“Critical Success Factors in ERP Systems Implementations in the Cypriot Public Sector”
ABSTRACT

One of the major advancements in the IT industry during the 1990s was the development of Enterprise Resource Planning (ERP) systems. Beyond the high costs and significant amount of effort needed to implement such a system, the possible benefits for the organization in achieving more efficient operations and improving its competitive stance in the competitive business environment have been undoubted.

The high failure rates of ERP systems implementations (Soh et al., 2000; Willis and Willis-Brown; 2002) have paved the way for a chase from both academicians and practitioners to understand and pinpoint the critical success factors that positively impact this type of projects’ success.

Research has been done for ERP implementations in numerous environments but there is a serious gap in the literature regarding implementations in the Cypriot context. Furthermore, after the island’s accession to the European Union (EU) in 2004, the need for the governmental sector to harmonize its systems and processes according to EU directives and to provide efficient services through transparent processes to citizens of Cyprus urged public organizations to proceed with the adoption of ERP systems to serve these purposes from both technological and business aspects.

This thesis aims to investigate the critical success factors that foster the successful rollout of ERP implementation projects in Cypriot public sector organizations. From the literature review a research proposition is devised through the development of a theoretical framework consisting of 10 critical success factors. These factors are examined in the specific project environment and their applicability and impact in successful implementations is determined.

A qualitative approach has been followed, through a multiple-case study in three Cypriot public sector organizations, by conducting a set of 9 semi-structured interviews and analyzing the results to determine the theoretical framework’s fit in the particular context and furthermore to determine the criteria which are used to determine ERP implementation success in the specific projects.

The results of the study indicate that project success is evaluated solely based on three criteria; time, cost and quality. In addition, 9 out of the 10 factors of the theoretical framework appear to be critical for implementation success.
ACKNOWLEDGEMENTS

This study doesn’t simply constitute the end of a project, but the end of a 16-month rollercoaster ride through postgraduate life. The chance to experience this journey and keep strong throughout would have never been possible without the outmost support of my loving family.

I would like to thank all of the people who were involved in this Master programme; the professors, administrative staff and my colleagues with whom we’ve not only shared a classroom together, but life experiences.

My sincere gratitude and appreciation goes to my supervisor Dr. Ralf Müller for his guidance, his constructive feedback which complemented the final outcome of this study and most of all his understanding during these past few months.

I also thank all organizations and their employees who participated and made this study possible.

Finally, I would like to take this opportunity and dedicate the thesis to my little nephew whose 2nd birthday I’ve missed this year. One day he might be reading this thesis and understand why.
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CHAPTER 1 - INTRODUCTION

This first chapter acts as a prologue to the current thesis. It aims to describe the acknowledged problem as it resulted from the study of the specific research area. The research question is formulated and expressed, along with the unit of analysis and finally, the architecture of the document is presented.

1.1. Research Background

An overview of the importance of the information technology sector and a synopsis on enterprise resource planning systems are presented first, followed by a discussion on the research problem and the academic and practical motivations for undertaking the present study.

1.1.1. Information Technology (IT) Sector

According to the IT Information Library® (2007), the term Information Technology (IT), is used to describe ‘the use of technology for the storage, communication or processing of information’. Moreover, ‘IT is often used to support business processes through IT services’ (IT Information Library®, 2007, p 24). A term generally used interchangeably, mostly in public sector and education environments, is Information Communication Technology (ICT).

Following statistical information from the Organization for Economic Co-Operation and Development (OECD) (2008) related to its participating countries\(^1\), the ICT sector is responsible for over 8% of the overall business gross domestic product (GDP) and for the employment of over 15 million people. Considering the top 250 ICT firms, we can observe that their global revenues in 2007 hit a level of 2.8 trillion USD. Investment in Research and Development (R&D) for the ICT industry in OECD countries is approximately 2.5 times larger than the equivalent investment in the automotive industry and more than 3 times larger than that of the pharmaceutical sector. Additionally, close to one million researchers are involved in the ICT business industry.

The above, are results of the recognized importance of IT in the corporate world. Besides being a supporting mechanism for running operations more efficiently and achieving better output, IT has a great strategic significance. Porter and Millar (1985) discussed the power of IT in creating sustainable competitive advantage by its influence in competition in diverse ways such as changing industry structures, aiding cost and differentiation strategies and even giving rise to new organizations.

1.1.2. Enterprise Resource Planning (ERP) Systems

At the beginning of the 1990s a new generation of information systems was widely adopted by organizations, Enterprise Resource Planning (ERP) systems. Literature on ERP systems

\(^1\) OECD Member Countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
has its ground origins in Information Systems (I/S) theory. ERP definitions refer to it as an enterprise-wide I/S which integrates all business functions and provides the ability to plan and control the organizations’ resources (García-Sánchez, N. and Pérez-Bernal, L.E., 2007; Al-Fawaz et al., 2008). In simple words, an ERP system consists of several software modules (e.g. sales, accounting, human resources etc) each related to specific business processes and by sharing a core database amongst them, full integration is achieved, with constantly updated and relevant information. In a manufacturing environment for example, typical problems would be for the sales department to sell more products than the manufacturing department is generating, or the procurement department ordering less raw material than production requires. With an ERP system in place all the different departments have the ability at any time to use updated, accurate information from the system’s sole database, avoiding endangering their business functions and keeping their resources at optimum control.

As discussed in García-Sánchez and Pérez-Bernal (2007) some I/S researchers even refer to ERPs as Enterprise Information Systems. In addition, the majority of publications on ERP systems are located in I/S journals. These facts support the notion that ERP systems ancestry can be tracked back to the information systems hub. Beyond the organizations’ need to replace their existing legacy systems\(^2\) in the 1990s, mostly as a measure to deal with the Y2K problem\(^3\) (Somers and Nelson, 2001), the recognized benefits of a successful ERP system implementation and the operational and strategic advance it can provide to the business, give a solid reason for the increasing adoption throughout the years. By taking a look into the top 10 software firms as ranked by the Organization for Economic Co-Operation and Development (2008, p. 64) we can find Oracle and SAP, the top ERP vendors, in positions two and three respectively, where if combined they comprise around 29% of the total top 10 revenue for 2006.

In order to reap the perceived benefits a successfully ran ERP project lifecycle must take place with its implementation phase as one of its most critical aspects. An ERP project lifecycle as shown in Esteves and Pastor (1999) consists of six phases, from the adoption decision to implement an ERP system in the organization, the acquisition, the actual implementation, the usage and maintenance, the evolution of the system, up to its retirement. The implementation phase that is of concern in this thesis, according to Esteves and Pastor (2001, p 13) relates to the ‘customization or parameterization and adaptation of the ERP package acquired to meet the needs of the organization’.

1.1.3. Problem Discussion

ERP systems implementations require complex efforts (Scott and Vessey, 2000) and many are the failure stories which rise up to our attention (Soh et al., 2000; Willis and Willis-Brown; 2002). In many cases, the negative results of a failed implementation in the form of

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\(^2\) Legacy Systems: Old computer/information systems that are simply used because of inability/unwillingness to renew them either due to resources restrictions and/or users’ habit and familiarity with them

\(^3\) Y2K Crisis: Year 2000 bug in computer systems. Because of the year storage in two digits form instead of four it was expected that on the 1\(^{st}\) of January 2000, systems would perceive the date as in 1900 and not 2000, with negative results
heavy monetary or competitive advantage losses are irreversible and lethal to the organization (Davenport 1998; Davenport 2000). The research effort of academicians and practitioners in order to address the high failure rate of ERP implementations (Somers et al., 2000) and understand the determinants of implementation success has been blooming in contemporary times, with a great focus area that of critical success factors identification (Akkermans and van Helden, 2002; Motwani et al., 2005; Nah et al., 2003; Somers and Nelson, 2004; Umble et al., 2003)

Since ERP implementations are performed in the form of projects, theory evolution on the specific topic originates from the study of projects. A major issue is the shared understanding of success itself and the investigation of project success criteria, traditionally meaning the achievement of cost, quality and time, but further developed to include organizational and stakeholder benefits (Atkinson, 1999). The concepts of critical success factors in project environments have heavily influenced the development of the relative concepts in ERP implementation. In the same manner critical success factors are examined and sought after in the specific field. As defined by Rockart (1979, p. 85), critical success factors are ‘the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization’. As Turner (2008) states in simple words, success criteria relate to what is to be achieved and success factors reflect how it will be achieved.

According to Moon (2007) publications on ERP implementations engage in change management, in cultural (national) issues, in focused stages in the implementation process, in critical success factors and in case studies. By reviewing the literature, several studies were tracked in the categories described.

The search for published research from academia related to ERP systems implementation in Cyprus and furthermore in the public sector was unsuccessful. Taking a brief look into some facts from the European Commission’s statistical information services (Eurostat, 2008) an effort was made to understand and explain the lack of material. In 2008, the percentage of Cypriot individuals interacting with the public authorities via Internet for obtaining information and downloading/sending forms is 14.9%. The relevant figure for Swedish individuals is 45.1%. This suggests that the Cypriot government-citizen online interaction is still under development to reach higher European standards. In addition, for 2006, the number of researchers (i.e. individuals fully or partly employed in R&D) for the Government sector rises up to 234 and in the Higher Education sector reaches 830. The percentage of online availability of 20 basic government services for 2007 was 45% and the relevant figure for Sweden was at 75%. In additional support of the general public sector evolution we can consider the Organization for Economic Co-Operation and Development (2008, p. 21) list of top 10 ICT policy priorities where amongst others we can locate: government online, ICT R&D programmes and public sector information and content.

These facts are speculative to suggest that public sector information technology services are still under study and development to reach the levels of older EU member states such as Sweden. In the same manner, considering the low number of researchers, the new developments and technologies would be researched at a slower pace than larger and
technologically advanced EU countries. It is encouraging though to consider the efforts to comply with EU initiatives such as the Lisbon Treaty which amongst others will boost technology development.

As Tsamantanis and Kogetsidis (2006) discuss, ERP systems in Cyprus were adopted only in recent years. The reasoning the researchers discuss is based on two factors:

- High costs which ‘recently floated at inhibiting numbers for the Cypriot market’ (p. 119)
- The size of the companies and their particular operating markets

The rapid evolution of technology and the fact of Cyprus accession in the European Union in 2004 appear to be the key reasons behind the wider acceptance of ERP systems and their prospective benefits. Furthermore, the island’s geographical location, as a crossroad between three continents (i.e. Europe, Asia, and Africa) has been an attractive strategic position for companies to set up services provision bases to address the needs of the surrounding areas. All the above have motivated international companies to establish operations in Cyprus and most importantly gave incentives for local companies to invest and expand their operations to compete in the ERP systems provision arena.

According to Tsamantanis and Kogetsidis (2006), big companies from both, private and public sector proceeded to ERP implementations such as: Carlsberg (Cyprus), KEO, AC Nielsen (Cyprus), Mercedes (Cyprus), Cyprus Telecommunication Authority and Electricity Authority of Cyprus.

In the case of the public sector, the need to reform following EU directives has become a key issue for all organizations. Especially in the cases where government organizations had control of the market and monopoly in specific sectors, now, at a deregulation phase and EU policies on open competition, the need to stay competitive has been more visible than ever. A typical example is that of the Electricity Authority of Cyprus where in their latest strategic development plan, one of their five main targets was the upgrading of IT systems which will assist the organization to achieve its business objectives (Electricity Authority of Cyprus, 2006 p.22).

The published research on ERP implementations in the Cypriot context seems to be at infancy and some of the above facts suggest it might be at the works at the moment, as is the case with the present thesis. From an academic perspective, there is ground to motivate the suggested study since it will add value to the Cypriot public sector ERP implementations in specific and the overall ERP implementation research community in general. The identification of similarities and/or differences between the global research findings and the Cypriot environment will support successful ERP implementation efforts from practitioners. From the point of view of ERP professionals acting locally, the specific study aims to provide an insight based on the identification of critical success factors, on where to concentrate managerial efforts in order to better distribute human and financial resources and on which areas to target focus to increase the probability of a successful ERP implementation.
Taking under consideration the project management discipline in Cyprus it can be said that it is barely starting to emerge. It is a usual phenomenon that people are awarded the title project manager as a seniority credential in organizations, for roles which are simply managerial and operational. As for professional bodies, the first national membership achieved in an international project management association was recorded in February 2008; the Cyprus Project Management Society (CPMS) was established as a member of the International Project Management Association (IPMA) (Cyprus Project Management Society, 2008). A search in the top project management journals (i.e. Project Management Journal, International Journal of Project Management) revealed zero results for the Cypriot region. It is evident to expect the local practitioners to be unaware of the latest evolutions in the project management area, the new perceptions in defining project success and the work done on critical success factors. Another expected outcome of this study is to examine the understanding and utilization of project success criteria since the participating organizations claimed to have reached successful ERP implementation projects.

Last but not least motivational factor for this research project is that it reflects the author’s interests, thus adding value to both his personal and professional development.

1.2. Research Question

“What are the critical success factors in ERP systems implementation projects in the public sector in Cyprus?”

To specify the targeted research area the following sub-questions arise:

- Are ERP implementations in the Cypriot public sector considered as successful based on success criteria solely related to the “iron triangle” (i.e. cost, quality, time)?

- Are the identified critical success factors from the literature review crucial for the successful rollout of an ERP implementation project in the public sector in Cyprus?

1.3. Unit of Analysis

The unit of analysis relates to what is being studied in the sense of ‘what the actor(s) or object(s) of the study is (are)’. There are three possible classifications for units of analysis; ‘1) the individual human person as an actor, 2) the society or groups of individuals (agglomeration of actors), and 3) the universe of humanity (the all-inclusive actor)’ (Yurdusev, 1993, p 80). Following Yurdusev (1993) and Yin’s approach (2003) the unit of analysis for this thesis is considered to be in the form of an entity, Cypriot public sector ERP implementation projects.
1.4. Glossary

A set of definitions, in alphabetical order, is provided for the readers’ aid.

Information Systems (I/S): ‘The means by which people and organizations, utilizing technologies, gather, process, store, use and disseminate information’ (UK Academy for Information Systems, 1999, p. 1). The conceptual difference between ICT and I/S is that ICT is a component of I/S, by offering the ‘infrastructure for intra- and inter- organizational information systems’ (UK Academy for Information Systems, 1999, p. 5).

Lisbon Treaty: By amending European Union and European Commission treaties, it supports the provision of the European Union ‘with the legal framework and tools necessary to meet future challenges and to respond to citizens’ demands’. (Europa, 2007)

Oracle: A global enterprise software corporation. It is in constant competition with SAP for the leadership in the ERP software market.

Product Life Cycle: ‘A collection of generally sequential, non-overlapping product phases whose name and number are determined by the manufacturing and control needs of the organization’. The last phase usually is the decline and fatality of the product. The link between the product and project lifecycles is that ‘a project life cycle is contained within one or more product life cycles’. (PMI, 2004, pp. 367-368)

Project: ‘A temporary endeavour undertaken to create a unique product, service or result’ (PMI, 2004, p. 368)

Project Life Cycle: ‘A collection of generally sequential project phases whose name and number are determined by the control needs of the organization or organizations involved in the project’ (PMI, 2004, p. 368)

Project Management: The application of tools, skills, techniques, methods and knowledge to project tasks in order to achieve the project requirements on time, cost, quality and stakeholder satisfaction. Its accomplishment involves activities such as: definition, planning, organizing, controlling, as well as motivating the people associated with the project. (APM, 2006; BS 6079-1, 1996; PMI, 2004).

SAP: A global enterprise, provider of software solutions with its ERP as its top selling software package. The abbreviation was derived from the company’s name when launched: Systems Applications and Products in Data Processing.

1.5. Thesis Architecture

The next chapter reviews the relevant literature and outlines the knowledge gap in reference to the research question, ending with a research proposition. The following chapter describes the research methodology adopted to achieve the study’s goals. In the subsequent two chapters the data collection findings are presented, analyzed and discussed. The final chapter summarizes the study and provides the final results.
CHAPTER 2 – LITERATURE REVIEW

2.1. Introduction

This chapter’s purpose is to analyze the relevant categories identified from the literature. First the search process in order to retrieve the appropriate literature is explained. The identified categories examined include project success, critical success factors in projects, ERP systems implementations and critical success factors and an overview in the Cypriot adoption of ERP systems. A theoretical framework is developed and finally the knowledge gap this research is dealing with is defined.

2.2. Search Process

Several databases were used in order to track and retrieve relevant to the thesis articles. Table 1 below shows the sources used.

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<td>Books/Journals/Articles database services</td>
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<tr>
<td>3</td>
<td>Project Management Institute</td>
<td>Online access to white papers/webinars and other publications</td>
<td>PMI Membership allows access to all available sources</td>
<td><a href="http://www.pmi.org/">http://www.pmi.org/</a></td>
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<tr>
<td>4</td>
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<td>Provides access to a list of online sources</td>
<td>Mostly used for Emerald Fulltext/JSTOR/Science Direct and NetLibrary collections</td>
<td><a href="http://www.athensams.net/myathens/">www.athensams.net/myathens/</a></td>
</tr>
<tr>
<td>5</td>
<td>Google Scholar</td>
<td>Easy search and access to articles and ebooks</td>
<td>Used as an additional source to search for articles</td>
<td><a href="http://scholar.google.co.uk/">http://scholar.google.co.uk/</a></td>
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Table 1. Resources used to retrieve information

The articles were searched using the following set of keywords: project success; project management; critical success factors; project life cycle; product life cycle; enterprise resource planning; ERP implementation; ERP critical success factors.
2.3. Project Success Criteria

The broader research area that the thesis is classified into is considered to be project success. By reviewing the available literature, an evolution through time is apparent in two basic concepts: the understanding that project management -and at a certain extent, overall project- success is not only measurable in terms of what Atkinson (1999) refers to as the “iron triangle” (i.e. time, cost and quality) and the appreciation that project success is not only of concern at the end of the project/product lifecycle but it’s of on-going reflection throughout its stages. It is important to establish a general idea on how our concept of project management success has developed and what variables or measures are added to the core belief.

Following Kloppenborg and Opfer’s (2002) study on the available project management literature since the 1960s as quoted by Jugdev and Müller (2005, p. 21), it is shown that in the 1970s concentration was on several methods and tools related to ‘program evaluation and review techniques (PERT), cost and schedule control (CSC), performance measurement, the use of a work breakdown structure (WBS) and life-cycle management’. Through the 1980s, research was concentrated on ‘design-to-cost and life cycle costing’, while in the meantime new ideas arose related to project risk management and CSC systems criteria. An important deviation from the rigid, controlling mechanisms development happened at the time, which received even greater attention in the 1990s. The recognition and observation of “softer”, human resources focused approaches such as leadership, motivation, team building and communications. PMI (2004) in recent times, states that if good practices on tools, methodologies and skills are applied rightly the chances of project success are improved, but at the same time explains that the management of daily activities is ‘not sufficient to ensure success’(PMI, 2004, p. 9).

2.3.1. Beyond the “Iron Triangle”

This new addition definitely not only brought significant change but at the same time gave birth to major challenges in the project management research world. The major question posed was: “how to measure the intangible?” This is parallelized with an identical problem in the overall management literature; measurement of companies value and success. Having in mind the business environment’s reality, the consideration of financial indicators appears to be dominant and intangible assets measurement is highly neglected. One of the most important suggestions on qualitative measurement, with stories of successful use in organizations, is the balanced scorecard as presented by Kaplan and Norton in 1992 and discussed further in their book in 1996. The general idea is converting strategic vision into a set of performance metrics; providing means to measure performance by using a balanced mix of criteria related to different key perspectives which Kaplan and Norton (1992, 1996) recognized as: financial, customer knowledge, internal business processes and learning and growth.

In Jugdev and Müller’s (2005) look into the overall project success literature, it is shown that the value of the use of project management is highly perceived as project efficiency-optimization, stigmatizing it as of operational character. This is supported by Kerzner (1994), where it is shown that project management use seems to offer efficiency related advantages such as cost and cycle–time reduction. Judgev and Müller (2005) highlight the problem of overlooking effectiveness and clearly state that there are challenges related to the intangibility of its determinants, as well as to its augmented measurement time due to its relevance throughout the project’s life cycle. Further support on these statements can be found in the
research study of Belout (1998). It is written that a look into the past justifies the notion that people’s concentration was solely on results and management of projects was of a more mechanical, procedural approach rather than a behavioural-focused one. In Gobeli and Larson’s (1987) study, three criteria were of highest importance rate regarding project effectiveness evaluation, which unsurprisingly fall under the usual umbrella; be on time, satisfy the budget plan and control quality. It is relevant at this point to consider that several formal attempts to define project management (Olsen, 1971; APM, 1995; BS6079, 1996) for many years kept a static common denominator which was the “iron triangle” and no evolution occurred up to the late-1990s where definitions started to take under consideration new branches such as stakeholder satisfaction (PMI, 2004; APM, 2006).

The need for involvement of soft skills in project management in order to achieve success has become more apparent and it has been embedded in more contemporary definitions of project management. Perspective is broadened to involve the management of people, their interaction as well as social and cultural issues (Cleland and Ireland, 2002; Turner, 1999). A great deal of attention is given to Human Resources Management in PMI (2004) with a good clarification that all the described elements are not a sequential procedure which needs to be followed, but different blends of those, consisting of different individuals or groups can interact with other project processes in diverse ways. A controversial study which presented evidence on the insignificance of ‘personnel’, as a factor having an impact on project success, was that of Pinto and Prescott (1988). Opposition was presented by Belout (1998), where he criticized and questioned the study’s methodology and results and proposed a ‘retest’ of the study, with weight given on a better structure of the human resources factor based on Tsui’s (1987, 1990) investigation.

Even in recently published studies, such as that of Bryde (2008), the need to address issues in an expanded scope, beyond the “iron triangle” (i.e. time, cost, quality) is apparent. In this case the author pitches in with an investigation on project sponsorship. A conceptual structure of sponsorship activities is defined and their effect on project success is discussed. Words like training, development, engagement, commitment, comprehension of activities are mentioned, providing a link to people-related matters. Suggestions that project management success is not only a product of strict application of tools and techniques, as well as efforts to measure intangible assets such as project management capabilities are presented by Kendra and Taplin (2004). Their ‘cultural framework’ on project success assesses the firm’s project culture and helps to devise action plans to achieve better ‘project management performance in the areas of project management competencies, performance measurement systems, supporting business processes and project structures’ (Kendra and Taplin, 2004, p. 43). Linking project management capabilities with project success, in terms of project managers’ personalities and their better fit to different project types with different needs has been looked at by Dvir et al. (2006).

Examination of soft skill-set and capabilities of project managers and their possible impact on success has become a topic of vast interest in the research and practitioners world. It is not a surprise to see that PMI sponsors major studies such as that of Turner and Müller (2005), to review the literature on project managers’ competences as an impacting factor on project success and furthermore determine if different skills/personalities blends have different fits in diverse project types (Müller and Turner, 2007). According to their review, there are indications that no straight relationship exists, but the authors suggest further exploration which will involve direct measurement of performance and success (Müller and Turner, 2007; Turner and Müller, 2006). Other smaller scale studies such as that of Christenson and
Walker (2004) support the possible impact of leadership on project success in the context of shared vision.

2.3.2. In Search of a Common Stage

A general problem that is evident in the literature is the lack of a common platform and mutual understanding of what project success is and how we measure it (McCoy, 1986). The existence of this issue is also discussed by Pinto and Slevin (1989), where they stress the diversity in perception of success amongst the project’s involved participants which leads to vagueness in success measurement and evaluation.

Baccarini (1999) demonstrates a logical framework method for defining project success in order to address the above stated problem. An important statement by the author sheds light to a project management literature flaw; the interchange of two separate concepts, product versus project management success. Extracting, comparing and combining definitions shown in several publications (Baccarini, 1999; Cooke-Davies, 2002; De Wit, 1988; Munns and Bjeirmi, 1996) we can pinpoint three important concepts:

• Project management success: concentrated on successfully meeting the time, cost and quality goals
• Product success: concerned with the outcomes of the end product of the project
• Project success: consideration of the overall goals of the project

In Baccarini’s (1999) work a clear conceptual distinction between the above terms is proposed which associates project management success to the resource inputs and tangible resulting outputs of the project and links product success to the overall project goal and purpose which are of strategic nature as well as relative to the users’ needs fulfilment and satisfaction. The recommended logical framework in relation to overall project success is shown in Fig.1.

![Fig. 1. Link Between LFM and Project Success (Adapted from: Baccarini, 1999 p 28)](image)

By examining project successes and failures Dalcher (2008) strongly emphasizes the need for unambiguous definitions and comprehension of success and in his conference presentation he uses four levels of project success to support his discussion. At their foundation, these levels
find their roots in differences amongst project management, product and project success. The proposed structure can be seen in Table 2.

<table>
<thead>
<tr>
<th>Levels:</th>
<th>I: Project Management Success</th>
<th>II: Project Success</th>
<th>III: Business Success</th>
<th>IV: Future Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>Efficiency and performance</td>
<td>Objectives, benefits, stakeholders</td>
<td>Value creation and delivery</td>
<td>New opportunities (as well as threats) and competences</td>
</tr>
</tbody>
</table>

**Table 2.** Levels of project success (Dalcher, 2008)

A relevant example to take a look into these terms is discussed by Lim and Mohamed (1999) and Gardiner (2005, p. 263). The Sydney Opera House project went over the planned budget at a multiple of 14, bureaucracy was creating problems in time because of the rigid governing committees’ structure; so in terms of cost and time it could be classified as a massive failure in the context of project management success, but it could be considered as a project success since the result was a world-famous landmark of excess architectural and construction engineering interest. Conflicting views on level II success exist as Dalcher (2008) states, since the required sound quality wasn’t achieved. Besides levels I and II failures though, the project achieved level III and IV success.

The topic of conceptually distinguishing the different terms we find interchangeably used in publications is also tackled by Jugdev and Müller (2005), where in their project success literature review, they clearly define and distinguish concepts and take a more in-depth look by graphically and verbally cross-comparing terms and discussing our understanding on success on different phases of the product and project lifecycles.

Looking into Table 3, we can see the overview of the product and project lifecycles as presented in Jugdev and Müller (2005).

**Table 3.** Overview of the project and product life cycles [PMI, 2004] (Adapted from: Jugdev and Müller, 2005 p 22)

The authors clearly indicate that although conceptually the different phases of the product life cycle are common, there is a great inconsistency in the vocabulary used in different industries
in the project life cycle context. The major difference between the two life cycles is pointed out at the two bottom rows where several project types don’t correspond to the overall product life cycle stages. PMI (2004, p. 24) mentions that in some ‘application areas, such as new product development or software development, organizations consider the project life cycle as part of the product life cycle’. An example where this match is apparent and the operations phase is included in the project life cycle can be a software package; which after development, it might create the need to set it up in an organization, train the users and be involved in maintenance operations.

2.3.3. Getting Stakeholders into the Picture

The need for a holistic approach in determining, deciding and communicating across all stakeholders a strongly-defined life cycle is discussed by Frame (1994). This will help any project activities to be aligned with business processes and restrain incoherency from reigning and delivering chaos. The viewpoint on project success is extended to include not only the project manager’s perception, but also the overall stakeholders’ views. PMI (2004) highlights as a possible jeopardyst of the project’s success the dual reporting of project team members to project and functional managers, thus supporting the overall goal, to understand the impact of all activities on several stakeholders at different phases of life cycles. Not considering the stakeholders at all phases and not aligning their needs and expectations can create significant performance gaps, according to the work of Deane et al. (1997) where in their study showed that an ‘ineffective project result’ (p 55) can occur if their identified 5 gaps take place. Those gaps relate to customers and project teams’ different perceptions of the project outcome.

Lined up to support this discussion, are the findings of Wateridge (1998), which show that in successful projects, there seemed to be a shared comprehension of conditions for success amongst the stakeholders (in this case project managers and users), in contrast with the unsuccessful projects where consensus wasn’t established on success conditions. In side of the above argument, with a generalized view, we find the PMI (2004) stating that stakeholder identification and their requirements/expectations understanding and management can lead to successful projects. Interest on the stakeholders’ importance also was shown by Mallak et al. (1991) who proceeded to identification of stakeholder categories to aid the process of involving, managing and satisfying them in order to achieve project management success.

Munns (1995) deals with another aspect which impacts the overall project success, which is trust. In the context of project teams, establishment and maintenance of trust amongst individuals and positive, healthy business relationship building is essential. The author states that the knowledge of expectations and purposes of the team members in the project is a prerequisite for the project manager to be able to anticipate and manage behaviours to achieve the intended project outcome. This seems to be in the same line of thought as the principles discussed for the stakeholders impact on success.

Turner (2004) summarizing the work of Wateridge (1995) and Müller (2003), presents four necessary conditions for project success which come down to: agreement of success criteria amongst the stakeholders prior project initiation and during the project; maintenance of a collaborative working relationship between the project owner and manager; empowerment of the project manager by the project owner, by providing him/her the flexibility to tackle unanticipated situations but keep guiding and providing their insights on how the project should be best realized; project owner should be interested in the project’s performance.
Again, it is apparent that the dynamics between stakeholders’ relationships are highly influential on project success.

Atkinson (1999), through his work on project management success criteria proposes a new framework to break-out from the captivity of the “iron triangle” and move into a more elaborated and inclusive structure, what he designates as the ‘Square Route’. Based on the collective analysis of several authors’ publications on the topic, groups have been formed to include the criteria mentioned through the literature and a suggested skeleton is extracted as shown in Table 4. One of the four dimensions exclusively regards stakeholder sought benefits.

<table>
<thead>
<tr>
<th>Iron Triangle</th>
<th>The information system</th>
<th>Benefits (organisation)</th>
<th>Benefits (stakeholder community)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Maintenance</td>
<td>Improved efficiency</td>
<td>Satisfied users</td>
</tr>
<tr>
<td>Quality</td>
<td>Reliability</td>
<td>Improved effectiveness</td>
<td>Social and</td>
</tr>
<tr>
<td>Time</td>
<td>Validity</td>
<td>Increased profits</td>
<td>Environmental impact</td>
</tr>
<tr>
<td></td>
<td>Information quality</td>
<td>Strategic goals</td>
<td>Personal development</td>
</tr>
<tr>
<td></td>
<td>use</td>
<td>Organizational learning</td>
<td>Professional learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduced waste</td>
<td>contractors' profits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Capital suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Team, economic impact to</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>surrounding community</td>
</tr>
</tbody>
</table>

Table 4. Square route to understanding success criteria (Adapted from: Atkinson, 1999, p. 341)

It is apparent that project success research is breathing new life into its quest for establishment of solid theory and best practices, and in the 2000s horizons are finally broadened to grasp on fresh perspectives and aid our common and better understanding of the project management world.

2.4. Critical Success Factors (CSF)

The notion of critical success factors was originally introduced by Daniel (1961) and further developed by Rockart (1979) through his research on management of information systems. The problem the author was addressing was the vast amount of information flowing in organizations -at the executives’ level- and the need for “filtering” somehow the most critical and relevant data to support their decision-making and actions. The resulting definition characterizes CSFs as ‘the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization’ (Rockart, 1979, p. 85). Numerous publications support the idea that CSFs relate to areas that must be under continuous interest from the organization’s management in order to meet the set goals (Rockart, 1979; Kerzner, 1987; Senn, 1990; Frenzel, 1992; Maizlish and Handler, 2005). According to Rockart (1979) the four principal sources of CSFs are: industry structure, strategy, environmental and temporal factors.

Considering the study results of Ramaprasad and Williams (1998), the CSF concept is applied in the following main areas: IS implementation, Project management and requirements. This fact strengthens and supports the present thesis’s structure since it empowers and in a sense validates the linkage between the areas examined and most importantly the choice of utilizing CSFs for ERP systems implementation projects.
The review continues with a synopsis of the literature on CSFs in project environments and a review of publications on CSFs in ERP implementations.

2.4.1. Critical Success Factors in Projects

Expanding on our comprehension of project success, studies have taken place throughout time in an effort to pinpoint the ideal recipe for success. Researchers in the 1980s further developed their efforts in tackling the question “what is to be achieved?” - which corresponds to project success criteria- in order to consist and answer “how it will be achieved?” resulting to the creation of critical success factors (CSF) lists and frameworks and ultimately leading to a contemporary, more global and inclusive approach, that of strategic project management (Jugdev and Müller, 2005; Turner, 2008).

Important milestones in this development can be considered:

- **late 1980s-early 1990s**: criteria related to stakeholder satisfaction aroused in opposition to completion criteria that were dominant at the time
- **1990s-2000s**: CSFs are mapped and looked at from various perspectives and in the different stages of the project life cycle (Müller, 2008; Jugdev and Müller, 2005)

Taking a look into Belassi and Tukel (1996) literature review of critical success/failure factors we can discover several attempts by researchers to identify CSFs in projects (Martin, 1976; Locke, 1984; Cleland and King, 1983; Sayles and Chandler, 1971; Markus, 1981; Baker et al., 1983, Morris and Hough, 1987). One thing that was obvious though was the lack of classification and groupings amongst all the resulting CSF lists. Individual lists based on theoretical grounds were developed, addressing different levels of scope and with no empirical support. The need for more cohesive CSF sets emerging from both theoretical and empirical work was created in order to provide the project management community with more solid suggestions.

Schultz et al. (1987) were one of the first research teams to address this problem by publishing work on CSF classification. Their focus was on the implementation phase of projects. After stating that project implementation was essentially a two stage procedure including a ‘goal-setting and planning phase followed by an action-oriented operational stage’ (p 35) they proceeded to categorize the factors which influence project performance as tactical and strategic. Factors of strategic nature were related to strategic planning and comprised project schedule/plan; top management support and project mission whereas tactical factors were related to operational matters and included client consultation, personnel selection and training, technical tasks, client acceptance, feedback, troubleshooting and communication. Through a Project Implementation Profile (PIP) which consisted of these general success factors and their interdependencies, they proceeded to a proposed 10-factor model, one of the most referenced in the literature as it’s shown in Fig. 2.

Pinto and Slevin (1989) when expanding their study beyond project implementation identified CSFs and took a deeper look into the comparative significance of them in all the
different phases of the project life-cycle in research and development (R&D) project environments. In the same spirit Pinto and Prescott (1988) examined the relative importance of the previously identified groups (i.e. tactical, strategic) in different project life-cycle phases and found that according to the success measure used CSFs importance would vary at the different stages. One important outcome of the study that they put across was that at the utilization of external measures the strategic factors where taking over tactical factors during the whole project life-cycle.

The significance of these findings and the 10-factor model became not only a cornerstone for further research supporting its use but at the same time was challenged and critiqued in order to test its possible weaknesses. An example of constructive argumentation, is the work of Finch (2003) where through an application of PIP in an IS project environment, the author pointed out some possible weak spots of the model and proposed further research to tackle those issues. His arguments on questioning the methodology were based on the following grounds: Related to validity the study showed external and internal factors which can have an impact on projects that weren’t addressed by PIP such as: project manager competence, political activity within the organization, external organizational and environmental factors and the perceived need to rapidly implement the project. As for reliability, study participants at different hierarchy levels had measurable differences in their scores. Based on cultural, gender and political influences that weren’t addressed by Pinto and Slevin (1987) the author suggests that the transferability of PIP in a different geographical/cultural/business environment didn’t seem to be strongly supported by the existing literature.

Still several problems such as the difference in perceptions of success and the poor proposals on the actual practical use of success concepts remained insufficiently tackled. As shown in Jugdev and Müller (2005), Lim and Mohamed (1999) in describing different views on success discuss the micro viewpoints in the project, relating to evaluating project management success when the project is completed and macro viewpoints related to ‘longer-range perspective of product use to measure customer satisfaction’ (Jugdev and Müller, 2005 p 24). Lim and Mohamed (1999) observed when reviewing the literature on CSFs lists (Baker et al., 1983; Kerzner 1987; Pinto and Slevin, 1987; Morris and Hough, 1987; Pinto and
Prescott, 1988; Nicholas; 1990) that no justification of why project success was perceived differently by different parties. Their suggestion on dealing with this problem supported that satisfaction and deliverables criteria should be adequate to decide on the macro viewpoint of success whilst solely project deliverables should be enough to demonstrate the micro viewpoint. As for the lack of action plans on putting success theory into practice, Clarke (1999) supports that there is a shortage in literature addressing practically meeting project management objectives. Her take leads to CSFs including ‘communication throughout the project, clear objectives and scope, breaking the project into “bite sized” chunks and using project plans as working documents’ (p. 140).

Initiatives for advance our understanding on project success and to devise ways in anticipating, avoiding and solving problems when they occur in order to achieve success are also taken by practitioners. It is important to note that views are such to incorporate both concepts of success and failure. As presented by Dalcher (2008) and published in a special issue of “Technology Analysis and Strategic Management” journal, a list of several crucial issues that appeared common in the study of recent failures in projects included: relationship management, trust, communication, management of expectations, politics, risk management, escalation and contract management.

Several other studies lead to the development of CSF lists. One of the most referenced and consulted survey publications is that of the Standish Group which is released annually. Their classification regards successful, challenged and failed projects. The former relates to achieving the iron triangle’s vertices, the latter to projects that are cancelled at some point in the development cycle and challenged projects are considered as ‘completed and operational but over-budget, over the time estimate and with fewer features and functions than originally specified’ (Software Magazine, 2001). As a result of their study the “Chaos 10” was carried out in 1994 and since then it has been re-released for years with no major, significant changes. This CSF list incorporates the following factors: executive support, user involvement, experienced project manager, clear business objectives, minimized scope, standard software infrastructure, firm basic requirements, formal methodology, reliable estimates and other criteria. As discussed by Jugdev and Müller (2005) the “Chaos 10” appears to be similar to the 10 factors model actualized by Pinto’s work.

Through an overview of critical success factors in projects, the literature review continues with a narrowed down focus to discuss critical success factors in ERP implementations.
2.4.2. ERP Systems

In order to aid the readers with the comprehension of the thesis content an overview of Enterprise Resource Planning (ERP) systems is introduced at this point. A definition is derived from the literature, a short history of their development is provided, as well as benefits and drawbacks to their use by organizations.

An enterprise resource planning system is a business management system, consisting of integrated sets of comprehensive software, which, when implemented successfully, can enable a company to manage efficiently and effectively the use of its resources by providing a total, integrated solution for all business processes and transactions-oriented data throughout the organization (Markus et al., 2000; Siriginidi, 2000; Nah et al., 2001; Shehab et al., 2004).

The predecessor of this type of system was the MRP (Manufacturing Resource Planning). The manufacturing industry striving for productivity improvement in the 1970s used MRPs in order to have the most efficient, optimal control of their production line and order processing. The system would make sure that the required material was ordered as needed and the production output was out on time, while keeping inventory levels as low as possible (Siriginidi, 2000). The next generation of MRP systems was introduced in the 1980s, given the name extension MRPII. A few basic developments were included in the new generation of systems such as (Siriginidi, 2000; IfM, 2008):

- Feedback – Feedback from the shop floor to the system regarding work progression in order to keep the schedule updated at all levels
- Rough Cut Capacity Planning – matching the orders to the existing capacity. In the case of excess orders were recognized they could be moved accordingly to keep a balanced production process
- Resource Scheduling – Scheduling capability with concentration on the necessary manufacturing facilities and equipment to turn material into final product
- Costing module

The further enhancement of the system was unavoidable since the scope of its possible usage was expanded beyond the manufacturing industry and beyond the already established functions served. The idea of a fully-integrated enterprise at all levels (Turban et al., 2002) lead to the evolution of ERP systems which in the 1990s became the ‘de facto standard for replacement of legacy systems in large and, particularly multi-national companies’ (Holland et al., 1999a as quoted in Parr and Shanks, 2000b, p. 289). As discussed in the definition provided earlier, different modules, integrated, compose an ERP system such as: finance, human resources, manufacturing, logistics and sales (Siriginidi, 2000; Esteves and Pastor, 2001; Shehab et al., 2004). An overview of an ERP system’s modules is shown in Fig. 3.
Fig. 3. ERP System Modules (Source: Shehab et al., 2004, p. 363)
A fact that helped the increase of sales of ERP systems at the time was the Y2K crisis, where organizations took decisions to replace their legacy systems (Somers and Nelson, 2001; Maizlish and Handler, 2005; Monk and Wagner, 2006). As stated by Davenport (1998, p. 122) ‘the business world’s embrace of enterprise systems may be in fact be the most important development in the corporate use of information technology in the 1990s’. The above comments support the immediate boost in ERP adoption by companies to enhance their competitiveness in their relevant industries and markets. As shown from AMR Research (2003) the market for ERP systems was expected to reach 70 billion dollars by 2004 and in a later report an increase of 14% in the overall market was observed for 2004 (AMR Research, 2005).

The major vendors of ERP systems worldwide referred to as the ‘big four’ were considered to be: SAP, Oracle Applications, PeopleSoft and J.D. Edwards (O’Leary, 2002). Including Baan the top five vendor companies accounted for 59% of the industry’s revenue (AMR Research, 2004). In this emerging market though and in the spirit of intense competition, from the time these data were published up to today, major changes occurred with the highlights being the acquisition of J.D. Edwards from PeopleSoft and following the acquisition of PeopleSoft from Oracle Applications (NYTimes, 2003; Computerworld, 2005).

The work of Shang and Seddon (2000) on a comprehensive framework for ERP systems benefits classification gives a good overview of possible benefits from ERP adoption. The study was concentrated on business benefits, didn’t consider costs and it corresponds to the management’s viewpoint. The framework proposed has five divisions in order to classify business benefits and ease their assessment (Table 5). In a general agreement, the biggest global vendor of ERP systems summarizes the business benefits of ERP adoption as: improvement of strategy/operations alignment, improvement in productivity, reduced costs, support changing industry requirements, risk reduction, improvement of financial management and corporate governance, optimization of IT expenditure, detainment of top performer employees and immediate access to information (SAP, 2008).

On the down side there are several drawbacks in the adoption of ERP systems that can be the major reasons for a failure to reap any benefits which come down to:

• the major investment required in terms of time and cost by the organization to implement and maintain such a system (Griffith et al., 1999; Mabert et al., 2003; Markus et al., 2000; Ross and Vitale, 2000; Teltumbde, 2000; Zhang et al., 2005)
• the possible inflexibility of the system to meet current or future needs of the organization (Häkkinen and Hilmola, 2008)

In this fact’s support, Davenport’s (2000) investigation found that only 10% of the companies he studied had achieved any real value from their ERP implementation. Considering Mabert et al. (2003) an ERP implementation can take several years to reach completion and cost significant amounts of money, indicative; ‘tens of millions of dollars for a moderate size firm and upwards of $100 million for large international organizations’ (p 302).
Nevertheless, the successful implementation of an ERP system in a business can create value through activities integration, improved operations due to best practices employed by the system, increased efficiency due to standardization and through the accuracy and easy access of data due to a core data source (O’Leary, 2000). Moreover, a well-accomplished ERP implementation can provide the organization with a competitive advantage to be able to compete in today’s fierce business arenas (Soh and Markus, 1995; Holland et al., 1999b).

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Sub dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Operational</td>
<td>1.1 Cost reduction,</td>
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<tr>
<td></td>
<td>1.2 Cycle time reduction,</td>
</tr>
<tr>
<td></td>
<td>1.3 Productivity improvement,</td>
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<tr>
<td></td>
<td>1.4 Quality improvement,</td>
</tr>
<tr>
<td></td>
<td>1.5 Customer services improvement</td>
</tr>
<tr>
<td>2. Managerial</td>
<td>2.1 Better resource management,</td>
</tr>
<tr>
<td></td>
<td>2.2 Improved decision making and planning</td>
</tr>
<tr>
<td></td>
<td>2.3 Performance improvement</td>
</tr>
<tr>
<td>3. Strategic</td>
<td>3.1 Support business growth</td>
</tr>
<tr>
<td></td>
<td>3.2 Support business alliance</td>
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<tr>
<td></td>
<td>3.3 Build business innovations</td>
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<tr>
<td></td>
<td>3.4 Build cost leadership</td>
</tr>
<tr>
<td></td>
<td>3.5 Generate product differentiation (including customization)</td>
</tr>
<tr>
<td></td>
<td>3.6 Build external linkages (customers and suppliers)</td>
</tr>
<tr>
<td>4. IT Infrastructure</td>
<td>4.1 Build business flexibility for current and future changes</td>
</tr>
<tr>
<td></td>
<td>4.2 IT costs reduction</td>
</tr>
<tr>
<td></td>
<td>4.3 Increased IT infrastructure capability</td>
</tr>
<tr>
<td>5. Organizational</td>
<td>5.1 Support organizational changes</td>
</tr>
<tr>
<td></td>
<td>5.2 Facilitate Business learning</td>
</tr>
<tr>
<td></td>
<td>5.3 Empowerment</td>
</tr>
<tr>
<td></td>
<td>5.4 Build common visions</td>
</tr>
</tbody>
</table>

Table 5. ERP benefits framework (Shang and Seddon, 2000, p. 2)
2.4.3. ERP Implementations

This section aims to aid barricading the scope of this research project. The focus is targeted at a specific phase of ERP systems lifecycle, implementation.

As an overview of an ERP system’s lifecycle, we can consider Esteves and Pastor’s (1999) framework, which breaks down the different phases of an ERP’s lifetime in a company to the following stages:

- Adoption Decision
- Acquisition
- Implementation
- Use and Maintenance
- Evolution
- Retirement

As Esteves and Pastor (2001) explain, the implementation phase has to do with adjusting, customizing and setting parameters of the acquired ERP package to match and fit the organization’s specific requirements. This process is typically handled by external consultants who have the knowledge and experience in implementation methods.

ERP literature has been widely concentrated on implementation matters. As Moon (2007) demonstrates in his literature review, up to May 2006 the dominant area examined by researchers was implementation; over 40% of the entire collection of ERP articles was falling under the specific category. The reasons for that can be found in the industry’s concerns about these systems. The high costs involved, the long duration, the numerous failure stories (Soh et al., 2000; Willis and Willis-Brown; 2002) and the inability to get value and reap the promised benefits even in the long-term (Peterson et al., 2001), raise the need to find ways to address implementation problems and suggest approaches to increase the probability of success.

As discussed by Scott and Vessey (2000) an ERP system implementation is a complex effort and the level of complexity is based on two variables: the amount and type of the implemented modules as well as the implementation strategy selected. As shown in Welti (1999) implementation approaches/strategies included Big Bang and Phased (or roll-out). Big Bang suggests the complete ERP system to be implemented at once at all facilities whilst Phased adoption suggests taking steps in introducing different modules at different timeframes and in different facilities (Umble et al. 2003). As ERP concepts and theory evolves several authors suggest different taxonomies for ERP implementation strategies and look further than the two traditional, long-established approaches (Holland et al., 1999a). An example of a different proposal on ERP implementation categorization is that of Parr and Shanks (2000a) where distinction comes down to three broad categories: Comprehensive, Middle Road and Vanilla. Differentiation was based on: physical scope, BPR scope, technical scope, module implementation strategy and the resource allocation.

A topic of major interest in ERP implementations is that of CSFs, addressed below.
2.4.4. Critical Success Factors in ERP Systems Implementations

Regarding CSFs in IS and ERP systems implementations and how they relate, the contribution by Somers and Nelson (2001, p.1) will be considered for the purposes of this research project. The authors state that ‘while ERP implementations differ from traditional systems in scale, scope, complexity, organizational changes, project costs, and need for business process re-engineering, the theoretical development of CSFs in ERP implementations remains embryonic’.

Esteves and Pastor (2001, p.14) in their annotated bibliography classified research related to ERP systems implementation phase in four key categories: implementation approaches (i.e. taxonomies, methods and techniques), implementation success, other implementation issues and implementation case studies. Moon’s (2007, p.239) literature review in more recent times classified ERP implementation subjects into: case studies, CSFs, change management, focused stages in the implementation process and cultural (national) issues.

Studies such as that of Somers and Nelson (2001) proceed to the identification of CSFs and furthermore, attempt to map the factors to the different stages of the ERP implementation lifecycle (i.e. initiation, adoption, adaptation, acceptance, routinization and infusion). A similar take on CSFs is that of Parr and Shanks (2000b), targeted in identification of factors related to different ERP implementation phases. Finney and Corbett (2007) discuss in their literature review on ERP implementation CSFs, that even though CSF topics are widely published, there is a significant gap in the literature regarding different stakeholder perspectives in CSF identification. The authors, following Holland and Light (1999) classification they presented the resulted 26 identified factors sorted in tactical and strategic.

Guided from Esteves and Pastor (2001) annotated bibliography and the recent literature reviews of Finney and Corbett (2007) and Moon (2007), numerous articles were retrieved addressing ERP implementation CSFs. In order to derive a list to use as a platform for this research project, a choice of seven articles has been made, based on their commonalities and relevant agreement in two aspects:

- Proposed CSF lists
- Description of individual CSFs

In the following section the chosen articles are used to provide a CSF framework for the purposes of the present thesis. Relevant discussions are provided for the chosen factors.
2.4.5. CSF Framework

From the articles chosen, the chronological first is that of Bingi et al. (1999). The authors discuss a number of critical issues in ERP implementations, stating the importance of factors such as top management commitment, integration of the system with other existing systems, choice and management of appropriate consultants and employees, business process re-engineering and the training of users in the ERP.

Umble et al. (2003) identified a number of CSFs in ERP implementations and tested the theoretical outcome with a case study on a widely-accepted successful ERP system implementation – based on achievements on success dimensions shown in the literature, tangible and intangible -. In answering why ERP implementations fail the authors produced a list of ten categories, which were examined in practice in the case study. At the top of the list, top management commitment, excellent project management and clear definition of strategic goals are placed.

Nah et al. (2001) by conducting a literature review identified eleven similar CSFs and placed them in respective categories of Markus and Tanis proposed ERP life cycle model in an effort to further specify the importance of each factor at different stages. Loh and Koh (2004) move a step ahead and propose a conceptual framework for successful ERP implementation in the context of SMEs. The structure similar-ly as Nah et al. (2001) uses Markus and Tanis ERP life cycle model to pinpoint their ten CSFs importance at each stage, but also identifies the critical people and critical uncertainties involved in each phase. Complimenting the target to include more axes when discussing CSFs, is the work of Somers and Nelson (2004). The authors discuss the significance of both key actors and activities, at different life cycle stages.

Akkermans and Van Helden (2002) based on the first publication of 21 identified CSFs by Somers and Nelson (2001), examined the top ten ranked factors’ application in a case study and concluded that indeed the list was relevant in identifying key originators of success and failure in ERP implementations. Motwani et al. (2005) through a set of four case studies developed an ERP implementation framework which presents CSFs in three different stages: pre-implementation, implementation and post-implementation.

Using the articles discussed above a cross-reference matrix is prepared which is presented below in Table 6.
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CSF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top management support</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Project team competence / Teamwork</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdepartmental co-operation</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear goals and objectives</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Project management</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td>Interdepartmental communication / Effective communication</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of expectations</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project champion</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor support</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Careful package selection</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dedicated resources</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steering committee</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User training</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education on new business processes</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business process re-engineering</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Minimal customization</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architecture choices</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change management / Program and culture</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Vendor partnership</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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</table>
Table 6. Matrix comparing identified CSFs between selected articles

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor’s tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation time</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of consultants</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation cost</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee morale</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focused performance measures / monitoring, evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Multi-site issues</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical difficulties</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business plan and vision</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Software development, testing and troubleshooting</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open information and communication policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Appropriate business and IT legacy systems</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT leveragability and knowledge capability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Appropriate celebration when the project is completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

[CSFs from 7 articles were identified and their appearance frequency within them was mapped]
2.4.6. CSF Description

Based on the matrix shown in the previous section a selection has been made for the most referenced critical success factors. The factors that were cited in at least four out of the seven articles will be used. The objective is to achieve a CSF list; the examination of each factor in different ERP implementation life cycle stages or relating them to different stakeholders is out of this project’s scope. Considering the above, the CSF framework which will be used for this research is shown in Table 7 and a description of each factor is provided in the following part.

| Critical Success Factors in ERP Systems Implementation |
|---|---|
| 1. | Top Management Support |
| 2. | Project Team Competence / Teamwork |
| 3. | Project Management |
| 4. | Effective Communication / Interdepartmental Communication |
| 5. | Change Management Programme and Culture |
| 7. | Clear Goals and Objectives |
| 8. | Focused Performance Measures / Monitoring, Evaluation |
| 9. | Project Champion |
| 10. | User Training |

Table 7. CSFs in ERP Systems Implementation

*Top Management Support*

Top management commitment and support is the top rated factor in the articles reviewed. The contribution and interest of the management is crucial in order to keep the project and the implementation teams on track (Somers and Nelson, 2004). The management should have an understanding of ERP systems and of both the expected input (i.e. financial and human resources) required and respected output it will achieve. Management should be committed and consistent in disposing important resources to support the implementation (Holland et al., 1999a). The management should champion the ERP project and strive to achieve the planned implementation and its benefits (Umble et al., 2003). Moreover, management has to identify the implementation as a top priority and communicate this fact at all levels of the organization (Motwani et al., 2005).

*Project Team Competence / Teamwork*

The composition of the ERP project team is highly important. The best choice must be made between individuals in the organization to achieve the optimal team formation and ideally a cross-functional team consisting of external consultants and in-house personnel (Loh and Koh, 2004; Motwani et al., 2005). The team members should be well aware of the business processes in the company and have knowledge on the industry’s best practices, in addition to technical knowledge. Also the team should have a good understanding of the overall business needs that the ERP system will serve and aim to keep the project on the correct path (Bingi et
The team should be empowered by management to take responsibility on taking important decisions (Umble et al., 2003). Preferably the team should be at the same facilities to ease collaboration (Loh and Koh, 2004).

**Project Management**

Project management involves the definition of project scope, clear objectives, work/resources plan with feasible milestones and the control throughout the ERP implementation (Nah et al., 2001; Umble et al., 2003; Loh and Koh, 2004). Akkermans and Van Helden (2002) add that due to the evolving business and project environments, project management shouldn’t be static and a level of creativeness could be a good attribute for an ERP project manager.

**Effective Communication / Interdepartmental Communication**

Stakeholder expectations should be effectively communicated in order to better achieve time/quality efficient, undisturbed communication. Communication channels can be broken because of difference in languages as well as technical terminology knowledge levels. Effective communication with the end-users should be managed, especially at the requirements collection stage (Nah et al., 2001; Loh and Koh, 2004). Communication amongst the different departments and between business processes in the organization is also a significant issue to be considered and suggestions to foster it include communication plans and the continuous updates regarding the system’s influence in users’ work. (Akkermans and Van Helden, 2002; Somers and Nelson, 2004)

**Change Management Programme and Culture**

The company should be prepared for changes in the existent business culture. A specific change management programme can be devised which has a strong focus on education and training of the users on the ERP system and encompasses their involvement in the business processes design. (Nah et al., 2001; Loh and Koh, 2004; Motwani et al., 2005)

**Business Process Re-Engineering (BPR)**

With the introduction of an ERP system, business processes in organizations change to fit the new system’s capabilities. According to the degree that the system fits the organization the BPR needed changes. Inevitably, when the system needs to be tuned in to adapt to the organization, the implementation costs rise. That is why when discussing BPR usually it is paired up with another success factor, minimal customization (Bingi et al., 1999, Nah et al., 2001; Loh and Koh, 2004).

**Clear Goals and Objectives**

The key individuals in the organization must formulate a motivating, realistic and clear vision of the ERP implementation, which will help achieving the best possible outcome in pleasing clients, empowering staff and easing suppliers (Umble et al., 2003). This vision should be set with specific and feasible goals and objectives which will designate the implementation’s
intended path. This should be communicated and infused to stakeholders during all project phases (Somers and Nelson, 2004).

Focused Performance Measures / Monitoring, Evaluation

From the beginning of the project, specific performance metrics to evaluate the implementation’s progress and impact in the organization should be put into effect. The most important aspects when setting, monitoring and evaluating these measures are the agreement of them between stakeholders and the shared understanding of rational expectations concerning performance. The design of the performance measures should be such as to stimulate people to perform the proper actions to accomplish the desired results (Nah et al., 2001; Umble et al., 2003).

Project Champion

The project champion should possess cross-functional knowledge in organizational and technological issues. Leadership skills are extremely important and the ability to motivate and influence people can have a great impact in the project. The champion should take over this role throughout the project, promote the ERP and try to ease the transition to the new system and eliminate resistance to change (Nah et al., 2001; Akkermans and Van Helden, 2002).

User Training

User training is a key factor since the operational status of the ERP system is in its majority based on its users. Education should take place in a systematic way to achieve the maximum result. Training should be on-going to aid the development of the employees. Besides the technical skills and IT literacy issues, the type of the ERP system and the requirement for BPR create the need to consider the tasks that the users will be involved in and explain to them the change they will be experiencing. The management should be prepared for a heavy investment for this critical issue (Bingi et al., 1999; Nah et al., 2001, Umble et al., 2003).

2.5. Justification to Continue

Through the literature review a solid theoretical background was built, upon which a theoretical framework has been developed. Within the scope of the databases used for this study, there weren’t publications to suggest that the critical success factors discussed above have been examined before in the context of ERP implementation projects in the Cypriot public sector organizations. Considering Müller and Turner (2007), ‘rating of success criteria and performance against them’ differs based on nationality. Thus, there is a rationale supporting an investigation of CSFs in a different cultural context. The applicability assessment of the generally referenced critical success factors from the overall ERP implementation literature in the specific environment can provide useful insights. And exactly this, serves as a proposition to be examined in the next chapters; the theoretical framework’s applicability in the Cypriot public sector ERP implementation projects.
CHAPTER 3 – RESEARCH METHODOLOGY

3.1. Introduction

In the previous chapter the relevant literature was reviewed. As an outcome, a theoretical framework was developed which has served as a basis for the research proposition. This will be put into the test through a structured research methodology. The aim of the current chapter is to present the reasoning behind the selected research process and clearly define each of its construct steps, in order to achieve the most suitable manner to address the research question and to explore the research proposition.

An appropriate skeleton which will be followed when tackling the research methodology is presented by Saunders et al. (2000 p. 85). The authors use their ‘research process onion’ metaphor to represent and map a set consisting of five layers; five key issues the researcher needs to discuss in order to develop a solid research methodology. An adaptation of the model is shown in Fig. 4. Having this as a core guide the following sections deal with each of the issues in turn.

![Fig. 4. The research process ‘onion’ (Adapted from: Saunders et al., 2000 p. 85)](image)

3.2. Research Philosophy

According to Krauss (2005, pp. 758-759) ‘epistemology is intimately related to ontology and methodology; as ontology involves the philosophy of reality, epistemology addresses how we come to know that reality while methodology identified the particular practices used to attain knowledge of it’. Taking these three dimensions under consideration the research paradigm is derived. This research project reflects the realism view since according to Perry et al. (1999) as presented in Sobh and Perry (2006, p 1201) we’re dealing with an external validity which ‘other people have usually researched or experienced aspects of that reality before, and so their perceptions are some of the many “windows” on to that reality deserving some consideration before realism data collection starts’. The development of the theoretical
framework from the literature review in the previous chapter, prior to data collection commencement, is perfectly aligned with what Miles and Huberman (1994) suggest for realism research as discussed by Sobh and Perry (2006, p 1201).

3.3. Research Approach

The approach followed is the inductive approach. The researcher expects to draw ‘inferences out of observations’ (Bryman and Bell, 2003, p 12), simply put, theory will emerge from the collected data (Bryman and Bell, 2003; Remenyi et al., 1998; Saunders et al., 2000; Sekaran, 2003).

3.4. Research Strategy

Qualitative research as opposed to quantitative research ‘tends to be concerned with words rather than numbers’ (Bryman and Bell, 2003 p. 280). As the authors discuss, the three other features that usually distinguish qualitative research is the association with the inductive view, the interpretivist epistemological stand and finally the constructionist ontological position. Following this notion, qualitative research was decided to be followed for the purposes of this research project as it appears to be more appropriate to realism and to the inductive approach.

In terms of the specific research strategy that is used, the multiple-case study has been selected based on ‘literal replication’ logic as discussed by Yin (2003 p.47). As the author describes, in a multiple-case study the set of cases is selected based on two reasons; either to predict similar or contrasting results. Furthermore the choice of a multiple-case design will provide evidence which is regularly ‘considered more compelling and the overall study is therefore regarded as being more robust’ (Herrriott and Firestone, 1983) as quoted in Yin (2003 p. 46). A small number of cases (i.e. 3) will be conducted for this thesis in order to support the set proposition based on expected literal replication.

As discussed by Perry et al. (1998), when using a case study as the research strategy some prior knowledge of the literature can be beneficial when designing the case study and analyzing its findings. The authors discuss that the deductive and inductive approaches when used at their extreme ends might prohibit a potential benefit from their synergistic effect, when used in appropriate balance to complement each other. This supports the examination of the existing theory in the literature review, as it might be proven useful at a later stage.

3.5. Time Horizon

The limited time from the availability of samples for data collection to the completion and submission of the thesis lead to the decision to study a ‘particular phenomenon at a particular time’ (Saunders et al., 2000), thus performing a cross-sectional research design. Following Bryman and Bell’s (2003 p.48) description of cross-sectional research design elements it is observed that it satisfies the specifications for the current selection. More than
one case are examined, data are collected concurrently in order to relate the critical success factors to ERP implementation success in the context of Cypriot public sector organizations.

3.6. Data Collection Tool

The decision on using semi-structured interviews as the data collection tool was taken. Based on Saunders et al. (2000) the advantages that were considered for this selection were:

- More efficiently handling the limited time to collect the data and the limitations in the interviewees’ early availability
- Having the flexibility to further explore the interviewees’ assessment of the proposed framework
- Establishing a more personal relationship with the interviewees which amongst others will assist to higher response rate than an impersonal survey or questionnaire and also ensure that the right person is the one tackling the questions
- A permutation in the order of the questions might be called for

Although a survey was highly considered to aid data collection and increase the validity of the findings, the inability for acquiring the large sample of respondents required forced the abandonment of this tool.

3.7. Theoretical Sampling

Considering the nature of the research, a non-probability sampling technique appears to be most appropriate as discussed by Saunders et al. (2000, p 152).

The possible total case sample size, the population, was defined by two specific parameters: Cypriot public sector ERP implementation projects completed in the past four years and formally declared as a success. This number was approximately 15 projects. A limit was set to acquire 3 interested organizations to participate in this research study.

The non-probability sampling technique chosen is that of purposive sampling, which allows the researcher to base the selection of cases on his judgement as appropriate to best address the research questions and reach the set objectives (Saunders et al., 2000).

Taking under consideration homogeneous sampling, effort was made in order to select the interview samples within the three cases accordingly. Three project members from each project were selected, ideally at different hierarchical levels in the project and the organization, but similar amongst the three cases.

More information on the interview design and process, as well as the actual samples is given in the following sections.
3.8. Data Collection Process

As discussed above, the first step regarding the data collection was to determine the sample’s characteristics. In order to better address the research question, interest was targeted in contacting public sector organizations in Cyprus which had recently went through an ERP implementation widely-accepted as successful. Contacts were initiated through a local ERP vendor company which collaborated with several public sector organizations in implementation projects. The objective was to acquire individuals who were members of the project teams in the different implementations and ideally a cross-functional mixture to have a more holistic viewpoint.

The second step was to approach and secure the organization’s agreement for the interviewees’ involvement and pinpoint the participants. Telephone conversation slots were booked through the local contact (i.e. vendor) with the relevant people (i.e. heads of IT departments). These conversations lasted between 15 and 25 minutes and consisted of:

- introduction of the thesis author’s identity
- purpose statement of the study
- specifications for the interviewees’ profiles
- required interaction and approximate time/effort needed from each of the possible interviewees
- assurance of full anonymity (if requested)
- if successful, exchange of further contact details to get in touch with the study participants

The successful conversations with the prospective organizations led to the authorization of the thesis’s author to study their ERP implementation projects and interact with the associated participants as shown in table 8.
<table>
<thead>
<tr>
<th>Number of Interviewee</th>
<th>Public Organization</th>
<th>ERP Implementation Project</th>
<th>Role in Project</th>
<th>Date of Interview and Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>“X”</td>
<td>ERP System Implementation</td>
<td>External Consultant (i.e. Requirements Specifications Development, evaluation of tenders and Project management)</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; of December (35 mins)</td>
</tr>
<tr>
<td>2</td>
<td>“X”</td>
<td>ERP System Implementation</td>
<td>Manager of Accounting Department (Customer Side - Project Supervision)</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; of December (40 mins)</td>
</tr>
<tr>
<td>3</td>
<td>“X”</td>
<td>ERP System Implementation</td>
<td>System User (accountant)</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; of December (25 mins)</td>
</tr>
<tr>
<td>4</td>
<td>“Y”</td>
<td>ERP System Implementation</td>
<td>Project Manager (Customer Side – preparation and evaluation of tenders / Project Supervision)</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; of December (35 mins)</td>
</tr>
<tr>
<td>5</td>
<td>“Y”</td>
<td>ERP System Implementation</td>
<td>Project Manager (Vendor)</td>
<td>17&lt;sup&gt;th&lt;/sup&gt; of December (40 mins)</td>
</tr>
<tr>
<td>6</td>
<td>“Y”</td>
<td>ERP System Implementation</td>
<td>System User</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; of December (25 mins)</td>
</tr>
<tr>
<td>7</td>
<td>“Z”</td>
<td>ERP System Implementation</td>
<td>External Consultant (Facilitating tender process and selection / project evaluation)</td>
<td>15&lt;sup&gt;th&lt;/sup&gt; of December (30 mins)</td>
</tr>
<tr>
<td>8</td>
<td>“Z”</td>
<td>ERP System Implementation</td>
<td>Project Supervision (Customer side – Chief Accountant)</td>
<td>18&lt;sup&gt;th&lt;/sup&gt; of December (35 mins)</td>
</tr>
<tr>
<td>9</td>
<td>“Z”</td>
<td>ERP System Implementation</td>
<td>Project Manager (Vendor)</td>
<td>17&lt;sup&gt;th&lt;/sup&gt; of December (35 mins)</td>
</tr>
</tbody>
</table>

Table 8. Sample of interviewees
The selected organizations’ and interviewees’ profiles are presented next. It is important to note that the information in this section was provided orally by the interviewees, except where stated otherwise. Organizations and interviewees requested to remain anonymous.

**Organization X**

*Overview*

The organization is a public broadcasting corporation in Cyprus which started as an initiative of the British rule in 1951 but it has been running independently since the declaration of the Republic of Cyprus in 1960. Its mission is to provide its broadcasting services within the island, ‘responding directly to the democratic, social and cultural needs of Cypriot society and to the need to secure pluralism of, inter alia, cultural and linguistic diversity in mass media, including a balanced package of services consisting of informative, cultural and entertainment programmes, social service programmes, programmes addressed to overseas Cypriots, and transmissions related to national emergencies and civil protection efforts’\(^4\). The governing Board of Directors is assigned every three years by the Council of Ministers.

The company has been developing rapidly through the years, continuously increasing the quantity and quality of its infrastructures and services. Today, it provides to the public, two TV channels, four radio stations and it is broadcasting worldwide through its own satellite channel and via the internet. The most important project the organization is undertaking is its preparation for introducing digital broadcasting, following the government’s decision to commence digital television in the next 3 years.

*Departmental Structure*

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<tr>
<th>Department</th>
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<tr>
<td>TV department</td>
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<tr>
<td>Radio department</td>
</tr>
<tr>
<td>Technical department</td>
</tr>
<tr>
<td>Administration department</td>
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</table>

- **TV department**
  Responsible for planning the operations and TV programmes and running the local and satellite channels. Further division in the department branches out according to programme genre responsibility (i.e. news, entertainment, education, social etc).

- **Radio department**
  Responsible for the planning, preparation and presentation of a variety of radio programmes. The four radio channels cover not only the Greek speaking audience’s needs, but also address Armenians, Turks and other nationalities, minorities in the island.

- **Technical department**
  Responsible for technical equipment. They decide about any issue related to technical procurement. They define the needs for any equipment, stations, cameras etc for all the TV and radio channels and also have the responsibility of acquiring and maintaining sub-transmitters as needed to allow reception from everyone in the country, at any location.

- **Administration department**
  Responsible for the management of all departments, as well as the control of HR, marketing and finance matters.

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\(^4\) For the sake of anonymity the source is not disclosed here, but can be obtained from the author upon request and approval from the source.
**ERP decision and project team overview**

Up to 2006 the organization was still in use of their legacy systems and in several business processes many tasks were performed manually.

The management decided to bring in an external consultant to study the IT needs of the organization and study the possible adoption of an ERP system. The feasibility study was positive and upon homophonous agreement of the Board of Directors a “Go” decision was given to proceed with the project.

Through the ERP implementation, the organization was planning to minimize costs and achieve a better control of their budget, mostly by knowing rapidly and at any given time, the exact budget handling of each department and section.

The project management was undertaken by the external consultant, although a senior accountant from the organization was involved in project supervision, in close collaboration with the consultant at a project management level.

The project team consisted of four members, user-representatives from four interested sections of the organization; purchasing, accounting, advertising and personnel units. The training technique used was of the “train the users” form, meaning these four people – referred to as super-users – would then transfer knowledge to the rest of the users in their respective departments.

The implementation followed the Big-Bang approach at a single site where the organization’s offices are located and was completed in a time-frame of 14 months.

**Interviewees**

Project Manager (External Consultant) – A local consultant with a computer science background and active in the software systems implementation business for around 32 years in numerous roles. The core activities undertaken are specifications documents preparation, tender documents evaluations and project management, with 80% of his work related to public sector projects in Cyprus. Experience includes ERP implementations in public sector organizations, either as a consultant and/or project manager. For the needs of the specific project, this person defined and prepared the specifications document and undertook project management.

Manager of Accounting Department – A chartered accountant with 30 years of experience in her field and working for the organization for the last 9 years. At the moment, she is the manager of the accounting department. For the needs of the project she was involved in supporting the external consultant in project management activities, supervising the whole process not only to aid the implementation but also to secure the organization’s benefits. A prior knowledge on ERP systems was acquired, at a basic level, from a user perspective in previous jobs held.

System User - A certified accountant, employee of the accounting department, with 15 years of experience within the organization. No previous knowledge on ERP systems, but with a perfect knowledge of the organization’s legacy systems and well-aware of cross-departmental business processes. For the needs of the project, this person was heading the users in the project team, mostly supporting administrative communications between the team and the project manager.
Organization Y

Overview

The company is an electrical energy provider in Cyprus which has been serving the general public for almost 60 years now. Personnel figures rise up to 2100 individuals. It is a semi-government organization, meaning that the State is the only shareholder, but all operations are performed following private company legislation.

Up to the early 2000s its monopolistic state was stable, as the market was closed for any other possible entrants. After the country’s accession to the European Union in 2004, all industries and markets are obliged to follow EU directives and laws, amongst them, legislation which allows free competition in all sectors. As a result of that, the organization is in a deregulation phase and has recognized this transition period as one of the most crucial in the company’s history.

The need for formulating and implementing a strategic development plan was apparent and this is the course of action they’ve taken. The ERP system implementation fits their strategic targets to achieve a strong competitive status and to meet business objectives.

Departmental Structure

The organization is separated into four major sections:

- Generation (power generation)

  Responsible to run the power stations, maintain them and be responsible in meeting Cyprus electric energy demands at the lowest costs.

- Transmission (power transfer)

  Keeps the transmission of the power on-going, at all districts of the island and deals with high voltage lines, substations and energy transformation.

- Distribution (energy provision to customers)

  Responsible for the delivery of electric energy to the actual consumers, domestic and industrial.

- Administration (Personnel/Accounting/Billing/Purchases/Planning/Management/IT)

  Responsible for the management and administration of all departments. They perform all necessary operations for planning, executing and running the company, from personnel matters (HR issues, including payroll) to tender documents preparation, purchasing and payments dealings. One section holds responsibility for customer care and billing which is responsible for the energy meter readings, preparation of bills and the control of several customer service points.
The organization’s management is based on a strict top-down model, reflective of its public sector nature. Cyprus consists of six districts, each with its own branch, equipped to meet the local district’s consumer needs. Common protocols and directives from the central offices are communicated to all district offices which have the responsibility to follow them and run their local operations accordingly. All the organization’s planning and execution policies are always developed from the central offices and then circulated to the districts’ branches as to achieve uniformity in operations and most importantly customer services.

**ERP decision and project team overview**

Primarily in order to stay competitive in an open competition environment and more specifically, to minimize costs, increase customer satisfaction and improve managerial decision making, the Board of Directors decided to lead the company into a new era. Technology utilization was one of the core aspects examined. As a result, the decision for an ERP system implementation was highly reinforced.

Most of the operations of the administration division were linked to the accounting department. Therefore, a core team from the accounting section was formed for the ERP implementation project, with other member-representatives from other interested sections, under the supervision of the IT department. The team prepared the requirement specifications and was involved in mapping and re-designing when necessary the business processes as to have a good understanding of tasks and information flow issues.

The management of the users’ team and the overall project supervision was undertaken by an accounting department representative who had a good understanding of the business functions in all the influenced sections. The IT department undertook the responsibility for all technical matters of the implementation.

The contract for the implementation was signed with a global market leader on ERP systems and the actual project was undertaken by a local company which was an accredited representative. The project took 2,5 years to completion.

The local vendor representative had the project management responsibility and added to the overall project team seven individuals, six ERP professionals and one project assistant. The Big Bang approach was followed, implementing the system in all the organization’s spectrum in one go. On the client’s side the core project team consisted of eight persons from the main offices; the client’s accountant/project supervisor, five users-representatives from the different influenced sections and two IT employees. Four representatives from each of the remaining five district offices concluded the rest of the team.

Because of the homogeneity of the organization in all branches, as directed by the main offices, specifications were developed by the core project team, as well as the business process re-engineering. The rest of the team members from other districts were kept informed during the process, but got totally encompassed in the team at a later stage.
Interviewees

Project Manager (Client) – A chartered accountant, assistant to the head of the accounting department, with 17 years of experience in the organization and with a practical knowledge of the legal framework related to the organization’s business processes. Moreover, this individual has a high level of understanding of all the organizational and departmental layers and the interaction between them. For the needs of the specific project he was acting as a project manager on the client’s side, ensuring the organization’s interests and supporting the vendor project manager throughout the project management process. His knowledge on ERP systems was very general prior to the implementation, limited to their concept and potential benefits for organizations.

Project Manager (Vendor) – A professional with 18 years of experience in public sector software systems implementations. ERP systems implementation experience sums up to 7 years. The project manager has been involved in systems implementation projects in the specific public organization in the past. The individual was involved in the vendor company’s tender document preparation and took over the project management when the contract was signed. Tasks involved all planning and monitoring activities, as well as communication management related to the implementation project. Advised in decision-making by the project supervisor (client’s side) when necessary and reported progress to the CEO of the organization in regular intervals and upon request.

System User – An employee of the organization’s accounting department with 20 years of experience and a great understanding of the overall organizational/departmental structures of the organization. For the needs of this project he was a member of the project team, as a user-representative and was involved in specifications analysis prior the implementation and throughout the project in BPR and training during implementation. No previous experience on ERP systems was acquired before the implementation project.

Organization Z

Overview

Since its foundation and establishment in 1971, the mission of the organization is stated as ‘to promote the art of theatre in Cyprus and to cultivate a sense of theatre among the people, and to promote artistic relations between the theatre world of Cyprus and that of Greece and other countries’. In an identical way the organization’s governing Board of Directors is assigned every three years by the Council of Ministers.

The organization runs four theatrical stages each related to a specific division of theatrical performances:

- Central Stage
- Second Stage
- Children Stage
- Experimental Stage

5 For the sake of anonymity the source is not disclosed here, but can be obtained from the author upon request and approval from the source
In parallel, the company holds responsibility for theatrical development of Cyprus at a wide spectrum which includes amateur, free, student theatre and any other theatrical activities. These are supported through the provision of financial, technical, infrastructure and other kinds of aid.

**Departmental Structure**

<table>
<thead>
<tr>
<th>The organization is divided into three main departments:</th>
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<tbody>
<tr>
<td>• Administration</td>
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<tr>
<td>• Accounting and Warehouses</td>
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<tr>
<td>• Technical and Artistic Staff</td>
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The administrative and technical staffs are a total of 51 employees and 23 actors make up the artistic staff. In parallel the organization employs per play/show actors on temporary contracts at a minimum period of 3 months. Additionally, as needed per play, any extra contributors like directors, musicians, dancers, sound/light technicians etc are brought on board on special limited time contracts.

**ERP decision and project team overview**

The organization has reached an operating status of four stages and with the relevant development efforts needed to manage and support its facilities, activities and personnel the call for an ERP System implementation was taken. In the case of this organization, in contrast with the rest cases, prior to the ERP implementation all business functions were performed manually with the exception of a simple computerized payroll system within the accounting department. The ERP system in this situation served an extra purpose, that of the organization’s computerization.

The project team consisted of four members; the organization’s financial controller and three users. The overall implementation was completed at a time-frame of 9 months following a Big-Bang approach.

**Interviewees**

External Consultant – This individual is a partner of a major consulting firm with 10 years of experience in IT consulting and an overall experience of 8 years in ERP implementations. His involvement has been at the mass majority in big projects in the public sector, both as a consultant and a project manager. In the specific project this person was involved in specifications preparation and facilitation of the tendering process and ultimately the final evaluation of the implementation. At the implementation stage the only involvement was upon request of the client to advice on major issues which would arise.

Chief Accountant – A chartered accountant with 3 years of experience in the accounting and financial auditing field. He was hired in the organization a few months before the ERP implementation began to fill in the gap after the previous financial controller’s retirement. No previous knowledge of ERP systems was acquired and due to the size of the organization a high level of comprehension of the different departments and business functions was obtained. For the specific project this person held responsibility from the client’s side, supporting project management when necessary and heavily involved in business process design.
Project Manager (Vendor) – An IT professional with 28 years in the industry, of which 18 in project management almost exclusively in public sector software implementation projects and 8 in ERP implementations. For the needs of this project the vendor undertook the project management responsibility.

3.8.1. Interview Design

In order to construct a template to keep the interview on the right track the following aspects were considered, from general to more focused ones. The conceptual skeleton is broken down to:

- **Introduction**
  - Introduce the researcher and thank the respondent for participation
  - Ensure a relaxed environment is established and that no distractions will occur for the rest of the interview
  - Define an agenda in terms of time management
  - State the general purpose of the interview and the overall study
  - Inform the interviewee of his/her choice in disclosing or not any identity information and agree upon the decision
  - State the interviewee’s right not to reply to any of the questions and to end the interview if they desire
  - Ask permission to record the interview assuring the confidentiality of its usage if desired

- **First Part (Interviewee’s involvement in the project)**
  - Briefly define the individual’s role in the organization
  - Briefly define the individual’s role and duties in the project
  - Briefly define any relevant experience in ERP implementation projects

- **Second Part (Defining success)**
  - Ask the interviewee to define the success criteria of the ERP implementation
  - If appropriate, discuss each of the four levels of project success for the specific implementation as identified by the researcher in the literature review

- **Third Part (Critical Success Factors)**
  - Ask the interviewee about what factors seemed important and led to the achievement of a successful project outcome
  - Based on the theoretical framework guide discussion around the ten factors

- **Conclusion**
  - Ask the interviewee if there is something he/she would like to add, with a focus on critical success factors
  - Informally state the end of the interview
  - Discuss details of further contact if anything needs to be clarified as well as communication of the study results
  - Repeat what was agreed regarding anonymity/confidentiality/usage purpose of the collected data
  - Thank the interviewee about participation
  - State the formal end of the interview

Originating from this high-level design and through a pilot test (first interview) the formal interview guide was derived as presented in Appendix I.
3.8.2. Interview Process

As shown in table 3.1 the total number of interviewees was nine; three individuals from each of the ERP implementation projects of the three participating organizations. The participants were involved in the projects at different levels of responsibility; including system users, external consultants, project supervisors and project managers.

Due to the late convenience of the respondents to participate in the interviews (i.e. beginning-mid December) and the between them diversity in date availability, the option to perform face-to-face interviews had to be replaced. Due to the strict time limitations as well as financial concerns about travelling to Cyprus the interviews were conducted at their majority through video-conferencing and in two cases by telephone.

In order to set appointments, prior communication via email was established. All the necessary requirements on hardware/software/internet connection were stated and agreed upon as well as the availability of a free telephone line to be used as a backup if any technology failure would occur.

All the participants were Cypriot natives, as well as the thesis’s author. Thus, the formal language used for communication was Greek in all cases. The interviews ranged from 25 to 40 minutes as a result of the flexibility of the semi-structured interview. Some interviewees would elaborate more on something if they felt the need to, while others were less talkative. The interviewer was conscious in maintaining the scope; not allowing the interviewee to deviate from the intended track to irrelevant information as well as directing the focus on specific issues if deemed appropriate. Whenever relevant, the interviewer would explain terminology that the interviewee seemed unaware of, in order to aid the comprehension of the question posed.

3.9. Reliability and Validity

Two dimensions are used to discuss the credibility of the findings of this research, reliability and validity.

Reliability

Case Study

According to Yin (1989) reliability comes from conducting several case studies, served in our case by the multiple-case study approach. What the author proposes, as methods to deal with this aspect, is the development of case study protocols and case study databases. In examining the case study protocol’s development principles the following sections -in a nutshell- are suggested to be covered: overview of the case study including its objectives and appropriate literature, field procedures and the specific questions asked (Yin, 1989, p 70). Since the thesis document itself provides all the relevant information and rationale behind the case studies performed, it is considered to entail the assurance purposes that a case study protocol brings forward.
Interviews

Another important aspect regarding interviews is considered to be the possible bias from the interviewer or respondent. An effort has been made prior to the interviews initiation to deal with the key measures in overcoming bias in qualitative interviews as presented by Saunders *et al.* (2000 p. 252). Among others the main topics considered were:

- The appropriate preparation for the interviews (Try to increase credibility by finding information on the organization. As quoted in Saunders *et al.* (2000 p. 252), Healey and Rawlinson (1994 p.136) state that ‘a well informed interviewer has a basis for assessing the accuracy of some of the information offered’
- The level of information supplied to the interviewee (As discussed above, no explicit information were provided prior the interviews that could lead to predetermination of specific answers)
- Appearance (In all interviews the interviewer adopted a formal appearance)
- Relevant opening comments (As discussed in the conceptual skeleton of the interview)

Construct Validity

The construct validity of the study is linked to the development of adequate operational measures and the objective judgement during data collection. Yin (1989, p. 42), suggests three methods to increase the construct validity:

- ‘Use multiple sources of evidence
- Establish a chain of evidence
- Have the draft case study report reviewed by key informants’

Amongst the six sources of evidence that Yin (1989, p. 85) proposes; only one was used for the purposes of the conducted case studies and that is interviews. A number of informants – total of nine- were interviewed from each of the three projects, from different project roles. The inability to visit the organizations' sites due to geographical, financial and time restrictions prohibited the acquisition of any documents and constrained any possible observation. A number of informants were interviewed from each of the three projects, from different project and organizational roles.

The chain of evidence development was considered and it should be possible to the reader to follow – bi-directionally- a clear trail from the research questions to the study results.

Reviews on key issues regarding the case studies were performed orally with three of the interviewees, one from each organization.
External Validity

Considering external validity, based on Yin (1994), Saunders *et al.* (2000 p. 251) state that ‘qualitative research using semi-structured interviews or in-depth interviews will not be able to be used to make generalisations about the entire population where this is based on a small and unrepresentative number of cases’. In this research, the multiple-case study approach does foster this concept so no claim that the findings can be widely generalized for the specific research setting is made.

Regarding the theoretical framework developed for this research, even though it is based on past elaborated work by several authors, it has been derived by considering only a certain number of articles and it was been narrowed down to a specific number of factors. Thus, theoretical generalization of the findings is further opposed.

On the other hand, the replication logic used in the multiple-case study method, examining findings in three different projects of the same nature, can support a certain level of external validity of corresponding findings, especially where a clear relation with the theory is evident.

Internal Validity

As discussed by Yin (1989) and Saunders *et al.* (2000) the development of a proposition before the data collection process can add benefit to the use of specific analyzing techniques. In our case the proposition developed will support the use of a pattern-matching technique in data analysis. The findings of the study are explained based on the theoretical framework which was developed in the literature review and where a matching pattern emerges the internal validity of the study is enhanced.

3.10. Summary

This chapter’s objective was to inform the reader, in a structured way, about the research methodology chosen and the reasoning behind its development. The research paradigm followed has the realism view and the research approach chosen is the inductive. A qualitative study is decided, through a multiple-case study approach, with the use of semi-structured interviews for data collection. The design and the process for the interview are shown and finally a discussion on the reliability and validity of the results is presented.

As discussed by Yin (1989, p. 29) five elements construct a solid research design for case studies. So far, the first three were addressed; the study’s questions, the proposition, and the unit of analysis. The following chapters deal with the remaining elements which relate to linking the data to the proposition and interpreting the findings. A deductive pattern-matching, qualitative data analysis, supported by the use of the theoretical framework will be applied (Saunders *et al.*, 2000; Yin, 1989).
CHAPTER 4 – ANALYSIS

4.1. Introduction

This chapter includes the collected data from the semi-structured interviews and their analysis in a systematic way, in order to reach to the conclusions of the study.

The deductive approach is followed for data analysis and based on Yin’s (1989) discussion on analytical strategies the use of a theoretical framework to support analysis is adopted. In order to guide the data analysis, the use of the theoretical proposition and the research sub-questions are considered. The general areas that we’re aiming to look at are the success criteria and the critical success factors of ERP implementation projects in the public sector in Cyprus. Based on the literature review these two concepts were targeted at a narrower focus which is examining: whether success criteria stay within or go beyond the “iron triangle” and whether a set of 10 critical success factors as composed from previous researchers’ work is applicable to the Cypriot public sector project environment. This helped earlier to categorize and structure the data collection process and in the same manner it will provide the platform to guide the data analysis.

The skeleton of the analysis is built in the following order:

- Success criteria
- 10 critical success factors from theoretical framework, in turn
  - Top Management Support
  - Project Team Competence / Teamwork
  - Project Management
  - Effective Communication / Interdepartmental Communication
  - Change Management Programme and Culture
  - Business Process Re-Engineering
  - Clear Goals and Objectives
  - Focused Performance Measures / Monitoring, Evaluation
  - Project Champion
  - User Training
- Other critical success factors which may have surfaced

A deductive pattern-matching analytic procedure (Yin, 1989) is applied, since the theoretical framework developed is cross-checked with the empirical data for a possible match. Moreover, if successful, this process can improve the internal validity of the research.

It is appropriate though, to understand the possible vulnerabilities of the theoretical framework utilization approach. As quoted in Saunders et al., (2000, p. 391), Bryman (1988) discusses the possibility of restricting the angle of investigation since a pre-conception might exist when pre-determining a specific theoretical framework and also, the respondents’ practical viewpoints might deviate significantly from it.

Collectively for each category identified above, the research findings from the different cases respondents are presented and a discussion on the results is provided in the next chapter.
4.2. Interviews Findings and Analysis

Considering the order of the interviewees sample in section 3.8 the respondents will be referred to when necessary using the following abbreviations: X1, X2, X3, Y1, Y2, Y3, Z1, Z2, Z3; where X,Y,Z are the organizations’ aliases and numbers denote their respective respondents.

4.2.1. ERP Implementation Project Success Criteria

The completion of the project on the planned time-frame, on budget and satisfying the specifications set at the beginning were mentioned as success criteria by 8 out of 9 respondents. The deviations from a consensus came from two respondents, users from different projects, where X3 and Y3 mentioned that a success criterion was that the users’ expectations were met. In more detail, that the agreed changes in their daily routines were followed as planned with no extra burden and that adequate training and support was provided. Quoting X3 ‘…you might save money, you might get a functional –on your opinion-system up and running, but if the user isn’t satisfied and says so…then you know for a fact you’ve failed…’. Moreover, X3 didn’t mention fulfilling time requirements as a criterion and Y3 discussed that the customer benefits would be a condition for success, upon their satisfaction on better service provision by the organization. As specifically stated by Y3 ‘…also I believe that at the end of the day, all of these are done to provide a better service to the public. Maybe they should be the ones judging if we succeeded, on their terms…’. Five out of nine respondents whose operational duties are performed within the accounting department of their organization appeared to emphasize the need to stay within budget and this fact’s importance to determine project success.

4.2.2. Ten Critical Success Factors

Top Management Support

Top management support was termed as ‘insufficient’ by X1. The commitment level was very low on their behalf since there wasn’t an interest to be informed on the progress of the project. X1 says ‘we were lucky enough not to have any serious problem. I have my doubts if there would be sufficient support to lift obstacles…’. In the specific project setting this was further supported by X2 and X3 as they said that there weren’t any indications of strong interest in the specific project.

Y1 immediately identified top management support as highly important. After the first support gesture which was to give a “Go” decision and invest in the project, during implementation the CEO had arranged regular project briefings to be informed about the project’s progress (Y1). Furthermore, any resources required would be given, although after strong, convincing arguments by the project manager. A highly referenced example was providing the permit and funding for personnel’s geographical movements from different districts to participate in training seminars (Y1, Y2, Y3). Top management was reported as well-aware of the benefits an ERP system would bring to the organization (Y1).
In the case of organization Z all respondents identified the top management as highly supportive. The key people at the top didn’t have any knowledge of ERP systems, but had a broad understanding of its benefits. Throughout the implementation top management attended meetings, requested briefing and showed clearly its excitement and motivation for the ERP adoption. As quoted by Z2, ‘…everyone in the organization was very excited to be a part of this implementation, from the users up to the top management…’. Top management would be around whenever possible; overseeing the implementation, talking to the users and the project manager and even showed an interest in the actual technical functions of the systems (Z1, Z2, Z3). As Z3 said, ‘…it was very interesting to have the CEO around at some of the training sessions…somehow this gave an extra enthusiasm boost…’.

Project Team Competence / Teamwork

In organization X, the project team competence appeared to be optimal. The respondents felt that the best possible individuals were involved. This resulted from X1 comments for the project team members and from X2, X3 about the project manager’s competence and abilities. The project team was cross-functional as it consisted of users from different departments and a project supervisor from the accounting department. Even though the team was located and worked together at the same site, team spirit appeared to be weak and teamwork wasn’t effective. X1 reported tension rising up at different times between the team members, many times resulting from seniority issues. Quoting X1, ‘…things get messed up sometimes…there are young people who because of credentials might be higher in the organization’s hierarchy, than others with many years of experience…this easily sparks up tension and the fight for power usually brings negative results…’. X3 mentioned that the team environment wasn’t highly cooperative even though the best possible team was formed.

In the case of organization Y, this factor was highly addressed by the interviewees as of major importance. The team was cross-functional, as different user-representatives involved, came from four different departments from each of the different district offices. According to Y1, a 75% of the team was highly competent, formed by the best possible individuals. A fact that was mentioned as key for good teamwork and communication was that a specific space was rented to host the project team. That was reported as fuelling team spirit and as Y2 commented ‘…the fact that we were all together made collaboration very easy and decision-making very rapid…’. Moreover, it was discussed that the team members had the freedom to take responsibility on decisions up to a certain level, in this case, adjusting simple functional and cosmetic characteristics of the system.

In organization Z, the specific factor was identified by the respondents immediately when requested from them to state their opinion on CSFs. The ERP implementation was also a first serious effort for full computerization of the organization. Excitement on behalf of the organization was at the highest level and motivation was elevated. The team was cross-functional and competent although no specific experience in ERPs existed. The project team was working at the same location and in terms of teamwork ‘…in my opinion the team collaborated flawlessly…’ as quoted by Z3. Z2 reported that, being new in the organization,
the project gave him the chance to bond with the team’s members at a faster pace than expected if the project didn’t take place.

**Project Management**

As reported by all interviewees in organization X, project management was recognized as highly efficient and critical to the successful outcome. Clear definition of the project needs and the objectives that were to be met was achieved by the project manager as a result of a well-laid out specifications document (X1). The project manager had everyone involved in the project to meet for a project review every week where progress was discussed, problems were resolved and next week’s activities were re-defined if necessary (X1,X2,X3). It was reported that the project manager’s intervention in conflict resolution was significant (X2). When discussing project management user-respondent X3 reports ‘...at any given time I knew the tasks I had to undertake and of which bigger activity they were parts of...that helped a lot’.

Project management in organization Y was stated to be competent and effective although no strong notions on its criticality were presented from the respondents except in the case of Y3 where the project manager’s control abilities were discussed as extremely important to keep everything up and running, not only in following tasks, but also in managing the relationships within the project team. Moreover Y3 discussed the project manager’s good relationship with the top management and the ability to make small changes in human and financial resources planning in order to achieve goals and minimize hold-ups when there was a risk for significant delays.

In the case of Z, the project manager (Z3), from his position didn’t emphasize project management as a critical aspect, although both Z1 and Z2 seemed to have an aligned opinion about how the project manager’s competence in business, technical and project management aspects was vital. The requested actions from the project manager were reported as feasible and with the relevant level of support according to each individual’s level of competence. As Z2 mentioned ‘...I was never asked to perform miracles, all the tasks given to me were comprehensible and realistic...’.

**Effective Communication / Interdepartmental Communication**

In company X, the importance of communication was stressed, especially at the specifications documentation as discussed by X1. It seemed to save a lot of miscommunication delays throughout the project if the users were engaged at that stage, first because they would feel involved and secondly because they would know what to expect and would agree to it prior, with documented evidence. The communication between the project manager and the client’s team (as an entity) reflected the good business relationship achieved (X1,X2,X3). On the other hand, interdepartmental communication was reported by X1 and X2 as poor. ‘...it seemed to be difficult to escape from “I” to “we”...’ as stated by X2. Each person was considering his/her own job in the organization and didn’t worry on how it might influence other departments’ work, which is a core issue in ERP implementation (X1, X2).
In company Y communication was perceived by all respondents as perfect. Y1 states how this level of communication was achieved as a result of a conscious user-centric approach from the beginning when specifications were set. Documentation of specifications and any important decisions during the project was the major tool used (Y1, Y2). The fact that the team was housed in its own office space enhanced communication. Immediate personal communication was present and an open-discussion culture was fostered (Y1, Y2, Y3). The fact that user-representatives were present from different departments that were influenced by the implementation, made communication easy, especially on issues regarding business process re-engineering. Regular meetings in order to discuss progress and share experiences and worries further cultivated interdepartmental communication. As Y1 stated it was also recognized that it was probably a good thing that everyone involved in the project were native Greek speakers, otherwise if the implementation was undertaken by a vendor’s team from abroad –as there was a competitive tender from Germany- perhaps communication at the local business and technical terminology would have been slower, if not distorted.

In company Z, communication was reported as exceptional. As Z3 stated, the small size of the team further eased that. The team members were representing different sections thus interdepartmental communication was ensured. The team was getting clear guidance on their tasks and most importantly at a business language they could understand and not in-depth technical terminology. As Z3 stated, ‘...it is very important to speak to the users at a language they can understand when defining jobs for them to do...I’ve seen projects significantly delayed because ERP specialists would be more on the technical side of things and users couldn’t catch up...’. Weekly reviews were always held to catch up on each other’s progress and most importantly document important decisions upon agreement (Z2, Z3).

Change Management Programme and Culture

In the case of company X, dealing with change was admitted to be a tough task. As the project manager (X1) said, this was a common phenomenon in his public sector ERP implementations experience. In the specific case, everything was ran pretty much in the same way for more than 40 years and the nature of tasks and jobs was so deeply rooted into people’s minds. People tended to try and achieve the least possible change in their respective job, without much consideration of the overall picture (X1, X2). A change programme was planned but its implementation was more difficult than what was initially thought of. A conscious effort for a smooth transition to the new system was put in place but the users’ resistance to it was significantly strong. X1 and X2 discussed that even though many difficulties occurred, if it wasn’t for this hard effort to train and bring the users close to the ERP system, a major negative impact to the implementation would be round the corner. Conflicting views in the interviews appear when X1 and X2 discussed about the change management programme and its help in keeping the implementation plan on track, X3 mentioned that no great effect came out of that programme. The user said that perhaps more time should be given in order to explain all future changes in the organization prior the start of the implementation.
In the case of Y it was perceived that the standalone user training programme was sufficient to cover the same needs a full change programme does. And indeed defence and resistance to change appeared to be minimal as reported by all interviewees. Having the users involved themselves when defining changes in the organization’s processes was a fact that eliminated in a sense any doubts from them in the long-run (Y1, Y2, Y3). As discussed by Y3, there was significant time spent for the users to understand changes, why those changes are made and define the new way of doing things. Especially interdepartmental testing scenarios helped users experience the changes, become familiar with them and wherever possible suggest adjustments to better the process (Y1, Y2, Y3). A minor drawback which was agreed amongst the interviewees that it was handled in the best possible way was that the “super-users” (internal terminology for users involved in the project team) got adequate training for around 2 years and the low-level users back to the district and main offices weren’t the same proficient. The best tactic which was utilized was to keep the super-users themselves to train the other users in their respective bases, since it was generally admitted (Y1,Y2,Y3) that employees would easier accept one of their own explaining things for them, rather than an external to the organization person. There was a discrete supervision from the vendor though throughout the process and when serious problems would appear, there was interference to resolve them.

In the case of Z, zero resistance to change was reported as a result of a change management programme which began from the early specifications collection stage. Except functional specifications of the system, the changes in organizational processes, BPR and a detailed training scheme were documented at the time with contribution from future users of the system. Furthermore, there was a ‘...genuine thirst for people to get something new into the organization...’ (Z1). As reported by all interviewees the fact that the transition would be from manual processes to the ERP solution and not from deeply-rooted in the organization legacy systems gave an extra reason to be flexible and desire the new changes. The idea of computerization in general and not only the ERP system in specific was a boost for the organization’s spirit and acceptance to change. It was reported that this welcoming attitude from the organization was fundamental for the successful implementation (Z1,Z2,Z3).

*Business Process Re-Engineering (BPR)*

In organization X, BPR was not addressed at specifications time, thus the process of defining BPR began right after contracts were signed and the implementation project started. Since the powerful resistance to change this appeared to be something that would put the project into a serious risk. It’s relevant to state that BPR was expected to be extremely challenging since around 65% of the employees were more than 55 years old and have been performing their respective processes in the same way for almost most of their professional lives, but at the same time early planning didn’t take place. It was stated by all respondents that BPR was undertaken by the vendor because of good business relationships and his own desire to complete not just a functional system, but an efficient one. In any other case, significant extra costs would be unavoidable, especially considering that the final customization of the client to tune up to the system was approximately at 70%. The consultant’s study prior the implementation clearly indicated that business processes were performed twice and
sometimes even more than three times in different departments. This duplication effects were more visible in purchasing procedures. It was a common admittance that because of the vendor’s and project manager’s experiences BPR was well-defined and managed along the way. At the same time it was identified that this neglect in BPR definition would have risked the project’s completion, but luckily it was managed throughout the project in an effective way.

In the case of Y, a major problem reported by all was that BPR wasn’t defined from the organization at the specifications stage in order to both, get the users involved early and to save time in the implementation phase. A major delay in the project resulted from this fact as reported by all respondents. The insufficient involvement of this factor at the very beginning as reported from Y1 had a negative impact; in order to balance the extra costs and delay that the late BPR involvement would bring, less customization took place, at an approximate 50%-50% share (between organization processes and ERP system modifications), instead of a targeted 85%-15%. The negative impact of poor BPR from the very beginning was apparent to the project team, especially at the project manager and supervisor’s views.

In the case of Z, BPR was reported as a critical success factor by all respondents. Again, based on the fact that the specifications document was rich and enclosed clear BPR and in many cases because of the transition from manual to computerized working environment actual business process designs from scratch. The high motivation of people and their satisfaction being involved in BPR, led to the users ownership of the project and to a clear view of all re-engineering needed for all the team members and end users. Even with a maximum “tuning” of the organization’s processes to integrate with the ERP system in the specific case, the pre-defined BPR was mentioned by all respondents as a major influence to the project’s success.

Clear Goals and Objectives

Organization X’s respondents fluctuated a bit in their responses. They all admitted to have set and understood a clear vision for the implementation, the benefits of the system and an overall goal to achieve. On the other hand in discussing specific objectives for different individuals, X1 and X2 mentioned that this was communicated to the team members and users on Friday weekly meetings. The two reported that at the beginning because of the lack of BPR planning and strong resistance to change, it was difficult at a more detailed level to gain the interest of the users, empower them and present to them their several objectives. X1 reported ‘...it is I believe a characteristic of the public sector...people get a general idea of what we’re trying to achieve here, but it’s always challenging - to say the least - to earn their interest and their attention beyond their operational tasks and get them to listen and absorb what the objectives for the project are and how they can support them...’. This was supported by user X3 when discussing that objectives weren’t as clear as the big picture was.

In the case of Y, the respondents all agreed on a clearly defined set of goals and objectives. It was stated by all that the feasibility of the goals was an important aspect. As Y2 said ‘...I strongly believe that everyone knew what the purpose of each task was and which goal it was
serving…’. The regular meetings would support the overall vision and keep the defined goals fading away from people’s minds. It was well embedded in people’s minds that they would also be the ones benefiting from a successful implementation.

Organization Z respondents shared a common view on this aspect. Everyone was well-aware of a clear vision from the very beginning, from specifications collection time. What was stated as important was that the organization’s people were involved in shaping this vision and setting goals for the implementation, so their possible distortion remained undisturbed. The fact of having these documented was emphasized by Z1 and Z3.

Focused Performance Measures / Monitoring, Evaluation

Collectively, considering respondents from all three projects, insufficient discussion about performance measurement was a general phenomenon. Simple control tools –especially financial- were used just to monitor progress and simply to follow-up the project plan and run the daily activities. Nothing was stated to indicate focused performance measurement by any of the respondents.

Project Champion

Organization X respondents discussed about a project champion, who was a user, member of the project team with an aptitude for technology and sufficient knowledge of the different departments and their interaction at the business process level. This individual’s contribution in pushing the project ahead was discussed by all interviewees. As X2 stated ‘…this person’s contribution was important, without her knowing…the fact that she could just get people back to their chair when they felt they couldn’t handle more and get them trying again, willingly, was remarkable…it was a shame that she had to re-locate and left half way through the project…she would have kept her peers more encouraged and involved…’.

In the case of organization Y, it was perceived that the selected “super-users”, representatives of the district and main offices were selected based on these characteristics and that they were acting as project champions for their respective bases. As Y2 discussed, with the help of Y1 who held a senior position within the organization a careful selection was made to acquire the best possible users to join the team and the sub-teams (based on districts) to be headed by project champions. These individuals appeared to have supported their teams in training and motivated the rest of the users upon returning back to their original posts. The respondents felt that many minor delays and obstacles, especially during training were eliminated because of those individuals’ contributions.

The same was the case in organization Z, although respondents in this case, again over-emphasized the fact that everyone was motivated by them selves to work on the project, on something new, thus as Z2 stated ‘…I don’t feel any specific person appeared to champion the project…but on second thought…maybe we all did!’
User Training

In the case of organization X, all respondents immediately identified user training as the most vital factor. All interviewees agreed that even with insufficient BPR planning and strong resistance to change, the persistence in delivering the best possible education and training was critical to the successful implementation. As X3 stated, at the users’ level, there were people who needed to brush up basic computer skills, before moving on to the ERP system’s use. These people were supported through practical seminars, to develop their skills. It was discussed by both X1 and X2 that the training plan was effective, but definitely if implemented at an earlier stage the project would benefit more in terms of time and change management.

In organization Y, from all interviewees the project’s success was primarily credited to a carefully designed and implemented user training scheme. The “users-train-the-users” approach gave benefits, since the users back to the district offices would accept “tuition” better from their peers and also it saved a lot of investment in both financial and human resources terms to get all the possible users trained in the same elaborated manner as the “super-users”. Another initiative of the training programme which was considered as critical by all respondents was the involvement of the “super-users” in BPR and most importantly their deep involvement in developing the user manuals which were distributed to all office locations. Another part of the scheme which all respondents discussed as of adding value and supporting the successful implementation was a detailed scenarios testing, involving users interdepartmentally, in order to see how each task is processed and influence each other’s work and also to adjust any possible flaws.

Organization Z’s interviewees, similarly with the rest of the cases, identified user training as a crucial aspect of the implementation. It was clear that there were several issues that should be addressed during training. Some computer literacy matters were tackled for a certain portion of the users through a short series of seminars. Through the constant vendor’s support, training seminars based on real work scenarios were held by the actual users, to detect weaknesses and address specific problems with further education. All respondents discussed that because of the organization’s prior manual business process state, there was an even higher level of awareness by the vendor and the client’s project manager in order to expect the amount of training required and plan accordingly.
4.2.3. Critical Success Factors outside the Framework

During the interviews, the interviewees were first asked to identify critical success factors which led to successful ERP implementations in their respective projects, before revolving the discussion around the ten critical success factors identified in the theoretical framework. In the majority of the responses, the CSFs identified were part of the theoretical framework, with a few exceptions which are discussed below.

Vendor - Client Partnership

In organization X, the contribution of the vendor was recognized and specifically stated by the interviewees. In the specific case, the established healthy business relationship with the vendor resulted to effective communication between the vendor, the project manager and the project team. It was mentioned that this triad had established an open dialogue for addressing all issues and the vendor’s good will also saved the project from serious financial and delay related trouble when putting extra work and effort than the contract stated in BPR.

Careful Package Solution

In the case of organization Z, it was stated by Z1 and Z2 that the ERP package selected proved to be advantageous since it was provided from a local vendor, who has developed an ERP system tailored to the Cypriot public sector, incorporating many of the government parameters related to legal, taxation, financial issues. It was reported that less parameterization was needed which maybe wouldn’t be the case if an external ERP provider was chosen. The package seemed to fit the organization’s needs at a high level and well considerate of the public services business processes and needs.

External Consultant

In organization X there was the statement that the presence of an external consultant in project management was extremely critical, especially in the specific public sector environment. Conflicts tended to rise up easily between the organization’s employees. By having an external consultant taking over project management, there was a feeling that everyone was equal to the project manager’s eyes, since as an external person to the organization he would be unbiased towards people and act solely on professional practices and instinct (X2, X3).
CHAPTER 5 – DISCUSSION

In the previous chapter the research findings from the semi-structured interviews were presented based on three key sections. Using the same division, a discussion on the findings is structured and presented in this section.

5.1. ERP Implementation Project Success Criteria

When asked to define their respective project success criteria, the mass majority of the respondents evolved their discussion around the “iron triangle” as discussed by Atkinson (1999). The functionality of the system according to specifications was the top priority and the top criterion to assess success. Staying within budget appeared to be significant for all respondents and significantly stressed by those whose jobs in the public organizations were in accounting departments. It was mentioned by the majority of the respondents that because public sector project details are transparent, since the state has to keep citizens informed on government spending, there is a lot of importance given to restrict projects from going financially overboard. The final “iron triangle” vertex, time, was mentioned by all respondents, but the team members at the user level, appeared to be less worried about completing the project on time, and in two cases emphasized issues related to Dalcher’s (2008) second level of project success, meeting stakeholders expectations, in terms of providing a better service to customers and having an ERP system which makes the users’ life easier.

5.2. Ten Critical Success Factors

Top Management Support

Top management support was identified as a CSF prior to the discussion on the framework by the majority of the respondents especially those at the project management level. It appears that the lack of top management support in one of the cases was creating a feeling of insecurity to the project team and in the other two cases the strong commitment by the top management appeared to bring benefits in terms of motivation and in terms of resources provision to support the project.

Project Team Competence / Teamwork

In the same manner the competence of the project team and the effective teamwork between the team members was identified as critical prior to the framework’s discussion. The project teams were overall rated high in terms of technical and business processes knowledge and appeared to have been selected with care to get the right mixture of people involved. One important aspect was that the teams were cross-functional, incorporating people from different departments and sections of the organizations. The fact that the project teams were working in a specific allocated area was highlighted as a reason to spark teamwork and establish good working relations amongst people. In the case where teamwork wasn’t effective significant time was spent to increase collaboration and on conflict resolution.
Project Management

In several parts of their discussion all respondents discussed benefits from effective project management, in both hard and soft aspects. The ability of the project manager to influence top management, the conflict resolution skills, the clear definition of goals and proper scheduling were reported as saving the project from delays and as an expansion from extra costs. Project manager interviewees didn’t discuss extensively about their competences but their contribution was identified and discussed in more detail by respondents at different levels.

Effective Communication / Interdepartmental Communication

The importance of interdepartmental communication was highly stressed by individuals and the need to have cross-functional teams and getting people to understand how changes influence each other’s work was considered to be beneficial and time-saving in the long-run. Effective communication between individuals in the project and ways to achieve it were highlighted and its benefits in terms of saving time appear to be significant.

Change Management Programme and Culture

Having a change management programme with a core axis user training and education was discussed and emphasis went to the fact that this is a process that should defined and start from the very early stages of a project, as it resulted through the interviews best at specifications/requirements collection and documentation. The most powerful drawback in one of the cases appeared to be resistance to change, causing several delays. In the cases where a change management programme was planned and implemented successfully the benefits in minimizing resistance were apparent and supportive of meeting the project plan’s goals.

Business Process Re-Engineering (BPR)

The outcome of the interviews, showed significant risks when BPR wasn’t planned and addressed early in project planning, even at specifications collection. In the case where BPR was utilized early with the help of the users, the process ran smoothly in contrast with the cases where it wasn’t planned early. This could jeopardize important goals, as the share of customization between the organization’s processes and the ERP system and at the same time create the need for more resources.

Clear Goals and Objectives

The definition and communication of clear goals and objectives was important in the implementation projects since where the message wasn’t reaching the users clearly, resistance to change was strengthened causing delays and discomfort and where the goals were communicated clearly and most importantly were feasible, people had a clear idea of where they’re heading with each performed. The general concept that the users are highly benefited from the ERP system was a key point to put across.
Focused Performance Measures / Monitoring, Evaluation

This aspect wasn’t discussed extensively by the respondents. Their answers indicated that focused performance measurement wasn’t carried out. Basic evaluation of the implementation at the end of the projects and basic financial assessments for budget control were the only methods used. Although its possible benefits weren’t negated by the interviewees, this factor wasn’t considered crucial for a successful implementation.

Project Champion

The benefits of project champions seem to be in agreement in all cases. The motivating spirit of the project champions appeared to be significant especially at the user involvement in training sessions and overall seemed to have saved the projects from delays and from highly resistant and unwilling users.

User Training

This factor was quoted as critical by respondents. As the ERP system’s full benefits and functionality can be achieved by skilled users, this appears to be the most significant aspect of the implementation and lots of effort and resources were spent to efficiently plan and ran training. In cases where early work wasn’t done in BPR and change management, time defects from them would be compensated by an extra effort during training. The high involvement of users in the process appeared only to bring gain. Also, it was noted that in the case of the public sector, training by peers can be more effective in terms of learning attention and than if conducted exclusively by external to the organization professionals.

5.3. Critical Success Factors outside the Framework

Vendor – Client Partnership

The good relationship between client-vendor can increase their ownership of the project and result to faster troubleshooting. In a specific case it was stated that due to the vendor’s honest will to support the project maybe was the safety net that rescued the project management failure.

Careful Package Solution

The ERP package selection was reported as beneficial in terms of less parameterization and quicker familiarization in one of the cases since it was specifically designed for the needs of the Cypriot public sector organizations.

External Consultant

In one of the cases the use of an external consultant in project management appeared to be advantageous in terms of making the employees feel equally treated, rather than having someone from the organization in that position and at the same time bringing in the know-how on ERP implementations which is absent from the organization itself.
CHAPTER 6 - CONCLUSION

6.1. Introduction

Considering the growth of the global IT industry and more specifically the wide adoption of ERP systems to satisfy constantly evolving company needs and to give a significant boost to organizations in today’s ever-changing and fiercely competitive business environment, this study concentrated a general focus on ERP systems implementations. In more depth, many ERP implementations in the past years have been coined as failures and opened a new chapter in ERP implementations research, that of critical success factors.

The overall aim of this research study was to address the topic of critical success factors in ERP systems implementations in the Cypriot public sector. Since Cyprus accession in the EU and the growing opportunities to invest in projects which require a considerable amount of financial and human resources, the local market for ERP systems has become more attractive for both vendors and customers.

The Cypriot public sector in an effort to harmonize completely with EU directives and to provide the best possible services to citizens through transparent procedures has been investing in different projects, amongst them new technologies and IT systems. A growing tendency is to invest in ERP implementations which if rolled out successfully, can support the significant development of the public organizations in both business and strategic terms.

A literature review helped to deepen our knowledge on ERP implementation projects success and the research done in critical success factors. The research question was derived and in order to better tackle it, it was broken down to two subparts. A qualitative approach was followed for data collection and analysis, served by a multiple-case study strategy. Three Cypriot public organizations which had successful ERP implementations within the past five years were approached and their projects became sources for data collection through semi-structured interviews.

The results of the study are presented in the following sections, with implications for practitioners and the academia, a statement of the study’s strengths and weaknesses and finally some recommendations for future research.
6.2. Answering the Research Question

“What are the critical success factors in ERP systems implementation projects in the public sector in Cyprus?”

Using the sub-questions developed, the following conclusions have been drawn.

- Are ERP implementations in the Cypriot public sector considered as successful based on success criteria solely related to the “iron triangle” (i.e. cost, quality, time)?

By analyzing the research findings it has become apparent that ERP implementation success is evaluated by using the “iron triangle” criteria. The formal criteria which allowed project officials to name the project a success were exclusively based on Dalcher’s (2008) level I which reflects Atkinson’s (1999) “iron triangle”. To be exact, these criteria provide an incomplete picture on success since they are used to estimate only the project management success of the project and neglect other important criteria such as stakeholder expectations, business value creation and future potential. The primary criterion appears to achieving a functional and on specifications system implementation. Secondly, the satisfaction of the set budget seems to be the second important criterion, since the public organization’s risk of exposure when publicizing negative results to the citizens can be high. Finally, meeting the planned time-frame was considered as a criterion to pinpoint success.

- Are the identified critical success factors from the literature review crucial for the successful rollout of an ERP implementation project in the public sector in Cyprus?

This sub-question refers to the theoretical proposition developed in the literature review. By examining the literature and previous work on CSFs a theoretical framework was developed, a list of 10 CSFs, whose applicability in the Cypriot public context was examined through data collection and analysis.

The set of critical success factors was confirmed as important for a successful implementation with a small deviation. The only factor which appeared to have no impact in the successful implementation was the utilization of focused performance measurement. In none of the cases it appeared that this process was critical and no negative impact has been shown by its absence.

Furthermore, three other factors were deemed as critical in the study, but for each of the factors only a specific case provides data to support it and there is no consensus from all three studies. These factors are: vendor-client partnership, careful ERP package selection and the use of an external consultant.
6.3. Theoretical Implications

As discussed in the introduction and as it was shown through the literature review, there isn’t a research stream on ERP implementations for the case of Cyprus. Especially for the case of the public sector it can be stated through the specific databases used for this research project that no published article or book was retrieved. This research aims to provide a small first step in order to expand the existent research on ERP implementation projects to include the Cypriot context.

The research revealed that in principle, international theoretical work on ERP implementations critical success factors can be fitted into the Cypriot context. Beyond the ten critical success factors that were discussed also the three CSFs that surfaced through the case studies, were factors that have been discussed in the international literature, but simply weren’t included in the theoretical framework.

This project suggests that a possible approach to expand research on the specific topic would be to put existing theory into the test and according to applicability and with the support of other studies of interpretive character complete a better picture and expand the limited existing knowledge and theory on Cypriot public sector ERP implementations.

6.4. Practical Implications

The study’s results can provide useful insights to practitioners involved in ERP implementations in the Cypriot public sector. Key issues as resulted by this research which should be addressed in this type of projects are presented below.

- Project success criteria should not only be at the project management level and include time, cost and quality but also include criteria as the achievement of objectives and stakeholder benefits, business value creation and delivery and future potential in new opportunities and competences.
- A user-focused change management programme should be defined and implemented since the very beginning of the project. BPR should be defined and planned as early as possible and involve the users to achieve its optimum results.
- User training is critical to success and must be given a serious investment in planning and implementing it. The “users-train-the-users” technique can be very effective especially in cases where the organization is large and geographically dispersed. The “super-users” ideally should have project champion characteristics. Furthermore getting the users involved in real-life scenario training and empowering them to be involved in suggesting adjustments can be beneficial.
- Bringing together a highly competent, cross-functional team for the project within the same area, increases communication, supports faster decision-making and rapid troubleshooting.
- Acquiring the top management’s support for the project from the very beginning and making an effort to keep them informed and raise their interest and commitment in the project is proven to be critical. It can save the project from a lot of trouble when necessary, lift obstacles and raise the general motivation in the organization.
• As a project manager, clearly defining and communicating the project plan, vision, goals and objectives can bring significant gain. Most importantly, the project manager should manage relationships effectively, and set feasible understandable tasks and goals for individuals and teams. Also, the project manager should be ready to face possible conflict interdepartmentally when users fail to understand impact on each other’s processes with the new rules of the game and try to protect their interest and achieve less change at a personal level.

6.5. Strengths and Weaknesses

This research study was based on a literature review to build a good theoretical background on the related issues. The author’s practical involvement in ERP implementations supported the understanding of related terminology and overall the better comprehension of the theory.

Although through the elaborated work of researchers a theoretical framework was developed as a proposition and as a basis for data collection and analysis it was based only on the use of seven highly referenced articles on ERP implementations CSFs and a limit was given for the factors which were referenced in four and more articles to join the developed list. A more inclusive framework could have been developed, but the significant time-constraint to complete the thesis prohibited that since the data collection and analysis would have been impossible at such a large extent.

The case studies could have incorporated additional data collection tools to provide a richer data-set to analyze, cross-reference and provide results of higher validity. Again, the geographical, financial and time constraints made it difficult to do so and a decision was made to use only the semi-structured interviews tool. Regarding the interviews, the fact that they were performed via video-conferencing and telephone perhaps had an impact on the data collected since face-to-face communication would provide the ability to better observe reactions and more importantly to achieve a better interviewer-interviewee relationship. The fact that the interviews were conducted exclusively in the Greek language conceals possible data quality issues since everything was translated in English by the author and perhaps the most accurate terms weren’t used effectively.

The fact that projects of the exact type were used to collect data for analysis was important, but a small drawback was the overall consideration of project team members from different levels to participate in the interviews. Perhaps it would have been more focused and more valuable to considerate a specific category of respondents and explore the research question from a specific stakeholder’s viewpoint.
6.6. Future Research Suggestions

A suggestion would have been to expand the present study, in terms of the data collection and analysis on case studies. The study could be further developed to incorporate data from different sources: further interviews, questionnaire, surveys and project documentation. This could provide this research with stronger supported statements and further validated results.

As discussed in the literature review, a great issue regarded in ERP implementations when discussing critical success factors, is the applicability and impact of them in different stages of the ERP project lifecycle and also different viewpoints from stakeholders involved. The suggested research question from this study could be further developed to include different stakeholders’ perspectives and different lifecycle phases. That would provide a narrower focus and would address more specific audiences in both the academic and practitioners’ world.

It has been said by Sophocles that ‘success is dependent on effort’, so it’s up to us, the researchers and aspiring professionals, to keep investigating, challenging and working hard towards finding the right answers.
REFERENCES


APPENDIX I – INTERVIEW QUESTIONNAIRE GUIDE

❖ Introduction
  ➢ Introduce the researcher and thank the respondent for participation
  ➢ Ensure a relaxed environment is established and that no distractions will occur for the rest of the interview
  ➢ Define an agenda in terms of time management
  ➢ State the general purpose of the interview and the overall study
  ➢ Inform the interviewee of his/her choice in disclosing or not any identity information and agree upon the decision
  ➢ State the interviewee’s right not to reply to any of the questions and to end the interview if they desire
  ➢ Ask permission to record the interview assuring the confidentiality of its usage if desired

❖ First Part (Interviewee’s involvement in the project)
  ➢ Can you please give a brief overview of your business background?
  ➢ Can you please give a short description of your position and duties in the organization?
  ➢ Can you please state your experience with ERP systems and with ERP implementation projects in specific?
  ➢ Can you please discuss what your position of responsibility in the project was and what your tasks involved?

❖ Second Part (Defining success)
  ➢ Your organization’s official statement on the project described it as successful. Could you discuss on which criteria a successful implementation is evaluated?
  ➢ (If appropriate, further revolve discussion around Dalcher’s four levels of success)

❖ Third Part (Critical Success Factors)
  ➢ Based on your personal opinion, which were the factors that were critical to the project’s success?
  ➢ (based on the theoretical framework guide discussion around the ten factors)

❖ Conclusion
  ➢ Ask the interviewee if there is something he/she would like to add, with a focus on critical success factors
  ➢ Informally state the end of the interview
  ➢ Discuss details of further contact if anything needs to be clarified as well as communication of the study results
  ➢ Repeat what was agreed regarding anonymity/confidentiality/usage purpose of the collected data
  ➢ Thank the interviewee about participation
  ➢ State the formal end of the interview