Phase	Ref.	Factors	Sub-Factors	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
Pre-Implementation	1	Strategic Visioning & Planning	1.1 Business Plan, Vision & Objectives	X	X	X	X	X	X
Implementation	2	Change Management, BPC & BPR	2.1 Change Management Plans	X	X	X	X	X	X
			2.2 BPC, BPR and software configuration	X	X	X	X	X	X
			2.3 Client Consultation & Training	X	X	X	X	X	X
			2.4 Client Acceptance	X	X	X	X	X	X
	3	Communication	3.1 Communication methods	X	X	X	X	X	X
			3.2 Management of Expectations	X	X	X	X	X	X
			3.3 User Involvement	X	X	X	X	X	X
			3.4 Interdepartmental Cooperation	X	X	X	X	X	X
	4	ERP strategy & Implementation Team	4.1 ERP Strategy	X	X	X	X	X	X
			4.2 Personnel & Teamwork	X	X	X	X	X	X
			4.3 Use of Consultants	X	X	X	X	X	X
			4.4 Partnership with Vendor	X	X	X	X	X	X
	5	Project Management	5.1 Project Management skills & techniques	X	X	X	X	X	X
			5.2 Risk Management						
			5.3 Project Completion						
	6	Management Support &Involvement	6.1 Top Management Support	X	X	X	X	X	X
			6.2 Project Champion	X	X		X		X
			6.3 Use of Steering Committee	X	X	X	X	X	X
Post-Implementation	7	Performance Evaluation	7.1 Monitoring & Feedback	X	X	X	X	X	X
			7.2 Troubleshooting	X	X	X	X	X	X
			7.3 Financial Budget		X		X		X
	8	Organisational fit of ERP systems/technical support	8.1 Legacy System Integration	X	X	X	X	X	X
			8.2 Data Analysis & Conversion	X	X	X	X	X	X
			8.3 Avoid Customisation		X		X		X

Table 5-5: CSF's identified by interviewees

				Organisation: B		Organisation: B		Organisation: B	
				Interviewee: 1		Interviewee: 2		Interviewee: 3	
			Critical Failure Factors	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
Phase	**Ref.**	**Factors**	**Sub-Factors**						
Pre-Implementation	1	**Not clear Strategic Visioning & Planning**	**1.1** Strategic Goals not clearly defined						
			1.2 Change in business goals during project		X		X		X
			1.3 Inappropriate timing						
Implementation	2	**Poor Change Management**	**2.1** Poor Change Management						
			2.2 Resistance from employees		X		X		X
			2.3 Inappropriate training methods & poor education						
			2.4 Hostile company culture						
			2.5 Poor knowledge transfer				X		
			2.6 Poor Quality of BPR						X
	3	**Lack of Communication**	**3.1** Lack of understanding of business implications/unrealistic expectations		X		X		
	4	**ERP strategy & Implementation Team**	**4.1** Poor selection of ERP systems and vendors	X	X	X	X	X	X
			4.2 High attrition rate of employees		X		X		X
			4.3 Inadequate resources		X				
	5	**Poor Project Management**	**5.1** Poor project management or planning						
			5.2 Tight project schedule		X				X
	6	**Lack of Management Support &Involvement**	**6.1** Lack of support from top management						
			6.2 Lack of business management support						
			6.3 poor middle management-commitment & understanding						
Post-Implementation	7	**Performance Measurement**	**7.1** Poor testing						
			7.2 Hidden costs						
	8	**Organisational fit of ERP systems/technical support**	**8.1** excessive customisation	X	X	X	X	X	X
			8.2 Multi-site issue not resolved						
			8.3 misalignment of IT/technical difficulties		X		X		X
			8.4 Inaccurate data		X		X		X
			8.5 lack of Internal integration		X				
			8.6 political pressures						

Table 5-6: CFF's identified by interviewees

5.3.1 Case 1 Analysis – Organisation B

As depicted in Tables 5-5 and 5-6 above, three interviewees were interviewed, and most answers were common amongst all three. The process of triangulation was also precedent in this organisation where the three interviewees were a part of the implementation team for both cases. Interviewee 1 was the ERP operations manager. Interviewee 2 was the IT manager and Interviewee 3 was the commercial manager. Interviewee 1 was the project manager and he was able to give more input into the different scenarios but in the case where the other two interviewees did not agree with his points, the factors were not considered as they do not agree with the process of triangulation where all three interviewees are required to have the same insight.

The CSF's identified for case 1 that led it to be a successful project are mainly related to having the right people on board part of the implementation team, and according to interviewee 1, the ERP operations manager, *"you should know your exact requirement before going to implement an ERP system"*. Interviewee 2, the IT manager, added *"we had so many divisions that we wanted to control under one system. We needed an ERP system"*. Interviewee 3, the commercial manager, highlighted *"collective information needs to be available to us if we wanted to be competitive in the market"*. From these answers, it becomes evident that organisation B had a *Business Plan, Vision & Objectives (**CSF 1.1**)*which is in line with the pre-implementation factor of *Strategic Visioning & Planning (**factor 1**).* Interviewee 2 went on to say that *"we needed to upgrade our system because we felt we were falling behind and we no longer had the information we need in this time and age. That is why we decided to upgrade our system"*. Their objectives were to *"have a central purchasing unit where information can be extracted when required for management to take informed decisions"*, stated interviewee 1.

In terms of the other CSF's identified, interviewees have agreed to the following factors highlighting them as important factors to be considered when implementing ERP systems and to attain success. They explained that ***CSF 2.1*** – change management plans, ***CSF 2.2** - BPC, BPR and software configuration*, ***CSF 2.3** - Client Consultation & Training*, ***CSF 2.4** - Client Acceptance*, ***CSF 3.2** - Management of Expectations*, ***CSF 3.3*** – user involvement, ***CSF 3.4*** –

interdepartmental cooperation, ***CSF 4.3 – use of consultants***, ***CSF 8.1- Legacy System Integration*** and ***CSF 8.2 - Data Analysis & Conversion*** are important to ensure that the change runs smoothly and as planned for. Interviewee 2 stated *"we and the business consulting team studied in detail how we were to manage this change. We studied the previous business processes in depth to ensure that when we implement the system, we have all the information we need ensuring that data is analysed and converted correctly without any gaps. We also worked with all the employees and departments to understand their exact needs and to know what they expect from this system."* Interviewee 1 further explained that "*communication was very important where we communicated on a daily basis either face-to-face or emails".* This identifies ***CSF 3.1 – communication methods*** as one that was present throughout the process. Interviewee 3 added "we worked well as a team because we selected the right and most knowledgeable team players to be a part of the team. We made sure that the ones selected worked well together and had good background knowledge". This aligns with ***CSF 4.2 – personnel and teamwork***. They also had an *ERP strategy (**CSF 4.1**)* which was also derived by the team and the business consultants. When asked whether they have a maintenance contract with the vendor, they responded that they did but they did not renew it after the first year because they thought everything was under control.

The interviewees also highlighted that ***CSF 5.1 - Project Management skills & techniques***, ***CSF 6.1 - Top Management Support*** and ***CSF 6.3 – use of steering committee*** were also present as advised by the business consulting team. When asked about the technical issues, they all agreed that ***CSF 7.1 – monitoring & feedback*** and ***CSF 7.2 – troubleshooting*** were done on a regular basis to ensure alignment with their requirements.

When considering the CFF's noted by the interviewees, interviewee 1 highlighted that *"although they were supportive and everything went as planned, we came to learn later that they should have advised us to renew or maintenance contract with them so we can enjoy any upgrades they have. They also should have advised us to avoid too much customisation so we don't hit major glitches when we come to upgrade".* This testimony aligns with ***CSF 4.1 - poor selection of ERP systems and vendors*** and ***CSF 8.1 - excessive customisation***.

5.3.2 Case 2 Analysis – Organisation B

The situation here is that case 1 finished within the planned time of six months, but case 2 finished in thirteen months and had an eighteen month stoppage time in between. The actual implementation time planned for case 2 was six months. Therefore, we notice that there was an additional seven months that were needed to implement the system. This statement considers actual work time. We need to investigate behind the reasons that led to this delay, therefore we would need to identify the reasons that caused this delay and for that, we would need to identify the critical failure factors that seem to have led to this delay even though the project was considered to be a successful one.

Interviewee 2 pointed out that *"we were constantly changing our business goals during the upgrade because we were trying to think of the easiest way to undergo this upgrade, without losing our data. We also had to worry about how we could transfer our pre-customised functions into standard ones that come with the system so we do not face the same problem in the future again".* This identifies *CFF 1.2 (Change in business goals during project)* and *CFF 8.3 (Misalignment of IT/technical difficulties)* as failure factors that led to the project delay. *"While attempting to find ways to un-customise the system to help us with the upgrade, we found inaccurate data which led us to transcribe data manually. We needed more time"*, stated interviewee 1 when asked 'were inaccurate data found?' He also added *"our employees were already exhausted having to work nine-hour work shifts, and to undergo this upgrade, we sometimes asked them to stay extra hours in the office to do the manual transcription. Funny enough, many resisted and were attempting to convince us that they way they do things is sufficient to get the reports ready, and we had many people leave while others join and at one point, we called in internship students to assist us with this process. Of course, there are indirect costs there that we did not consider in our budget".* By these answers, it becomes apparent that *CFF 2.2 (Resistance from employees), CFF 4.2 (High attrition rate of employees, CFF 5.2 (tight project schedule)* and *CFF 8.4 (Inaccurate data)* were also the critical failure factors that led to the project delay.

Other CFF's that have also been highlighted by the interviewees are:
- *CFF 4.1 - Poor selection of ERP systems and vendors*

- *CFF 8.1 - Excessive customisation*

The reasons for that is as stated earlier, they felt that they should have been advised better by the consulting team and vendor in terms of over customisation. Thus, these two sub-factors are inter-related.

CFF 2.6 - Poor Quality of BPR is a factor that was reported by interviewee 3 where the feeling was that business processes could have been re-engineered in a better manner but it is nothing that caused disaster.

In terms of the CSF's that were highlighted by the interviewees, they felt that they agreed with those of case 1 but had to add *CSF 6.2 - Project Champion, CSF 7.3 - Financial Budget* and *CSF 8.3 - Avoid Customisation* as successful factors that should be considered for ERP project implementations. The reasons due to that are because they have realised through the upgrade that avoiding customisation will decrease project complexity and time. Financial budget is to be studied deeply to incorporate the extra costs that arise when you come to upgrade the system. Costs in the sense that adding more people to the team to assist in data conversion and analysis need to be considered in detail compared against the work needed from them. A project champion's presence is important to constantly motivate and push the project team to do the work.

"Because of the major customisation we had done earlier, we were not aware that the project would cost us as much as it did", stated interviewee 1 when asked 'was the second project finished within the budget dedicated to it?' *"The costs were unexpected as the vendor did not give us a clear expectation of the upgrade costs. But I would not blame the vendor alone, I could say that this was a joint fault",* added interviewee 3, commercial manager. From their answers, it has been revealed that in order for a project to be a successful one, one would need to a) avoid customisations so as not to incur extra costs when future upgrades take place, and b) financial budget needs to be dedicated to the project by having a clear understanding of the entire system impacts and functionalities.

5.3.3 Comparison between Case 1 & Case 2 Analysis – Organisation B

A comparison between cases 1 and 2 at organisation B will be provided where it becomes important to highlight the reason as to why case 2 – the upgrade - was difficult to fulfil and took a longer time than planned for to complete, even though the project was considered a successful one.

5.3.3.1 Commonalities identified

Business Plan, Vision & Objectives (CSF 1.1) is among the factors that have been highlighted for case 1 and 2, which leads to the conclusion that both cases had a vision, plan and objectives before implementing the ERP system. Other factors are those indicated in Tables 5-5 and 5-6.

In terms of highlighting the CFF's that have been found as common for both cases, *CFF 4.1 - poor selection of ERP systems and vendors* and *CFF 8.1 - excessive customisation,* were the common factors. With that, it has become evident that organisation A faced difficulties with the system; especially that it did not suit their requirements which meant that they had to customise it. They would not select the same system or vendor in the future and they have learnt not to customise the system and just go with the standard functions of the system. Thus and given that the project was successful, this explains that these factors are not necessarily the reasons behind the delay of case 2 but does not eliminate them as factors that led to the delay. The interviewees have made it clear that they have selected the incorrect system and vendor and that the excessive customisation made it difficult for them to upgrade their system when it came time to do so. Interviewee 2 noted *"when possible, I would recommend to avoid customisation as that just takes time and it becomes difficult to upgrade the system because you would have to break the information again to suit the systems default settings, and then re-customise it to suit your requirements. It's a hassle, believe me!"*

On a positive note, we would need to assess the success factors of case 1 and 2 that led to their successful outcomes. The common CSF's can be derived from Table 5-5are:

- *CSF 1.1 – Business plan, vision & objectives*
- *CSF 2.1 - Change Management Plans*
- *CSF 2.2 - BPC, BPR and software configuration*

- *CSF 2.3 - Client Consultation & Training*

- *CSF 2.4 - Client Acceptance*

- *CSF 3.1 - Communication methods*

- *CSF 3.2 - Management of Expectations*

- *CSF 3.3 - User Involvement*

- *CSF 3.4 - Interdepartmental Cooperation*

- *CSF 4.1 - ERP Strategy*

- *CSF 4.2 - Personnel & Teamwork*

- *CSF 4.3 - Use of Consultants*

- *CSF 4.4 - Partnership with Vendor*

- *CSF 5.1 - Project Management skills & techniques*

- *CSF 6.1 - Top Management Support*

- *CSF 6.2 - Project Champion*

- *CSF 6.3 - Use of Steering Committee*

- *CSF 7.1 - Monitoring & Feedback*

- *CSF 7.2 - Troubleshooting*

- *CSF 8.1 - Legacy System Integration*

5.3.3.2 Differences identified

The results clearly indicate that the upgrade made it difficult to deal with case 2. The CFF's highlighted for case 2 and not case 1, which explain why case 1 finished during the planned time while case 2 needed more time, as depicted from Tables 5-5 and 5-6, are as follows:

- *CFF 1.2 - Change in business goals during project*

- *CFF 2.2 - Resistance from employees*

- *CFF 4.2 - High attrition rate of employees*

- *CFF 5.2 - Tight project schedule*

- *CFF 8.3 - Misalignment of IT/technical difficulties*

- *CFF 8.4 - Inaccurate data*

There are two success factors that seem to be different between case 1 and case 2 where they were only highlighted as being considered for case 2. They are:

- ***CSF 7.3 - Financial Budget***
- ***CSF 8.3 - Avoid Customisation***

With reference to the data analysis, Tables 5-7 and 5-8 below illustrate the CSF's and CFF's, respectively, that have been identified through the interview process that was undertaken.

				Organisation: B	
				All Interviewees	
			Critical Success Factors	Case 1	Case 2
Phase	Ref.	Factors	Sub-Factors		
Pre-Implementation	**1**	**Strategic Visioning & Planning**	**1.1** Business Plan, Vision & Objectives	X	X
Implementation	**2**	**Change Management, BPC & BPR**	**2.1** Change Management Plans	X	X
			2.2 BPC, BPR and software configuration	X	X
			2.3 Client Consultation & Training	X	X
			2.4 Client Acceptance	X	X
	3	**Communication**	**3.1** Communication methods	X	X
			3.2 Management of Expectations	X	X
			3.3 User Involvement	X	X
			3.4 Interdepartmental Cooperation	X	X
	4	**ERP strategy & Implementation Team**	**4.1** ERP Strategy	X	X
			4.2 Personnel & Teamwork	X	X
			4.3 Use of Consultants	X	X
			4.4 Partnership with Vendor	X	X
	5	**Project Management**	**5.1** Project Management skills & techniques	X	X
			5.2 Risk Management		
			5.3 Project Completion		
	6	**Management Support &Involvement**	**6.1** Top Management Support	X	X
			6.2 Project Champion		X
			6.3 Use of Steering Committee	X	X
Post-Implementation	**7**	**Performance Evaluation**	**7.1** Monitoring & Feedback	X	X
			7.2 Troubleshooting	X	X
			7.3 Financial Budget		X
	8	**Organisational fit of ERP systems/technical support**	**8.1** Legacy System Integration	X	X
			8.2 Data Analysis & Conversion	X	X
			8.3 Avoid Customisation		X

Table 5-7: CSF's identified for organisation B cases

Phase	Ref.	Factors	Sub-Factors	Organisation: B All Interviewees	
			Critical Failure Factors	Case 1	Case 2
Pre-Implementation	1	**Not clear Strategic Visioning & Planning**	**1.1** Strategic Goals not clearly defined		
			1.2 Change in business goals during project		X
			1.3 Inappropriate timing		
Implementation	2	**Poor Change Management**	**2.1** Poor Change Management		
			2.2 Resistance from employees		X
			2.3 Inappropriate training methods & poor education		
			2.4 Hostile company culture		
			2.5 Poor knowledge transfer		
			2.6 Poor Quality of BPR		
	3	**Lack of Communication**	**3.1** Lack of understanding of business implications/unrealistic expectations		
	4	**ERP strategy & Implementation Team**	**4.1** Poor selection of ERP systems and vendors	X	X
			4.2 High attrition rate of employees		X
			4.3 Inadequate resources		
	5	**Poor Project Management**	**5.1** Poor project management or planning		
			5.2 Tight project schedule		X
	6	**Lack of Management Support &Involvement**	**6.1** Lack of support from top management		
			6.2 Lack of business management support		
			6.3 poor middle management-commitment & understanding		
Post-Implementation	7	**Performance Measurement**	**7.1** Poor testing		
			7.2 Hidden costs		
	8	**Organisational fit of ERP systems/technical support**	**8.1** excessive customisation	X	X
			8.2 Multi-site issue not resolved		
			8.3 misalignment of IT/technical difficulties		X
			8.4 Inaccurate data		X
			8.5 lack of Internal integration		
			8.6 political pressures		

Table 5-8: CFF's identified for organisation B cases

5.3.4 Summary of Organisation B Case Analysis

From the analysis, it has become evident that *Financial Budget (CSF 7.3)* and *Avoid Customisation (CSF 8.3)* are the two factors that have been highlighted as ones that the interviewees felt the need to share in terms of what they had done differently between the two cases. Financial budget was not a factor that they had considered in case 1, but was one that they considered in case 2 and felt that it was important to identify the budget of the project at an early stage rather than being surprised with costs during or post-implementation. They also realised that it would be better to avoid customisation which is something they did not consider in case 1. These two factors could explain why the project was delayed even if it was considered a success. Interviewee 1 noted that *"I support the customisation of reports but not the customisation of the systems existing functions"*. He also added that customisation tends to increase the work load. Interviewee 2 added *"new people come on board, either from the vendors' side or from our team, they will not know what has been customised, and that caused us a problem when we came to upgrade and took us more time to re-structure the system"*. Interviewee 3 shared *"upgrades take care of the basic functions of the system; they do not consider how we have customised they system to suit our needs"*. From that we understand that when case 2 came to be upgraded, the team found difficulties in doing such even though they were still using the same ERP system. Due to the customisation that took place in case 1, they found that time was a major issue which is basically the reason why the project was delayed and took an extra seven months over the planned six months to complete.

5.4 Interview Analysis – Organisations C, D and E

As explained earlier, organisation C, D and E have been analysed in the same manner as organisations A and B, but due to the word limitations in this research, they will only be reported on in summary format. Reference to Tables 5-9 and 5-10 below will provide you with a brief summary in tabular format about the findings attained from all the interviewees at the five organisations, where a total of eight cases were reported on. The tables are divided into the different organisations that are further divided into the cases they reported on. They are then further divided representing the three interviewees interviewed. Interviewee 1 at organisation A, for instance, is referred to as A1. The same referencing format has been followed throughout. Three different types of information can be extracted from the table. 1) factors that have been

agreed on by interviewees 2) factors the interviewees have not reported on interpreting that they are not critical and 3) factors that have not been agreed to by all the interviewees that will not be considered as part of the findings as they do not agree with the process of triangulation.

Phase	Ref.	Factors	Sub-Factors	Organisation A						Organisation B						Organisation C			Organisation D			Organisation E					
			Critical Success Factors	Case 1			Case 2			Case 1			Case 2			Case 1			Case 1			Case 1			Case 2		
Pre-Implementation	1	**Strategic Visioning & Planning**	**1.1** Business Plan, Vision & Objectives	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
Implementation	2	**Change Management, BPC & BPR**	**2.1** Change Management Plans	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			2.2 BPC, BPR and software configuration	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			2.3 Client Consultation & Training	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			2.4 Client Acceptance	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	3	**Communication**	**3.1** Communication methods	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			3.2 Management of Expectations	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			3.3 User Involvement	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			3.4 Interdepartmental Cooperation	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	4	**ERP strategy & Implementation Team**	**4.1** ERP Strategy	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			4.2 Personnel & Teamwork	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			4.3 Use of Consultants	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			4.4 Partnership with Vendor	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	5	**Project Management**	**5.1** Project Management skills & techniques	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			5.2 Risk Management	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			5.3 Project Completion	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	6	**Management Support &Involvement**	**6.1** Top Management Support	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			6.2 Project Champion	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			6.3 Use of Steering Committee	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
Post-Implementation	7	**Performance Evaluation**	**7.1** Monitoring & Feedback	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			7.2 Troubleshooting	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			7.3 Financial Budget	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	8	**Organisational fit of ERP systems/technical support**	**8.1** Legacy System Integration	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			8.2 Data Analysis & Conversion	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			8.3 Avoid Customisation	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3

Table 5-9: Results of the interviews – Critical Success Factors

Legend:

(hatched)	Interviewees that have agreed to the factor
(blank)	Interviewees that have not agreed to the factor
(grey hatched)	Factors that do not qualify due to not meeting the process of triangulation requirements

Phase	Ref.	Factors	Sub-Factors	Org A Case 1			Org A Case 2			Org B Case 1			Org B Case 2			Org C Case 1			Org D Case 1			Org E Case 1			Org E Case 2		
				A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
Pre-Implementation	1	**Not clear Strategic Visioning & Planning**	**1.1** Strategic Goals not clearly defined	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			1.2 Change in business goals during project	A1	A2	A3	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			1.3 Inappropriate timing	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
Implementation	2	**Poor Change Management**	**2.1** Poor Change Management	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			2.2 Resistance from employees	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	**D1**	**D2**	**D3**	**E1**	**E2**	**E3**	E1	E2	E3
			2.3 Inappropriate training methods & poor education	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	**D1**	**D2**	**D3**	**E1**	**E2**	**E3**	E1	E2	E3
			2.4 Hostile company culture	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	**C1**	**C2**	**C3**	**D1**	**D2**	**D3**	E1	E2	E3	E1	E2	E3
			2.5 Poor knowledge transfer	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			2.6 Poor Quality of BPR	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	3	**Lack of Communication**	**3.1** Lack of understanding of business implications/unrealistic expectations	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	**E1**	**E2**	**E3**	E1	E2	E3
	4	**ERP strategy & Implementation Team**	**4.1** Poor selection of ERP systems and vendors	**A1**	**A2**	**A3**	A1	A2	A3	**B1**	**B2**	**B3**	**B1**	**B2**	**B3**	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			4.2 High attrition rate of employees	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	**D1**	**D2**	**D3**	E1	E2	E3	E1	E2	E3
			4.3 Inadequate resources	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	5	**Poor Project Management**	**5.1** Poor project management or planning	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	**D1**	**D2**	**D3**	**E1**	**E2**	**E3**	E1	E2	E3
			5.2 Tight project schedule	A1	A2	A3	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	**D1**	**D2**	**D3**	E1	E2	E3	E1	E2	E3
	6	**Lack of Management Support &Involvement**	**6.1** Lack of support from top management	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			6.2 Lack of business management support	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			6.3 poor middle management-commitment & understanding	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
Post-Implementation	7	**Performance Measurement**	**7.1** Poor testing	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	**E1**	**E2**	**E3**	**E1**	**E2**	**E3**
			7.2 Hidden costs	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
	8	**Organisational fit of ERP systems/technical support**	**8.1** excessive customisation	A1	A2	A3	A1	A2	A3	**B1**	**B2**	**B3**	**B1**	**B2**	**B3**	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			8.2 Multi-site issue not resolved	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			8.3 misalignment of IT/technical difficulties	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	**D1**	**D2**	**D3**	E1	E2	E3	E1	E2	E3
			8.4 Inaccurate data	A1	A2	A3	A1	A2	A3	B1	B2	B3	**B1**	**B2**	**B3**	C1	C2	C3	**D1**	**D2**	**D3**	E1	E2	E3	E1	E2	E3
			8.5 lack of Internal integration	**A1**	**A2**	**A3**	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3
			8.6 political pressures	A1	A2	A3	A1	A2	A3	B1	B2	B3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	E1	E2	E3

Table 5-10: Results of the interviews – Critical Failure Factors

Legend:

- [hatched box] Interviewees that have agreed to the factor
- [empty box] Interviewees that have not agreed to the factor
- [hatched box] Factors that do not qualify due to not meeting the process of triangulation requirements

5.4.1 Summary Analysis - Organisation C

In the case of organisation C, one ERP system implementation project was assessed. It was the first ERP system they implement in their organisation. Prior to the ERP system, they were using an accounting system that just took care of their accounts.

When considering the CSF's that the team found as vital to be present during ERP implementations, they noted all the factors as per the literature found except for:

- ***CSF 4.3 - Use of consultants***
- ***CSF 4.4 - Partnership with vendor***
- ***CSF 5.2 - Risk management***
  - ***Why?*** From analysis: Project manager with IT background is sufficient

Note: use of consultants (CSF 4.3) was highlighted by interviewee 3 where it was established that the consultants could have performed better and done more in terms of the implementation. Since this factor was only highlighted by one of the interviewees and does not follow the process of triangulation, it will not be considered as part of the findings.

In terms of what the interviewees had to say about the CFF's, it was agreed by all that having a *hostile company culture (CFF 2.4)*, is a critical failure factor that they have met during the implementation process but it alone did not affect the projects outcome.

Note: Interviewee 2 noted **CFF 2.2** - *Resistance from employees*, but it has not been considered as part of the findings section since it does not satisfy the requirement of the process of triangulation. Her reasoning was based on resistance from accounting department employees since they were used to a certain system and had to learn a new system now.

5.4.2 Summary Analysis - Organisation D

Organisation D, like organisation C, had one case study to report on. It was the first ERP system that was put in place at the organisation. It was expected that the implementation time would be six months, but instead, it took nine months time for the implementation. Reasons for that have

been related to internal technical difficulties with their existing network. The consulting team were not the ones to be blamed for such delay but it is rather related to having *misalignment of IT/technical difficulties (CFF 8.3)* and a *tight project schedule (CFF 5.2)* that should have been resolved prior to the implementation process.

Interviewee 3, who is a sales executive, felt the need to share one extra item that he felt was a success factor that was strong but it will not be considered in findings as it does not meet the process of triangulation requirements:

- *Use of Consultants (CSF 4.3).*
    - *Why?* He felt that the consultants' presence assisted and guided the implementation project

The interviewees, though, agreed that the following factors were not considered as important to the success of the project:

- *CSF 2.1 - Change Management Plans*
- *CSF 2.4- Client Acceptance*
- *CSF 4.4 - Partnership with Vendor*
- *CSF 5.3 - Project Completion*
- *CSF 8.3 - Avoid Customisation*
    - *Why? Qualified team with technical background should be present and they need to control the project.*

When considering the CFF's, the team agreed that the following CFF's identified were factors that occurred during the implementation process and these are the ones that could have been the reasons that led to the project delay, though, according to them, the project succeeded.

- *CFF 2.2 - Resistance from employees*
- *CFF 2.4 - Hostile company culture*
- *CFF 4.2 - High attrition rate of employees*
- *CFF 5.1 - Poor project management or planning*
- *CFF 5.2 - Tight project schedule*
- *CFF 8.3- Misalignment of IT/technical difficulties*

- *CFF 8.4 - Inaccurate data*
  - o *Why? IT manager was brought on board late and was not able to manage the project from the beginning.*

From the analysis, it becomes evident that the main reason the project could have failed was from pressure from the top management that was exerted onto the employees. The findings acknowledge that top management's role in such a project is important but their approach on wanting everything done immediately was difficult to deal with. Therefore, it has become obvious that had management given the knowledgeable team (with an IT background) more time to implement the system, they would not have been under too much pressure and resistance. The project succeeded because the factors highlighted were ones that could be dealt with, with difficulty, but would not necessarily cause a project to fail.

5.4.3 Summary Analysis - Organisation E

Interviewees at organisation E had two ERP system implementation cases to report. The first case was implementing an ERP system that for 15 users and the second was the implementation of the same software but for 50+ users. The case here is not that of a system upgrade, but that of a software upgrade while using the same system. The first system they used which is ORION Advantage allows for $15 - 50$ user licenses. When organisation E grew in number of employees and ERP system users, they needed to change to ORION Enterprise which allows for $50 +$ users. Both implementations were considered successful and they both finished within the planned timeframe of twelve months.

Interviewees reporting on case 1 had similar responses to each other except for interviewee 3 who noted that *CSF 5.2 – risk management* is an important factor that needs to be considered due to her not having IT background.

5.4.3.1 Commonalities identified

For both cases, the team highlighted that the following factors as ones that were not relevant to the project success and they could be ignored while still meeting project success. The CSF is as follows:

- *CSF 5.2 - Risk Management*
    - *Why? Team of qualified professionals is sufficient*

In terms of the CFF's identified that were considered critical for both cases, the team shared the same result which is:

- *7.1 Poor testing*
    - *Why? Critical if errors are found after going live.*

5.4.3.2 Differences identified

Of the factors that have been identified as critical success factors for case 2 that were not done in case 1, we have:

- *CSF 2.4 - Client Acceptance*
- *CSF 3.2 - Management of Expectations*
- *CSF 5.1 - Project Management skills & techniques*
    - *Why?* Size of the project where more integration and management was required to ensure a positive project outcome.

Of the critical failure factors that they faced during the first implementation, but managed to change them for the second implementation, they all noted that the following factors could lead to failed implementations:

- *CFF 2.2 - Resistance from employees*
- *CFF 3.1 - Lack of understanding of business implications/unrealistic expectations*
- *CFF 5.1 - Poor project management or planning*
    - *Why? For the organisation to be better prepared.*

5.5 Summary

The chapter analysed the cases from the organizations that were studied. The reason for analysing this data was to portray and present a conceptual framework that either agrees, disagrees or adds knowledge to existing research.

Chapter 6 - Conclusions & Recommendations

6.1 Conclusion

The research that was presented explored ERP system implementation in terms of the critical success and failure factors that either hinder or positively influence project outcomes. These factors create an understanding of what can promote or impede on project success. Five organisations(multiple case studies) based in the U.A.E. were approached where a total of eight cases were reported on. A conceptual framework (Tables 3-1 and 3-2) was derived from the literature, and was used as the basis of the interview segment where data was collected, analysed and reported on. From the analysis, the researcher has drawn up four tables indicating:

1) Critical Success Factors identified by the majority of the interviewees (Table 6-1)

2) Critical Success Factors identified by the researcher as per the analysis done on organisation A - case 1 having it failed and organisation B-case 2 where they found difficulties in the upgrade (Table 6-2)

3) Critical Failure Factors identified by the majority of the interviewees (Table 6-3)

4) Critical Failure Factors identified by the researcher as per the analysis done on organisation A - case 1 having it failed and organisation B-case 2 where they found difficulties in the upgrade (Table 6-4)

These tables have then been further concluded and presented as the final conclusions in Tables 6-5 and 6-6 where the critical success and failure factors as depicted from this research through undergoing the interview process have been presented. This presents the findings of this research (research) and presents it as knowledge in the field of ERP system implementation, specifically their success and failure factors. Some factors are found to concur with the existing literature while other factors do not and the tables (6-5 and 6-6) present the discrepancies.

	Factors							
	Pre-Implementation	**Implementation**					**Post-Implementation**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Strategic Visioning & Planning	**Change Management, BPC & BPR**	**Communication**	**ERP strategy & Implementation Team**	**Project Management**	**Management Support &Involvement**	**Performance Evaluation**	**Organisational fit of ERP systems/technical support**
Sub-factors	**1.1** Business Plan, Vision & Objectives	**2.1** Change Management Plans	**3.1** Communication methods	**4.1** ERP Strategy	**5.1** Project Management skills & techniques	**6.1** Top Management Support	**7.1** Monitoring & Feedback	**8.1** Legacy System Integration
		2.2 BPC, BPR and software configuration	**3.2** Management of Expectations	**4.2** Personnel & Teamwork	**5.2** Risk Management	**6.2** Project Champion	**7.2** Troubleshooting	**8.2** Data Analysis & Conversion
		2.3 Client Consultation & Training	**3.3** User Involvement	**4.3** Use of Consultants	**5.3** Project Completion	**6.3** Use of Steering Committee	**7.3** Financial Budget	**8.3** Avoid Customisation
		2.4 Client Acceptance	**3.4** Interdepartmental Cooperation	**4.4** Partnership with Vendor				

Table 6-1: Critical Success Factors identified by the majority of the interviewees

Legend:

[hatched box] Factors identified by the majority of the cases (>4)

[empty box] Factors not identified by the majority of the cases (<4)

	Factors							
	Pre-Implementation	**Implementation**					**Post-Implementation**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Strategic Visioning & Planning	**Change Management, BPC & BPR**	**Communication**	**ERP strategy & Implementation Team**	**Project Management**	**Management Support &Involvement**	**Performance Evaluation**	**Organisational fit of ERP systems/technical support**
Sub-factors	**1.1** Business Plan, Vision & Objectives	**2.1** Change Management Plans	**3.1** Communication methods	**4.1** ERP Strategy	**5.1** Project Management skills & techniques	**6.1** Top Management Support	**7.1** Monitoring & Feedback	**8.1** Legacy System Integration
		2.2 BPC, BPR and software configuration	**3.2** Management of Expectations	**4.2** Personnel & Teamwork	**5.2** Risk Management	**6.2** Project Champion	**7.2** Troubleshooting	**8.2** Data Analysis & Conversion
		2.3 Client Consultation & Training	**3.3** User Involvement	**4.3** Use of Consultants	**5.3** Project Completion	**6.3** Use of Steering Committee	**7.3** Financial Budget	**8.3** Avoid Customisation
		2.4 Client Acceptance	**3.4** Interdepartmental Cooperation	**4.4** Partnership with Vendor				

Table 6-2: Critical Success Factors identified by the researcher

Legend:

Factors identified by the researcher

Factors not identified by the researcher

|	Factors							
	Pre-Implementation	**Implementation**					**Post-Implementation**	
	1	2	3	4	5	6	7	8
	Not clear Strategic Visioning & Planning	**Poor Change Management**	**Lack of Communication**	**ERP strategy & Implementation Team**	**Poor Project Management**	**Lack of Management Support &Involvement**	**Performance Measurement**	**Lack of Organisational fit of ERP systems/technical support difficulties**
Sub-factors	**1.1** Strategic Goals not clearly defined	**2.1** Poor Change Management	**3.1** Lack of understanding of business implications/unrealistic expectations	**4.1** Poor selection of ERP systems and vendors	**5.1** Poor project management or planning	**6.1** Lack of support from top management	**7.1** Poor testing	**8.1** excessive customisation
	1.2 Change in business goals during project	**2.2** Resistance from employees		**4.2** High attrition rate of employees	**5.2** Tight project schedule	**6.2** Lack of business management support	**7.2** Hidden costs	**8.2** Multi-site issue not resolved
	1.3 Inappropriate timing	**2.3** Inappropriate training methods & poor education		**4.3** Inadequate resources		**6.3** poor middle management/commitment & understanding		**8.3** misalignment of IT/technical difficulties
		2.4 Hostile company culture						**8.4** Inaccurate data
		2.5 Poor knowledge transfer						**8.5** lack of Internal integration
		2.6 Poor Quality of BPR						**8.6** political pressures

Table 6-3: Critical Failure Factors identified by the majority of the interviewees

Legend: ▨ Factors identified by the majority of the cases (>4)
☐ Factors not identified by the majority of the cases (>4)

Sub-factors	Factors							
	Pre-Implementation	**Implementation**					**Post-Implementation**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Not clear Strategic Visioning & Planning	**Poor Change Management**	**Lack of Communication**	**ERP strategy & Implementation Team**	**Poor Project Management**	**Lack of Management Support &Involvement**	**Performance Measurement**	**Lack of Organisational fit of ERP systems/technical support difficulties**
	1.1 Strategic Goals not clearly defined	**2.1** Poor Change Management	**3.1** Lack of understanding of business implications/unrealistic expectations	**4.1** Poor selection of ERP systems and vendors	**5.1** Poor project management or planning	**6.1** Lack of support from top management	**7.1** Poor testing	**8.1** excessive customisation
	1.2 Change in business goals during project	**2.2** Resistance from employees		**4.2** High attrition rate of employees	**5.2** Tight project schedule	**6.2** Lack of business management support	**7.2** Hidden costs	**8.2** Multi-site issue not resolved
	1.3 Inappropriate timing	**2.3** Inappropriate training methods & poor education		**4.3** Inadequate resources		**6.3** poor middle management/commitment & understanding		**8.3** misalignment of IT/technical difficulties
		2.4 Hostile company culture						**8.4** Inaccurate data
		2.5 Poor knowledge transfer						**8.5** lack of Internal integration
		2.6 Poor Quality of BPR						**8.6** political pressures

Table 6-4: Critical Failure Factors identified by the researcher

Legend: ▨   Factors identified by the researcher
              ☐   Factors not identified by the researcher

	Factors							
	Pre-Implementation	**Implementation**					**Post-Implementation**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Strategic Visioning & Planning	**Change Management, BPC & BPR**	**Communication**	**ERP strategy & Implementation Team**	**Project Management**	**Management Support &Involvement**	**Performance Evaluation**	**Organisational fit of ERP systems/technical support**
Sub-factors	**1.1** Business Plan, Vision & Objectives	**2.1** Change Management Plans	**3.1** Communication methods	**4.1** ERP Strategy	**5.1** Project Management skills & techniques	**6.1** Top Management Support	**7.1** Monitoring & Feedback	**8.1** Legacy System Integration
		2.2 BPC, BPR and software configuration	**3.2** Management of Expectations	**4.2** Personnel & Teamwork	**5.2** Project Completion	**6.2** Project Champion	**7.2** Troubleshooting	**8.2** Data Analysis & Conversion
		2.3 Client Consultation & Training	**3.3** User Involvement	**4.3** Use of Consultants		**6.3** Use of Steering Committee	**7.3** Financial Budget	**8.3** Avoid Customisation
		2.4 Client Acceptance	**3.4** Interdepartmental Cooperation	**4.4** Partnership with Vendor				

Table 6-5: Critical Success Factors - Final Conclusion

	Factors					
	Pre-Implementation	**Implementation**			**Post-Implementation**	
	1	**2**	**3**	**4**	**5**	**6**
	Not clear Strategic Visioning & Planning	**Poor Change Management**	**Lack of Communication**	**ERP strategy & Implementation Team**	**Performance Measurement**	**Lack of Organisational fit of ERP systems/technical support difficulties**
Sub-factors	**1.1** Change in business goals during project	**2.1** Resistance from employees	**3.1** Lack of understanding of business implications/unrealistic expectations	**4.1** Poor selection of ERP systems and vendors	**5.1** Poor testing	**8.1** excessive customisation
		2.2 Inappropriate training methods & poor education		**4.2** High attrition rate of employees	**5.2** Hidden costs	**8.2** misalignment of IT/technical difficulties
		2.3 Hostile company culture				**8.3** Inaccurate data
		2.4 Poor knowledge transfer				**8.4** lack of Internal integration
		2.5 Poor Quality of BPR				

Table 6-6: Critical Failure Factors - Final Conclusion

The results presented in the tables do not exactly agree with previous literature, but they also do not disagree with literature. For that, the proposed framework (Tables 6-5 and 6-6) present the different factors and sub-factors that have proved relevant to organisations in the U.A.E.. and that should be considered by project managers prior to implementing ERP systems in their organisations. The research has fulfilled its objectives in identifying the critical success and failure factors and can now be utilised in organisations especially, Sayegh Establishment, to ensure a positive project outcome and to meet project success when implementing ERP systems.

6.2 Recommendations

The recommendations below should be used by managers to address the research issue that has been raised in this research. They are based on Tables 6-5 and 6-6 as part of the findings and conclusions that this research had presented. They are as follows:

1. Strategic visioning and planning needs to be considered as part of the pre-implementation project phase where business plans, vision and objectives are clarified. The presence of this could lead to project success while the absence of it, or it not being clearly planned, could lead to project failure.

2. Change management with proper BPC and BPR could lead to project success. Change management plans are considered a part of this factor along with client consultation and training and client acceptance. If the BPR is considered to be that of poor quality, then there is a chance that the project could be considered a failure one. Also, in order for the change management process to have a positive outcome, resistance from employees should be monitored where they should be trained properly and the system should be explained to them well for them to not resist it. The company's culture should also be accepting this change and the culture should assist the employees embrace this change rather than resist it.

3. Communication methods should be clear where the end-users expect what they will get out of the system and for that to happen, users need to be involved in the implementation phase of the project to ensure their needs and requirements are considered. Interdepartmental cooperation should also be applicable to ensure project success. The lack of understanding of the business

implications where unrealistic expectations are drawn up, could lead to project failure. Therefore, it is important to communicate the project to all the team.

4. An ERP strategy should be in place. Personnel should be chosen as per their background knowledge and how they would ensure that teamwork is successful. Consultants should have knowledge of the software and ways of working with the rest of the team where if they (consultants) are poorly selected, the project could be considered a failure. Also, the wrong system could lead to project failure. Having a certain partnership with the vendor could assist in long-term project success as a partnership with the vendor entitles the organisation to benefits that without having a partnership, they might not attain. This refers to the implementation phase and post-implementation phase where it is advised to have a maintenance contract with the vendor.

5. Project management skills and techniques have been highlighted as leading to project success. It has also been highlighted that people with IT background and knowledge be a part of the implementation team.

6. Top management support, the presence of a project champion and the use of a steering committee are considered as factors that could lead to project success. The absence of them does not necessarily lead to project failure, but their presence could assist in attaining project success.

7. Part of the post-implementation phases, monitoring and feedback, troubleshooting and financial budget have been considered as important to ensure project success. Having poor testing and hidden costs have been reported as sub-factors that could lead to project failure. Therefore, it is important to test the system properly prior to the 'go-live' phase to be able to fix any problems before utilising the final system throughout the organisation.

8. It is important to ensure that the legacy systems, or the old ways of doing things, are properly integrated into the ERP system. The lack of the internal integration could lead to project failure. Data should be analysed and converted in a proper manner to ensure that inaccurate data are avoided. The misalignment of IT and facing technical difficulties has led to project failure in certain cases. It is important to have someone with IT background as the project champion and manager to ensure that any gaps or misalignments are dealt professionally with someone that has the background knowledge.

Avoiding customisation of the system has been reported as a factor that could lead to project failure especially when one comes to upgrade their system or migrate their date from one system to another. Therefore, it is advised to avoid customisation of the system as much as possible. Customising the reporting scheme or page structure is fine, but customising the features of the system are considered to be problems that produce difficulties and are time-consuming that could lead to project failure.

6.3 Limitations of the study

The study undergone has limitations in terms of:

a. generalisation since sample size in this qualitative study is small where the results only presented one failed ERP system implementation and seven successful ones

b. generalisation since the study was based only in the U.A.E. and might not be applicable in other countries

6.4 Recommendations for further studies

a. Study organisations of the same scale and within the same industry where it is preferable that they are pertaining to similar cultures in terms of geographical locations.

b. Study how the CSF' and CFF's differ between the different project managers i.e. IT manager as the project manager vs. financial manager as the project manager. This would explain the influence of having an IT background and how that attributes to the project success as opposed to having a project manager without an IT background.

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Appendices

Appendix A

Student Declaration Form

Appendix B
>   *Copy of the document sent to the interviewees that were contacted as customers of Sayegh Establishment.*

To Whom It May Concern,
I would like to take a few minutes of your time requesting that you go through the following set of questions that will assist me, Deema Sayegh, in:

1. Completing my research for my research in MSc Project Management that will also be contributing to academic literature
2. Assisting Sayegh Establishment in understanding our clients' point of view of the implementations we have undergone in your organizations, that will only support us in gaining knowledge and improving our services to serve you better.

This is an invitation for you to participate in a research that aims at identifying critical success and failure factors of the implementation of ERP systems. Your organisation has been chosen to participate in this research for the following reasons:

1. Finding out what you think about the ERP system and implementation process you underwent will assist us in understanding your viewpoint and give us feedback that we can work with to better service you.
2. As I work at Sayegh Establishment, it is beneficial for me to contact you since we have implemented our ERP system in your organisation

All the information collected from the participants will be kept confidential and will only be made available to the researcher. From the information you will provide, an assessment of the procedure you went through will be analysed and a recommendation will be provided to Sayegh Establishment, separately.

During the process of collecting data, it is envisaged that I would meet with the personnel that were part of the ERP system implementation process and those that are currently using the system. If meeting with the personnel is difficult, and you would rather respond to these set of questions via email or phone, please feel free to inform me of such. Your name will be kept confidential, and if answering any of the questions puts you in discomfort then do not answer them.

If you agree to participate in this research, please sign at the bottom of the page.

Thank you for your time, and I look forward to hearing from you.

Deema Sayegh

If you agree to the points above, please sign below:

_____

Appendix C
Copy of the document that was sent to the 3i InfoTech's customers.

To Whom It May Concern,

I would like to take a few minutes of your time requesting that you go through the following set of questions that will assist me, Deema Sayegh, in:

3. Completing my research for my research in MSc Project Management that will also be contributing to academic literature

This is an invitation for you to participate in a research that aims at identifying critical success and failure factors of the implementation of ERP systems. Your organisation has been chosen to participate in this research for the following reasons:

3. Finding out what you think about the ERP system and implementation process you underwent will assist me in understanding your viewpoint

All the information collected from the participants will be kept confidential and will only be made available to the researcher.

During the process of collecting data, it is envisaged that I would meet with the personnel that were part of the ERP system implementation process and those that are currently using the system. If meeting with the personnel is difficult, and you would rather respond to these set of questions via email or phone, please feel free to inform me of such. Your name will be kept confidential, and if answering any of the questions puts you in discomfort then do not answer them.

If you agree to participate in this research, please sign at the bottom of the page.

Thank you for your time, and I look forward to hearing from you.

Deema Sayegh

If you agree to the points above, please sign below:

_____

Appendix D
Copy of the interview questions that were proposed during the interviews.

Information about your Organisation
Organisation Name:
Location:
Industry:
Number of employees:
ERP system Implementation Start Date:
ERP system Implementation Finish Date:
# of months ERP system has been functioning in your organisation:
Information about the Interviewee
 Please note that this information will remain confidential and will not be shared with anyone other than the interviewer.
Name:
Department:
Role in the project:
Were you apart of the implementation process?

ERP system pre-implementation Questions

1. How was the computer and IT culture prior to the implementation of the ERP system?

2. Why did your organisation want to implement an ERP system?

   i. How have your business goals been achieved? Did they change from the original goals?
   ii. How was the timing?
   iii. Would you say that your organisation was not ready for the system, but due to external political pressure it needed to implement one?

3. How was a certain ERP strategy developed to ensure success of implementation?

ERP system Implementation Questions

4. How did you choose the vendor or business consulting services team and how important was their role in the project?

   i. How was their knowledge on the software and was it transferred to you appropriately?
   ii. How were they involved in the different stages of the implementation?
   iii. After selection of the vendor, how did you find working with the system and vendor selected?
   iv. How do you feel about the *post-implementation* service you are receiving from the vendors?

5. How was the IT based infrastructure systems prior to the ERP system?
   How were the interfaces for your 'old' system (legacy system) incorporated?

      i.   How was the data transferred?
      ii.   How, if any, were inaccurate data found?
      iii. How was the idea of multi-site usage of the same ERP system resolved (if applicable)?

6. Since this was a major change, how would you attribute the *Business process change (BPC), Business process re-engineering (BPR) and software configuration* to project success?

      i.   How did employees within the organisation react to the change?
      ii.   How did the organisation, as a whole, react to this change?
      iii. How was the change managed?
      iv. How were users involved during the design and implementation phases of the project?

7. How was the project team selected? Was the team cross-departmental?

      i.   How was the performance of the team upon implementation compared to now?
      ii.   How was the mixture of the team's knowledge? *(Technical background, business background or a mix of both?)*

8. How many people were to use the system after implementation?
      i.   How was the communication controlled across those people?
      ii.   How would you attribute the '*management of expectations'* to the success of the project?
      iii. How do you attribute the scope, its planning, execution and completion during implementation and after to the outcome of the project?
      iv. Were strategic and tangible benefits, costs, risk, time and resources outlined in the project plan?

9. How do you attribute management support to the project outcome?
      i.   How did top management contribute their support to the project?
      ii.   How was middle-management involved? Were they committed and did they understand the project?
      iii. How did the project receive business management support?
      iv. How was the project run? Under the lead of one person or a committee?

ERP system Post-Implementation Questions

10. How did the results of the testing phase aid with finalising the project and reaching a successful outcome?

11. How was the 'post- implementation' performance evaluated?
    i. How were the monitoring and feedback reports?
    ii. How were troubleshooting errors resolved?

12. How was the budget dedicated to the project? Was the project finished within budget?

13. How was the ERP systems pre-set standard configuration?
    i. How did you adjust the system to suit your requirements?
    ii. Why or why won't you recommend customisation?

Appendix E
Copy of the questions cross-referenced with the pre-determined factors.

ERP system pre-implementation Questions

1. How was the computer and IT culture prior to the implementation of the ERP system?
2. Why did your organisation want to implement an ERP system?

> ***Answer:*** ***CSF 1.1*** *– Business plan, Vision & objectives* were clearly identified
> ***Or* CFF 1.1***- Strategic goals were not clearly defined*

 iv. How have your business goals been achieved? Did they change from the original goals?

> ***Answer:*** ***CFF 1.2*** *– Change in business goals during project*

 v. How was the timing?

> ***Answer: CFF 1.3*** *– Inappropriate timing*

 vi. Would you say that your organisation was not ready for the system, but due to external political pressure it needed to implement one?

> ***Answer: CFF 8.6*** *– Political Pressures*

3. How was a certain ERP strategy developed to ensure success of implementation?

> ***Answer: CSF 4.1 –*** *ERP Strategy*

ERP system Implementation Questions

4. How did you choose the vendor or business consulting services team and how important was their role in the project?

 v. How was their knowledge on the software and was it transferred to you appropriately?

> ***Answer: CFF 2.5*** *– Poor knowledge transfer*

 vi. How were they involved in the different stages of the implementation?

> ***Answer: CSF 2.3***- Client consultation and training*
> ***Or* CFF 2.3***– Inappropriate training methods and poor education*

 vii. After selection of the vendor, how did you find working with the system and vendor selected?

> ***Answer: CFF 4.1***- Poor selection of ERP systems and vendors*

 viii. How do you feel about the *post-implementation* service you are receiving from the vendors?

> ***Answer: CSF 4.4*** *– Partnership with vendor*
> ***Or* CSF 4.3***– Use of consultants*

5. How was the IT based infrastructure systems prior to the ERP system?

How were the interfaces for your 'old' system (legacy system) incorporated?

> <u>**Answer:**</u> **CSF 8.1**- *Legacy System Integration*
> <u>**Or**</u> **CFF 8.5**– *Lack of internal integration*

iv.   How was the data transferred?

> <u>**Answer:**</u> **CSF 8.2**- *Data analysis and conversion*
> <u>**Or**</u> **CFF 8.3**– *Misalignment of IT/technical difficulties*

v.   How, if any, were inaccurate data found?

> <u>**Answer:**</u> **CFF 8.4**- *Inaccurate Data*

vi.   How was the idea of multi-site usage of the same ERP system resolved (if applicable)?

> <u>**Answer:**</u> **CFF 8.2**- *Multi-site issue not resolved*

6. Since this was a major change, how would you attribute the *Business process change (BPC), Business process re-engineering (BPR) and software configuration* to project success?

> <u>**Answer:**</u> **CSF 2.2**- *BPC, BPR and software configuration*
> <u>**Or**</u> **CFF 2.6**– *Poor Quality of BPR*

v.   How did employees within the organisation react to the change?

> <u>**Answer:**</u> **CSF 2.4**- *Client acceptance*
> <u>**Or**</u> **CFF 2.2**– *Resistance from employees*

vi.   How did the organisation, as a whole, react to this change?

> <u>**Answer:**</u> **CFF 2.4**- *Hostile company culture*

vii.   How was the change managed?

> <u>**Answer:**</u> **CSF 2.1**- *Change Management plans*
> <u>**Or**</u> **CFF 2.1**– *Poor Change Management*

viii.   How were users involved during the design and implementation phases of the project?

> <u>**Answer:**</u> **CSF 3.3** – *User involvement*

7. How was the project team selected? Was the team cross-departmental?

> <u>**Answer:**</u> **CSF 3.4**– *Interdepartmental cooperation*
> <u>**Or**</u> **CFF 4.3**– *Inadequate resources*

iii.   How was the performance of the team upon implementation compared to now?

> <u>**Answer:**</u> **CFF 4.2** – *High attrition rate of employees*

iv.   How was the mixture of the team's knowledge? *(Technical background, business background or a mix of both?)*

__Answer:__ CSF 4.2 – Personnel & teamwork

8. How many people were to use the system after implementation?
   v. How was the communication controlled across those people?

   __Answer:__ CSF 3.1 – Communication methods

   vi. How would you attribute the '*management of expectations*' to the success of the project?

   __Answer:__ CSF 3.2 – Management of expectations
   __Or__ __CFF__ __3.1__ – Lack of understanding of business implications/unrealistic expectations

   vii. How do you attribute the scope, its planning, execution and completion during implementation and after to the outcome of the project?

   __Answer:__ CSF 5.1 – P.M skills and techniques
   __Or__ CSF 5.3 – Project completion
   __Or__ CFF 5.1 – Poor P.M or planning

   viii. Were strategic and tangible benefits, costs, risk, time and resources outlined in the project plan?

   __Answer:__ CSF 5.2 – Risk Management
   __Or__ CFF 5.2 – Tight project schedule
   __Or__ CFF 7.2 – Hidden costs

9. How do you attribute management support to the project outcome?
   v. How did top management contribute their support to the project?

   __Answer:__ CSF 6.1 – Top management support
   __Or__ CFF 6.1 – Lack of support from top management

   vi. How was middle-management involved? Were they committed and did they understand the project?

   __Answer:__ CFF 6.3 – Poor middle management commitment & understanding

   vii. How did the project receive business management support?

   __Answer:__ CFF 6.2 – Lack of business management support

   viii. How was the project run? Under the lead of one person or a committee?

   __Answer:__ CSF 6.2 – Project champion
   __Or__ CSF 6.3 – Use of steering committee

ERP system Post-Implementation Questions

10. How did the results of the testing phase aid with finalising the project and reaching a successful outcome?

       Answer: CFF 7.1 – _Poor testing_

11. How was the 'post- implementation' performance evaluated?
   iii.   How were the monitoring and feedback reports?

       Answer: CSF 7.1 – _Monitoring & feedback_
   iv.   How were troubleshooting errors resolved?
       Answer: CSF 7.2 – _Troubleshooting_

12. How was the budget dedicated to the project? Was the project finished within budget?

       Answer: CSF 7.3 – _Financial Budget_
       _Or_ CFF 7.2 – _Hidden Costs_

13. How was the ERP systems pre-set standard configuration?
   iii.   How did you adjust the system to suit your requirements?
   iv.   Why or why won't you recommend customisation?

       Answer: CSF 8.3 – _Avoid customisation_
       _Or_ CFF 8.1 – _Excessive customisation_