Justifying an ERP Investment: Critical Success Factors for Transformation Investments

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Justifying an ERP Investment: Critical Success Factors for Transformation Investments

Justification des Investissements en PGI: Facteurs de Succès pour les investissements transformationnels

Completed Research Paper

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Abstract

Enterprise Resource Planning (ERP) projects often lead to disappointing outcomes, even downright failures, which is not in keeping with the vast investments they require. It is argued in this paper that a lack of managerial focus on the Critical Success Factors (CSFs) for ERP implementation at the outset of their project (however well captured they have been in the literature to date) is the root cause of organisations not achieving the expected outcomes from their Transformation investment. This paper examines the ERP project implementations of four organisations where data and observations were collected over a two year period. From this rich body of empirical evidence, we propose to contribute to our collective understanding of the CSFs for ERP implementation that play a key role in ensuring that investments in ERP packages (Transformation investments) have a greater likelihood of producing desired project outcomes. This research paper also contributes to increasing the perceived usefulness of CSFs to managers and practitioners and illustrates the fact that organisations should undertake self-assessment exercises to improve their preparations for ERP project implementations.

Keywords: Transformation Investments, ERP projects, CSFs, Case Studies, Theory Building

Résumé

Les Investissements en Progiciels de Gestion Intégrés (PGI) ont souvent des résultats mitigés, voire désastreux. Cet article montre que le manque d’attention des managers aux facteurs de succès spécifiques de ce type de projets explique en grande partie pourquoi les entreprises n’obtiennent pas les effets transformationnels recherchés. Sur la base de quatre études de cas, nous proposons une théorie qui explique les relations entre les facteurs de succès identifiés et les résultats des projets PGI.

Introduction

ERP packages are positioned as one of the most sought after means of organisational transformation and IT innovation since the mid 1990s and form the cornerstone of IS for an ever increasing percentage of organisations (Holland & Light, 2001; Swanson & Ramiller, 2004; Sharif et al., 2005; El Amrani et al., 2006). Investing in an
ERP package has been characterised as a Transformation investment (Ross & Beath, 2002), which requires managers to understand the importance of changes to the business in order to achieve the expected benefits from the project (Murphy & Simon, 2002; Ross & Beath, 2002). Paradoxically, while investments in ERP packages are amongst the most significant an organisation will ever have to engage in; the realities of ERP implementation are not fully understood by managers (Olsen & Saetre, 2007) and the benefits expected at the outset of the project are not always a realistic feature of actual project outcomes (Chen, 2001; James & Wolf, 2000; Murphy & Simon, 2002; Shang & Seddon, 2002; Law & Ngai, 2007). All too often organisations fail to prepare appropriately for an ERP project implementation, which has been referred to as mindlessness by Swanson & Ramiller (2004), and as a result invest in what is essentially an IT initiative as opposed to a business change project (Wood & Caldas, 2001; Murphy & Simon, 2002; Ross & Beath, 2002). It is argued in this paper that a lack of managerial focus on the CSFs for ERP implementation at the outset of a project is the root cause of organisations not achieving their expected benefits from their ERP-based Transformation investments.

The objective of this research is to identify the CSFs for ERP implementation that can be used by managerial decision-makers to improve the likelihood that their ERP-based Transformation investments produce outcomes in-line with organisational expectations. To meet this objective four cases of ERP implementation are studied. A series of CSFs for ERP implementation are analysed across the cases to provide an insight into the presence or absence of these CSFs at the outset of the project and the impact on project outcomes. The remainder of this paper is structured as follows. The next section presents ERP projects as Transformation investments followed by an analysis of the CSFs for ERP implementation. Following this, the research method followed in our study is then presented followed by a presentation of the findings of the research in the four organisations studied. Finally, we propose a CSF-based recipe to achieve Transformation investment outcomes in the case of ERP projects and the conclusions and implications of the research are discussed.

Theoretical Grounding

It is extremely difficult to estimate all the costs and to assess all the benefits, in particular intangibles (Murphy and Simon, 2002; Sumner, 2005), at the outset of an ERP project (Stefanou, 2000; Teltumbde, 2000). This assessment exercise is often referred to as making the ‘business case’ for the project implementation (Sumner, 2005). Thus, an alternative means of assessment to making this ‘business case’ is needed in order to provide managerial decision-makers with the ability to evaluate their preparations for their ERP implementation at the outset of the project in order to ensure that the outcomes expected from the project investment can be achieved; therefore, moving away from a pure costs and benefits mindset. As a result, this paper focuses on analysing the presence or absence of CSFs for ERP implementation as an alternative means of assessment.

ERP as Transformation Investments

Although there is no agreed upon definition for ERP systems, they are characterised as integrated, all-encompassing, complex mega-packages designed to support the key functional areas of an organisation (Gable et al., 1997; Markus and Tanis, 2000). It is this all-encompassing nature and high degree of business integration which distinguishes ERP packages from other technologies or systems (El Amrani et al., 2006; Law & Ngai, 2007) and leads us to consider ERP project investments as inherently different in terms of difficulty and success factors.

An ERP project is essentially a business change project as opposed to an IT initiative and can be classified as a Transformation investment (Ross & Beath, 2002). A Transformation investment is perceived as a strategic decision as opposed to a cost justified business decision and “transformational investments are necessary when an organisation’s core infrastructure limits its ability to develop applications critical to long-term success” (Ross & Beath, 2002 p.53). However, what is critical to understand is that this infrastructure must be aligned with the requirements and directions of the organisation’s changing business model, therefore, ensuring that the long-term vision of top managers is supported by the implemented ERP system. As a result, for an ERP investment to be considered a true Transformation investment and to achieve the expected benefits, the importance of changes to the business processes supporting the business model needs to be fully understood from the outset (Murphy & Simon, 2002; Ross & Beath, 2002; Law & Ngai, 2007) along with the realisation that payoffs are not easily or quickly achieved (Ross & Beath, 2002; Gargeya & Brady, 2005). Furthermore, “transformation investments demand significant senior management commitment to invest funds, guide implementation and process change, and steer the organisation toward opportunities to leverage the investments” (Ross & Beath, 2002; p.57). These characterisations
of Transformation investments allow us to note that, based on the many reported cases of ERP implementations, investments in ERP projects are often unrealistic and lack credibility, in terms of what can be achieved in reality based on the means applied by the organisation, and what is actually expected from the initiative. Thus, it is necessary to establish what actions should be taken by managers to ensure that ERP investments turn out to be transformational in terms of their impact, so as to make sense of the low levels of satisfaction that are reported by organisations post ERP implementation (Law & Ngai, 2007).

Prima facia, we can hypothesise that if managers and organisational personnel’s expectation of the extent of the change needed is lacking, then ‘desired’ Transformation investments may only produce outcomes characteristic of Renewal investments, which is simply an investment to replace existing systems without embracing cultural and procedural changes (Sammon & Adam, 2007). According to Ross & Beath (2002, p.55) “renewal investments replace old shared technologies with newer, more powerful or more cost effective ones. Renewal may foster process improvement, but that is not its primary objective”. Therefore, this mismatch between the ambitious ‘desired’ goals and the means applied and the resulting ‘actual’ outcomes of an ERP investment will lead to underperforming implementations of ERP which don’t deliver value-for-money investments. The value of Renewal initiatives does not depend on making business process changes and the initiatives are often the responsibility of IT. As a result, if ERP projects are considered huge organisational undertakings (Transformation investments introducing business change), coupled with a potentially high risk of project failure, it should be imperative that proper evaluation be undertaken so that these projects don’t get treated as simple IT projects (Teltumbde, 2000; Murphy & Simon, 2002).

Evaluating ERP Investments

Over the past fifteen years, ‘a tidal wave of IT-enabled initiatives’ has elevated the importance of investing strategically in IT (Ross & Beath, 2002). Numerous reports have highlighted that ERP projects have occupied a dominant space in IT investment throughout this period, however paradoxically; researchers have noted a deteriorating trend of evaluation of these investments (Stefanou, 2000; Teltumbde, 2000; Chen, 2001; Murphy & Simon, 2002; Ross & Beath, 2002; Summer, 2000; 2005). In fact, ERP investments are often made on faith and not on good judgment; this observation is further corroborated by many studies, both in relation to ERP and the broader IS community (Hochstrasser & Griffiths, 1991; Willcocks, 1992; 1996; Ballantine et al., 1996; Wagle, 1998; Bannister & Remenyi, 2000; Swanson & Ramiller, 2004). This is not a new argument in the IS field, where the evaluation of IT investments in general is regarded as unsatisfactory (Strassmann, 1997) or patchy (Willcocks & Lester, 1997). The predominant reason for this state of evaluation of IT investments is that organisations find it very difficult to perform such evaluations (Wilson, 1991; Ballantine et al., 1996; Changchit et al., 1998; Ward & Peppard, 2002; Murphy & Simon, 2002), which it can be argued, is related to the lack of suitable investment appraisal methodologies for this type of strategic investment (Counihan et al., 2002).

Analysing the discourse of participants within the ERP Community, notably vendors and consultants, but also managers who look towards ERP as the solution to all their problems, all too often reveals unrealistic and unachievable expectations being placed on ERP packages (Sammon & Adam, 2002; Law & Ngai, 2007). Implementing organisations seem to display an acceptance of the ERP vendors’ and consultants’ sales discourse that is not in keeping with the most basic principles of prudence (Westrup & Knight, 2000). Indeed, “the rhetoric of the packaged software vendors is particularly pervasive and has widespread appeal” (Howcroft & Light, 2006, p.217). Therefore, believing that the introduction of an ERP package will be the solution to all organisational problems can have detrimental consequences for the organisation (Kelly et al., 1999; Markus & Tanis, 2000; Stefanou, 2000; Van Stijn & Wensley, 2001; Shang & Seddon, 2002; Verville & Haltingen, 2003; Gargeya & Brady, 2005; Keil & Tiwana, 2006; Olsen & Saetre, 2007). This insight proves extremely worrying for organisations investing in ERP packages and calls into question the expectations of organisational decision-makers as to the ‘desired’ outcomes from investing in an ERP package versus the ‘actual’ outcomes and value-for-money from such an investment. However, scant reasoning and mindlessness are indeed common characteristics defining organisations’ approaches to investing in ERP packages (Milford & Stewart, 2000; Chen, 2001; Wood & Caldas, 2001; Swanson & Ramiller, 2004) which indicates that the realities of ERP implementation are not fully understood by managers at the outset. As a result, examining the CSFs for ERP implementation may provide us with some insight into the factors that have received attention in the literature to date.
CSFs for ERP Implementation

CSFs have been applied to many aspects of Information Systems (Butler & Fitzgerald, 1999) and are defined as “those few critical areas where things must go right for the business to flourish” (Rockart, 1979; p.85). An abundance of research articles have been published over the past fifteen years documenting various CSFs for ERP project implementations (Holland et al., 1999; Holland & Light, 1999; Bingi et al., 1999; Sumner 1999; Parr et al., 1999; Parr & Shanks, 2000; Chen, 2001; Esteves & Pastor, 2001; Nah et al., 2001; Somers & Nelson, 2001; Akkermans & van Helden, 2002; Hong & Kim, 2002; Al-Mashari et al., 2003; Brown and Vessey, 2003; Umble et al., 2003; Verville & Bernardas, 2005; King & Burgess, 2006; Finney & Corbett, 2007). Table 1 provides a thorough synthesised representation of the CSFs for ERP implementation which have been discussed to date. The CSF names used in Table 1 were chosen from the terminology frequently used in the literature to allow the reader to appreciate and easily identify the concepts these CSFs represent. Therefore, Table 1 presents a macro-level naming of each of the eight CSFs we have synthesised from the literature reviewed, to embrace as exhaustive a set of CSFs as possible (without carrying the large number of different factor names presented; for instance in Finney and Corbett, 2007), while also reporting on when each factor is considered a success/failure as gleaned from the extant literature reviewed.

Table 1: A Synthesis of CSFs for ERP Implementation (adapted from the literature listed above)

<table>
<thead>
<tr>
<th>CSFs</th>
<th>Factor is considered a Success when..</th>
<th>Factor is considered a Failure when..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence of Actual Strategic Business Need informing Specific Project Goals and Objectives</td>
<td>The project mission is related to business needs and this is clearly stated</td>
<td>Organisations fail to specify their organisational objectives</td>
</tr>
<tr>
<td>Top Management Commitment and Support</td>
<td>Top management monitors the progress of the project and provides the direction for the implementation</td>
<td>High-level executives do not have a strong commitment to the project</td>
</tr>
<tr>
<td>Prioritised Business Requirements and Required System Functionality</td>
<td>Organisations translate business needs into prioritised activities and recognise the importance of streamlining business operations</td>
<td>Organisational diversity is ignored or downplayed and idiosyncratic ways of doing business, which are most likely inefficient, are automated</td>
</tr>
<tr>
<td>Allocation of Best Internal Business Personnel</td>
<td>The internal business resources are dedicated full time to the project and understand the overall needs of the organisation and guide the project efforts in the right direction</td>
<td>The most knowledgeable organisational personnel are not part of a cross-functional project team and there is an overreliance on consultants, often resulting in limited knowledge transfer</td>
</tr>
<tr>
<td>Effective Communication</td>
<td>Top management communicate a shared vision of the organisation including the role of the new system and structures</td>
<td>Internal communication channels are not open at all times and / or neglect certain categories of actors</td>
</tr>
<tr>
<td>Definitive Project Scope</td>
<td>The project scope is clearly defined, understood and controlled, including the number of modules implemented, the involvement of business units, and the amount of business process reengineering needed</td>
<td>A lack of coordination leads to implementation delays and organisational conflicts, while piecemeal implementation neglects the very purpose of an integrated package</td>
</tr>
<tr>
<td>Accurate Project Timeframe and Costing</td>
<td>Comprehensive project planning is not taken lightly or with little forethought</td>
<td>Organisations were unable to develop a comprehensive plan</td>
</tr>
<tr>
<td>Required Organisational Buy-In and Project Ownership</td>
<td>Cross-functional coordination exists ensuring appropriate involvement of all stakeholders</td>
<td>If no agreement or collaboration on changes exists between managers then there will be no 'enthusiasm', 'buy-in' or there may even be active resistance</td>
</tr>
</tbody>
</table>
It can be argued that the volume of literature relating to the factors critical to an ERP project implementation falls short of providing organisational decision-makers with the necessary issues to address in an ERP project, and more importantly the methods through which these issues can be understood at the outset of the project. In fact, while studies of CSFs for ERP implementations are well received in the academic community and provide lists of CSFs, they are “only a partial aid to the practitioner struggling to understand the implications of their actions”, while “the vast majority of the literature [on CSFs for ERP project implementations] focuses on ‘static’ CSFs, often for the development stage of the life-cycle, and generally not explicitly linked to outcomes” (King and Burgess, 2006 p.59; p.67). Therefore, the impact of CSFs on achieving desired ERP project outcomes has yet to be established. In fact, Lam (2005, P.176) commented that CSF studies are “valuable for making sense out of problems where there are many potential factors influencing the outcome, and where the researcher hopes to make a set of practical recommendations based on the most influential factors”.

It is a surprising characteristic of ERP research that efforts have not been made to improve the significance of CSFs and their usefulness for ERP project implementations. The majority of the ERP literature focusing on CSFs for ERP implementation presents ‘simplistic classification systems’ or ‘laundry lists’, while the theoretical development of the CSF concept remains embryonic (Somers & Nelson, 2001; Akkermans & van Helden, 2002; Lam, 2005; Finney & Corbett, 2007). One notable omission from these research endeavors is an illustration of how these ‘simplistic classification systems’ are to be used in practice. Indeed, as managers seem to make the same mistakes repeatedly when it comes to undertaking investments in ERP packages, it suggests that they either cannot or simply do not choose to use the recommendations documented in the academic literature. Therefore, it remains that these simplistic classifications of CSFs have not been applied in practice to any great extent, leaving the issue of improving understanding amongst decision-makers preparing to undertake an ERP project implementation unaddressed. It has been argued that a more intimate understanding of CSFs by managerial decision-makers would ensure that these factors receive attention to guide an ERP implementation (Finney & Corbett, 2007). Therefore, IS researchers need to contribute towards raising the usefulness and relevance of the CSF approach, in particular with regard to guiding ERP implementations so organisations achieve their Transformation investment project outcomes.

Research Methodology

The objective of this research was to identify the CSFs for ERP implementation that should specifically be used by managerial decision-makers to ensure that their Transformation investments (ERP projects) produce outcomes in-line with organisational expectations. Also, our aim was to consider complete ERP projects, that is to say, unlike Brown and Vessey (2003), to take a holistic view of ERP project outcomes and not only focus on the implementation phase. This is particularly important for three out of our four cases which required major follow-on investments, contributing to their excessive duration. In light of the lack of theoretical maturity around the CSFs for ERP implementation (Somers & Nelson, 2001; Akkermans & van Helden, 2002; Lam, 2005; Finney & Corbett, 2007) and the level of organisational dissatisfaction with the outcomes of ERP projects (Stefanou, 2000; Teltumbde, 2000; Chen, 2001; Murphy & Simon, 2002; Ross & Beath, 2002; Sumner, 2000; 2005) this exploratory research sought to build theory using case studies. Building theories from case studies is deemed appropriate in situations where ‘little is known about a phenomenon’, or ‘current perspectives seem inadequate because they have little empirical substantiation’, or ‘they conflict with each other or common sense’ (Eisenhardt, 1989; p.548), simply because building theory from case studies does not rely on previous literature or prior empirical evidence (Gersick, 1988; Eisenhardt, 1989; Dooley, 2002). As a result, “building theory from case study research is most appropriate in the early stages of research on a topic or to provide freshness in perspective to an already researched topic”, where “conflict in the process is likely to generate the kind of novel theory which is desirable when extant theory seems inadequate” (Eisenhardt, 1989; p.548). Indeed, in the context of this research study, this ‘freshness in perspective’ is required on the topic despite the fact that it has received considerable attention throughout the past fifteen years.

From the perspective of this research study, the following description of the appropriateness of a case study to a particular type of research seems accurate: “case research is particularly appropriate for certain types of problems: those in which research and theory are at their early, formative stages, and sticky, practice-based problems where the experiences of the actors are important and the context of action is critical” (Benbasat et al., 1987; p.369). However, the selection of cases, the sampling problem, is an important aspect of any type of research approach, especially when building theory from case studies.
Case Selection

A ‘collective case study’ (Stake, 2000; p.437) research strategy was adopted for this study. A collective case study is a multi-site qualitative research approach which is extended to several cases using a replication strategy. In an effort to guide the case selection, the insights of Stake (2000) were drawn upon, where an instrumental study replicated in several cases was undertaken. It is a fact that understanding a single intrinsic case would not in itself have fulfilled the objective of this study, however, jointly studying a number of instrumental cases better facilitated investigating the presence or absence of CSFs for ERP implementation, where the diverse organisational stories of those ‘living the case’ could be teased out (Stake, 2000). In the context of this study, for an organisation to be considered suitable for inclusion it had to have undertaken an ERP project, and at the time of first contact with the organisation, be in the post-implementation phase, operating on an ERP platform for at least twelve months, for all or part of the project, depending on the implementation approach followed by the organisation. We used a systematic purposeful sampling approach (Patton, 1990) for the selection of the research sites, where we considered twelve potential organisations, which were reduced to four case studies at the end of a process of elimination. Over a two month period following initial contact and preliminary interviews with a point-of-contact in each research site, four sites ruled themselves out of participating in the research, due to their inability to commit to the time required for the interviewing process; however, the researcher ruled out the possibility of continuing research in four other sites, due to concerns about future access to interviewees and the openness to questioning and willingness to share documentary evidence on the part of the point-of-contact. Notwithstanding this, throughout this same two month time period, two of the remaining four cases had progressed considerably in such a short timeframe, where openness to share information and willingness to make personnel available for interview was a key feature of their attitude and willingness to participate in the research. Therefore, to maintain good quality research design, the selection of the four cases was driven by the ‘appropriateness’ (Miles and Huberman, 1994; Patton, 1990) of each research site, in that they demonstrated a fit to both the purpose of the research and the phenomenon of inquiry. The four organisations we studied are as follows: SerCom Solutions, an Irish owned organisation specialising in Supply Chain Management Services, Banta Global Turnkey (BGT) a global organisation involved in a similar business to SerCom, the Irish Health Services (now the Health Service Executive), and An Post, the state-owned entity in charge of delivering postal services in Ireland. During the selection process, an initial perception of each ERP project and its outcomes was achieved, as presented in Table 2. All in all, we have to consider that all organisations began their ERP projects around 2000 and this makes them early adopters of the technology in the terms proposed by Brown and Vessey (2003).

It should be noted, as is common in collective case studies (Stake, 2000 p.437), that very little was in fact known about each of the cases selected in advance, with regard to any common characteristics the cases may possess. In fact, the instrumental qualities of each of these four cases may have proven similar or dissimilar at the time of selection, although this was not fully known by the researchers. In fact Miles and Huberman (1994, p.25) have commented that “multiple cases offer the researcher an even deeper understanding of processes and outcomes of cases, the chance to test (not just develop) hypothesis, and a good picture of locally grounded causality”. In retrospect, this collection of cases has proven extremely beneficial, due to the fact that understanding them has led to (1) a better overall understanding of the ‘desired’ and ‘actual’ outcomes of their investment and, (2) an in-depth understanding of their respective preparedness to undertake such an initiative regarding the presence or absence of certain CSFs for ERP implementation. Table 2 illustrates the key differences between the cases, as well as their inherent cohesion as a sample of four organisations having undertaken and completed ERP projects in the last few years.

Data Collection and Data Analysis

For the purposes of this study both project documentation and interviews were the primary sources of empirical data. Documentation analysis was exploited as much as was possible, and for each case the documentation provided specific details to corroborate, and in some instances clarify, evidence collected through interviews. A total of 84 hours of interviews was conducted over a two year period for this study (2004-2006), as illustrated in Table 3.
### Table 2: Initial Perceptions of Cases Selected for the Research Study

<table>
<thead>
<tr>
<th>Organisation</th>
<th>SerCom</th>
<th>BGT</th>
<th>HSE</th>
<th>An Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>Private</td>
<td>Private</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>ERP Package</td>
<td>SAP R/3</td>
<td>JDE World</td>
<td>SAP R/3</td>
<td>JDE OneWorld</td>
</tr>
<tr>
<td>ERP Footprint</td>
<td>Core Operations (Manufacturing and Logistics)</td>
<td>Core Operations (Supply Chain Manufacturing and Finance)</td>
<td>HR / Payroll</td>
<td>Finance</td>
</tr>
<tr>
<td>ERP System Type</td>
<td>Value Chain Operations</td>
<td>Value Chain Operations</td>
<td>Support Operations</td>
<td>Support Operations</td>
</tr>
<tr>
<td>Project Type</td>
<td>Business Change</td>
<td>IT</td>
<td>IT</td>
<td>Business Change</td>
</tr>
<tr>
<td>Enterprise-Wide View</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Project Outcome</td>
<td>Very Successful</td>
<td>Near Failure</td>
<td>Suspended</td>
<td>Partly Successful</td>
</tr>
<tr>
<td>Point-of-Contact Comment</td>
<td>“The project required an enormous effort from everyone but it was successful”</td>
<td>“I could tell you all the things not to do. We have not done well with our implementation”</td>
<td>“This project is not going well. It will face huge issues when rolled-out nationally”</td>
<td>“We have learned some hard lessons but that’s the nature of these projects”</td>
</tr>
</tbody>
</table>

### Table 3: Breakdown of Interviews by Case

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Number of Informants</th>
<th>Hours of Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>SerCom</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>BGT</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>HSE</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>An Post</td>
<td>6</td>
<td>17</td>
</tr>
</tbody>
</table>

All interviews were conducted on site, varying from a one to a three hour duration. A large percentage of interviewees were interviewed two, and in some cases, three times. All interviews were audio-taped for subsequent transcription and for verification of accurate interpretation. Following the first round of interviews, transcripts were sent to the informants for review and verification of the content. During the focused interviews ambiguities and discrepancies were clarified and information from the first round of interviewing was confirmed. Furthermore, the repeat rounds of focused interviews ensured that a certain flow of questioning was followed based on the analysis conducted on the earlier interviews, both in that same case and across the other cases. As we conducted semi-structured interviews, we provide a sample of first round interview topics from our interview guide (see Appendix A). It is noteworthy that our informants were the remaining key decision-makers and most knowledgeable persons in each site, in relation to the decisions made during the enterprise-wide ERP project; some key organisational personnel involved in the projects having already left.

In the within-case analysis, rich constructed narratives were developed to characterise each ERP project. These were used in the cross-case analysis to compare cases systematically, illustrating the similarities and differences between the cases. These constructed narratives provided a common frame of reference in order to better recognise, understand and ultimately structure the stories that informants retrospectively recalled about their organisation's ERP project implementation. Furthermore, the informants' retrospective accounts were used to rigorously detect the

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1 Throughout the two year period the movement of personnel to different organisational roles and to other organisations was both expected and observed.
presence or absence of CSFs for ERP implementation in their respective projects. In fact, Brown (2000, p.46) described narratives as “the most useful way to understand sense-making”. Furthermore, these retrospective accounts of informants were triangulated with available documentation to ensure that the ‘plot’ (Abbott, 1992) of each case was reported correctly. As part of the data reduction process and in an effort to build a logical chain of evidence for each case, a series of Explanatory Effects Matrices (Miles and Huberman, 1994) were used during both within-case and cross-case analysis. For the purposes of clarity and readability in this paper, Table 4 and Table 5 illustrate some of the final outputs of the iterative case analysis process.

A Comparative Analysis of the Cases Studied

Based on the within-case and cross-case analysis we conducted (reported in detail in other publications by the authors), it was observed that the awareness and preparedness around the CSFs for ERP implementation within BGT, the Health Services, and An Post were inadequate for undertaking such a Transformation investment as an ERP project. On the other hand, SerCom’s decision-makers displayed a greater awareness and preparedness around the CSFs for ERP implementation within their ERP project initiative and as a result can be characterised as being mindful (Swanson & Ramiller, 2004) in their approach to their ERP project. Against this backdrop, which serves to characterise the process followed by the organisational personnel involved in each of the four projects, the CSFs for ERP implementation and their presence or absence in the preparations of each organisation are discussed in the next section. Our analysis of the absence or presence of these CSFs is then benchmarked against the expectations managers had of their ERP projects, initially. Based on these observations, we then derive a set of CSFs which are particularly important for managers in ensuring that the most important and difficult aspects of their ERP projects, those that relate to the transformational nature of these projects, are handled successfully.

CSFs for ERP Implementation

In preamble to this discussion, our observations in the four cases lead to the conclusion that certain decisions taken at the outset of the project based on the awareness and preparedness of managerial decision-makers around the CSFs for ERP implementation, can: (1) affect the impact of the project/investment on the organisation, (2) account for the problems that an organisation experiences throughout the execution phase of the project implementation, and (3) impact on the desired outcomes of the project. These conclusions are supported by the evidence presented in Table 4, which illustrates each of the organisation’s experiences around the CSFs for ERP implementation, based on a sample of the retrospective accounts of informants within each of the cases.

The appreciation within SerCom to understand the business implications of the project from the outset and embrace an enterprise-wide view for the project initiative was extremely high. For example, SerCom took a strategic view that their business model was changing and acted mindfully (Swanson & Ramiller, 2004) with regard to prioritising critical aspects of the business and ensuring that these business operations were represented on the ERP system from the outset. Therefore, SerCom management considered the impact of the ERP package on the entire organisation and isolated critical functional areas. From the outset, the awareness of SerCom management dictated that no attempt be made to represent all functional areas on the system at once, only those earmarked as critically important, in view of future business changes needed. As a result, this ensured that the scope of the project was more manageable and the project could be completed in a shorter timeframe. Therefore, as a result of the management’s awareness to isolate and prioritise business requirements, SerCom achieved their objectives within a short timeframe and 100% of the functionality required was delivered, using a small number of highly skilled and knowledgeable business and IT personnel.

An Post demonstrated a high level of awareness for the project initially, however, their preparation was inadequate at the outset and as a result they faced a number of setbacks throughout the lifecycle of the project. Indeed, borrowing the terminology of Patton (1990), An Post can be characterised as a deviant case, in that managers displayed a high awareness of what was involved, but this awareness translated into less than adequate preparations being made for the project. This observation suggests that while decision-makers within An Post were aware of what was needed, in theory, for their ERP initiative, they did not fully appreciate the importance and complexities of the implementation process, in practice, when making preparations for the project. In other words, they failed to apply the means that their ambitious aims required. Therefore, while the ERP project was considered the largest ever business process project within An Post it was not approached as a ‘priority one’ concern by all business units.
Table 4 Informants’ Retrospective Accounts of CSFs for ERP Implementation

<table>
<thead>
<tr>
<th>CSF</th>
<th>SerCom</th>
<th>BGT</th>
<th>HSE</th>
<th>An Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF Existence of Actual Strategic Business Need informing Specific Project Goals and Objectives</td>
<td>P There was an understanding that the business model was changing and a number of strategic business goals were set against the project</td>
<td>A There was very little appreciation that the nature of the business was changing and no real business objectives were set for the project</td>
<td>A Very little consideration was given to the business need for the project and no real strategic business objectives were associated with the project</td>
<td>P Managers anticipated a changing competitive business environment and a number of strategic business objectives were assigned to the project</td>
</tr>
<tr>
<td>CSF Top Management Commitment and Support</td>
<td>P The project was the priority one concern of the CEO who was also the chairperson of the steering committee</td>
<td>A The ERP project was never given ‘priority’ and there was a lack of conviction at top levels to drive the project</td>
<td>A There was very little executive sponsorship throughout the Health Service</td>
<td>A The project was the largest ever business process project but was not approached as a priority by all units</td>
</tr>
<tr>
<td>CSF Prioritised Business Requirements and Required System Functionality</td>
<td>P The requirements of the business were prioritised and consensus was reached as to the critical elements in each area in addressing the business needs. This guided the module selection / implementation and 100% of what was required was delivered</td>
<td>A A poorly defined set of business requirements was developed at the outset, providing a ‘wish-list’ as opposed to critical requirements. As a result, the ERP did not have the capabilities to meet all business requirements</td>
<td>A The project was a replacement of ‘as-is’ business processes as per legacy systems. It led to ‘local interpretations’ of how to automate business processes. There was a lack of even the most basic consensus in relation to the business value of the ERP</td>
<td>A During the analysis process, not all personnel performing the business process activities were involved. Requirements were only established as ‘high level overviews’. This led to functionality gaps and, ultimately, undelivered functionality</td>
</tr>
<tr>
<td>CSF Allocation of Best Internal Business Personnel</td>
<td>P There was active involvement of key personnel in the project and all project team members were full-time on the project</td>
<td>A Where business personnel were involved on the project, it was still driven by IT, and the IT personnel were telling the business personnel what to do</td>
<td>A Insufficient commitment of internal human resources to the project</td>
<td>A Most internal project team members had little experience of project work and were on the team on a contractual basis, or as recently appointed graduates</td>
</tr>
<tr>
<td>CSF Effective Communication</td>
<td>P Communication from the top ensured the project was a priority throughout the organisation</td>
<td>A No central steering group existed governing the project which led to poor organisational communication and managerial support</td>
<td>A The attitude to the project was negative and support for change and criticality of adoption were not communicated from the top down</td>
<td>A There was a lack of a formal communication structure to promote dialogue between members of the project team</td>
</tr>
<tr>
<td>CSF Definitive Project Scope</td>
<td>P A complete blue-print was developed with prioritised business functions and the scope was defined accordingly</td>
<td>A Poorly defined scope and automated site specific ‘as-is’ processes to varying degrees</td>
<td>A There was no real focus for the project; therefore, the scope of the project was subject to scope creep over time</td>
<td>A The detail behind each system’s function was not adequately documented in support of the business</td>
</tr>
<tr>
<td>CSF Accurate Project Timeframe and Costing</td>
<td>P The project was completed within a short timeframe and within budget</td>
<td>A The project was not fully completed within the timeframe and the true accumulated cost of selecting, implementing, supporting and modifying the ERP package over the past decade was unknown</td>
<td>A The project was not fully completed and was suspended. Also, the controversial PPARS project is estimated to have cost anything between €150 and €500 million, where original estimates of costs were set at €8.8 m.</td>
<td>A The project was not completed with the timeframe and the true accumulated cost of selecting, implementing, supporting and modifying the ERP package was unknown</td>
</tr>
<tr>
<td>CSF Required Organisational Buy-In and Project Ownership</td>
<td>P A level of commitment existed to do whatever it took and to embrace change to ensure the future growth of the business. Leading members of each functional area were involved, under the guidance of a strong project manager</td>
<td>A Getting buy-in from business personnel was difficult because BGT employees did not want to take part in a project that was perceived as extra work and responsibility. Furthermore, some business personnel were slow to buy into the project and take ownership because it was seen as an IT initiative</td>
<td>A There was a resistance to business change in a civil service culture and this did not facilitate getting things done nationally in a unified and standardised way. Ultimately, entities within the Health Service enjoyed huge autonomy in how they operated</td>
<td>A There was resistance to business change due to the civil service culture. Changing people’s mindset was difficult because of the autonomy enjoyed by the various units. Many issues arose due to personnel not taking ownership of the ERP, or not even understanding the processes</td>
</tr>
</tbody>
</table>

Actual Project Outcome | Transformation | Renewal | Renewal | Renewal |
For example, An Post was aware of the importance of a steering committee for the project, but they failed to ensure that the steering committee remained for the full duration of the ERP project. Furthermore, An Post understood the importance of documenting requirements throughout the project, but preparations were not made to ensure that this documentation of requirements was produced throughout phase 1 of the project. As a result of this, when end-users expressed dissatisfaction with the functionality of the ERP package in meeting their requirements, post ‘go-live’, there was no requirements documentation available to support the emergence of an easy solution to this problem. Finally, the majority of the project team (business personnel especially) had little or no experience of enterprise-wide projects and were assigned on a contractual basis, or were recently appointed graduates specifically employed by An Post for this project (therefore not being able to contribute in any meaningful way). These examples of a lack of preparedness left An Post with less than desirable project outcomes where the project failed to deliver real business value and meet the business objectives set for the project, resulting in the business never properly taking ownership of the project.

Both BGT and the Health Services share a number of common characteristics in terms of their experiences with their ERP project initiatives. Both organisations found themselves undertaking an IT initiative from the outset, where the required level of business support simply was not there. Therefore, the priority of the project was not set at a high enough level within the business community. Furthermore, the project was never given a set of clear and consistent (universally understood) strategic business objectives as a platform to guide decision making during the project (although it is clear from our interviews that major changes in the environments of both organisations were requiring major changes to the business model) and the criticality of adoption was not communicated from the top level. In both BGT and the Health Services the active involvement of business personnel on the project was a cause of serious problems. It was a feature of both organisations that personnel were not seconded onto the project team full-time and as a result their commitment to the project was reduced as they were also performing their daily roles in parallel. Furthermore, no real formal team structure was put in place and the roles and responsibilities of project team members were poorly defined, leading to a lack of ownership for the project by team members. We claim that in both sites, this lack of ownership led to a less than successful project outcome. However, a failure to allocate sufficient business resources to the ERP project, in both these cases, also compounded the impact of the problem of standardisation, in that, the business personnel were not adequately skilled to perform their roles on the project team, in terms of understanding the business and driving change to introduce standardisations at an organisational level (ie across sites). Thus, it is obvious that a lack of preparedness for such a key issue as standardising to an enterprise-wide business process infrastructure from the outset, led to an extended project timeframe, with an associated escalation in costs, and a poor fit between the software and the business, in both BGT and the Health Services. As a result, no real long-term business value-added was realised from undertaking the ERP project in these two cases.

Finally, within BGT, the Health Services and An Post, the rationale for adopting their initial approach to the implementation of the ERP package hinged on the organisational structure and the mindset of those involved in the project at the time of initiation. Therefore, unlike SerCom, these three organisations demonstrated a lack of appreciation of what an enterprise-wide view of the organisation entails, for example in terms of business process infrastructure, where very little attention was attributed to standardising processes to drive out efficiencies in the business. Therefore, the CSFs for ERP implementation were not fully understood within these three cases, especially when pursuing a Transformation investment.

**Benchmarking the Outcomes of the Projects against Managers’ Expectations**

When organisations are evaluating their investments in ERP packages they can move beyond the ‘business case’ of analysing costs and benefits by ensuring that the CSFs for ERP implementation are understood and exist in their Transformation project endeavour. Based on our observations in three of the cases studied (excluding SerCom), where these CSFs were absent in their ERP project implementations, their investment became *Renewal*. Analysing the nature of the ERP investments within the four organisations studied and highlighting the discrepancies between what was achieved in reality and what was actually expected when undertaking the project at the outset provides a clear illustration of the mismatch between the theory and practice with regard to investing in ERP packages. As an example, Table 5 highlights the differences between the ‘desired’ (expectations at the outset of the project) and ‘actual’ outcome of the respective ERP project investments. It can also be noted that in two of the cases (BGT and An Post) additional “corrective” project initiatives (Process Improvement investments) were undertaken to provide the expected value-added of the initial ERP investment.
Table 5: Categorising the ‘Desired’ and ‘Actual’ ERP Project Outcomes

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Desired Project Outcome</th>
<th>Actual Project Outcome</th>
<th>Initiatives to Adjust Actual Project Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>SerCom</td>
<td>Transformation</td>
<td>Transformation</td>
<td></td>
</tr>
<tr>
<td>BGT</td>
<td>Transformation</td>
<td>Renewal</td>
<td>Business Process Improvement initiatives in SCM and Finance</td>
</tr>
<tr>
<td>HSE</td>
<td>Transformation</td>
<td>Renewal</td>
<td>Project suspended</td>
</tr>
<tr>
<td>An Post</td>
<td>Transformation</td>
<td>Renewal</td>
<td>Process Improvement exercises to retrofit the implemented ERP system</td>
</tr>
</tbody>
</table>

From the outset SerCom viewed their ERP project as an enterprise-wide initiative and the supporting investment was viewed as Transformation. The driver for the project was very much a carbon copy of that described by Ross & Beath (2002) for Transformation investments ‘a core infrastructure that is inadequate for desired business model’. Furthermore, the entire organisation took ownership of the project investment, embracing a ‘long-term growth’ strategic objective and a ‘shared infrastructure’ technological scope. However, when compared to the ERP project undertaken by BGT, while it was also initially considered a Transformation investment in terms of group-wide focus, both the US and European operations commenced separate Renewal investments. Both of these initiatives were driven by the issue of Y2K compliance and were owned by IT. The strategic objective characterising these investments was short-term focused, where the technological scope was limited to providing a separate shared infrastructure for both operations. However, over time BGT invested in a series of Business Process Improvements (Finance BPI and SCM BPI) from a group perspective throughout BGT. These Process Improvement investments were viewed as the key to bringing BGT closer to the ideal of a Transformation investment. Therefore, this new investment portfolio allowed BGT to fulfil their strategic objective of ‘long-term growth’ and providing a ‘shared infrastructure’ across the entire group.

An Post attempted a Transformation investment at the outset but it was effectively a Renewal characterised by a series of Process Improvement investments throughout the project although they were not distinctly identified as such. The project ultimately delivered cost reductions in certain areas of the An Post operation and raised the quality of IT service, in the majority of cases moving from a manual to automated solution within the business units involved. However, limited business process change was a feature of the project, where existing ‘as-is’ processes were simply automated, and it was very much driven by external consultants and internal IT, with poor business resource and expertise provided by the business units for the project. While the strategic objective was ‘short-term profitability’, the technological scope provided ‘shared infrastructure’ but on a somewhat limited enterprise-wide view, throughout An Post. In comparison the ERP project within the HSE may have been politically described as a Transformation investment (as its label Personnel, Payroll and Related Systems or PPARS suggests), but in reality, at the outset, the project was supported as a Renewal investment type (short-term strategic objective, introducing a limited shared infrastructure), in that it was simply replacing existing HR/Payroll systems in a small number of health agencies. The PPARS project did not embrace an enterprise-wide perspective or set about to introduce process standardisation across the Health Service in these functional areas. Although advised by a number of external consulting groups to address the state of the project before proceeding in phase 2, the Health Service continually attempted to undertake a Transformation investment without addressing these issues. It is possible that these issues may have been addressed if the Health Service leveraged a number of distinct Process Improvement investments, as was identified in BGT and in An Post to a lesser extent. Inevitably this attempted Transformation investment failed and the project did not achieve enterprise-wide coverage (and was in fact suspended).

**Conclusion: Deriving CSFs for Transformation Investments**

We conclude this section by leveraging the discussion presented in the previous sub-sections to derive a set of five macro-CSFs which require particular attention from managers in order to ensure that investments in ERP packages produce outcomes which are in-line with those desired by an organisation at the outset of a project. These five CSFs for Transformation investments are described below.
CSF 1: **Define** a strategic business need and **Communicate** the need for change

This ensures that the business impacts of the proposed business change programme are documented and the project is not simply considered an IT initiative. Evidence supports the fact that a lack of a real business objective at the outset of the project left BGT and the Health Services in a situation where the outcome of the project was less than successful in terms of delivering the required ERP package functionality. In addition, it failed to contribute to developing the future business capability these organisations required in the future. Therefore, the existence of an actual strategic business need and the ability to prioritise critical business process areas, based on this need, is critical to ensuring that a project will produce the desired successful outcome in terms of business value and required package functionality.

CSF 2: **Communicate** a visible ‘priority one’ project status and **Manage** expectations from the top

This ensures that under the governance of senior management, the project is understood by all to support the future strategic business direction. As is evident from the cases studied here, many organisations struggle with the necessarily large commitment required by a Transformation investment. In fact, SerCom was the only organisation to embrace this notion of ensuring that responsibility for the Transformation investment rested with those stakeholders who understood the business and could drive through the necessary process changes. All of the other organisations faced problems with this ideal vision of responsibility for the investment and ultimately the project. For example, where SerCom had the most senior and highly skilled business personnel in positions of responsibility on the project, both An Post and the Health Services had inexperienced business personnel taking responsibility, when these business personnel were in fact made available (in fact consultants took a lot of the responsibility in these two project initiatives), while BGT had IT personnel predominantly dictate the project and take responsibility.

CSF 3: **Prioritise** the critical functional areas of the business and **Define** ‘must-have’ business requirements

This ensures that the ERP package functionality will be aligned to meet the critical requirements of the business. As evidenced within the cases performing an ‘as-is’ and ‘to-be’ analysis of the critical business processes ensures that the organisation will achieve the desired project outcomes associated with implementing the ERP package in support of the future direction of the business. As an example, BGT, the Health Services and An Post implemented the ERP package on a site by site basis, embracing ‘as-is’ site specific business processes. This approach was as a direct result of their lack of preparation at the outset of the project where a very limited attempt was made to analyse existing business processes in an effort to prioritise requirements and introduce process improvements wherever possible across the entire organisation. By contrast, this prioritisation of requirements and business process improvement was a feature of the SerCom approach from the outset.

CSF 4: **Allocate** the best internal business resources to the project team full-time

This ensures that the critical functional areas are appropriately represented when business requirements are defined. As evidenced within the four cases this CSF had the most significant impact on all of the ERP projects. Evidence also supports the fact that managers were reluctant to give up their best business resources full-time to the initiatives. For example, within BGT, the Health Services and An Post, a reluctance to provide the best internal business resources to their respective projects, which it is argued was as a direct result of a lack of top management commitment and support to the project from the outset, led to an immature understanding of existing business processes on the one hand and new business process transactions on the other hand. The addition of the new technological environment and its additional uncertainties copper-fastened the delivery of poor project outcomes in terms of required ERP package functionality.

CSF 5: **Define** a narrow project scope to meet requirements within a short timeframe and within budget

This ensures that the project is completed within a short timeframe and key functional areas have the required package functionality delivered quickly in support of their ‘must-have’ business requirements. Evidence supports the fact that in three of the cases this CSF had the most significant impact on all of the ERP projects. Evidence also supports the fact that in three of the cases there was a lack of a coherent implementation methodology, emphasising clear and consistent project scope focusing on critical aspects of the business, appropriate documentation of requirements to be addressed, and clearly defined lines of authority, responsibility, and accountability, from the outset of their
projects. As a result, this left BGT, the Health Services, and An Post in a situation where the outcome of the project was not delivered on time and within budget. However, SerCom achieved their desired project outcome, where an accurate project costing and an accurate project timeframe were characteristics of their efforts.

The presence of these actionable CSFs is the first step in improving the likelihood that a Transformation investment in ERP produces the actual outcomes in-line with the outcomes desired at the outset of the project.

Concluding Remarks, Implications and Further Research

The outputs of this research study contribute to our understanding of ERP project outcomes, in terms of the concept of Transformation investments as defined by Ross and Beath (2002), and lead to a causal model of the CSFs for ERP implementation that must be present to ensure that investments in ERP packages have a greater likelihood of producing Transformation investment project outcomes. Furthermore, this research paper make a definitive attempt to raise managers’ awareness of the need for their organisations to undertake self-assessment exercises to improve their preparations for ERP project implementations. The implications for research and practice are now discussed.

This study offers several implications for researchers. The first outcome consists of a definitive characterisation of ERP project outcomes in terms of the Ross and Beath (2002) framework. Based on our observations, we propose to define Transformation investment project outcomes as follows: where the organisation has gained the flexibility to react more efficiently to changing business requirements or enter new business areas to meet customer needs. The organisation’s efficiency is supported and enabled by the existence of a robust business process infrastructure enabled by the ERP system and an enterprise-wide view of data. Furthermore, we distinguish a Renewal investment project outcome as follows: where the organisation has modeled current business processes on the ERP system providing an adequate infrastructure to meet current customer needs, but is unable to operate efficiently to meet changing demands; while an enterprise-wide view of data may also not exist. Such a project outcome may require additional investment to retrofit the implemented ERP system in the future. We believe these two definitions are an apt characterisation of the gap that often arises between what managers try to obtain and what they end up obtaining after their ERP implementations, bearing in mind that the resulting infrastructure is binding for these organisations (Markus and Tanis, 2000).

Secondly, the research findings contribute to theory development in IS by adding to our current understanding of investing in ERP packages and illustrating the usefulness of the CSF approach to evaluating such investments. Our paper proposes a method for evaluating investments in ERP packages moving away from the business case, which focuses narrowly on costs and benefits, towards assessing the presence or absence of CSFs for ERP implementation at the outset of a project. An organisation’s inability to evaluate investments in ERP packages seems to be a key characteristic of their mindlessness (Swanson & Ramiller, 2004). Thus, if managerial decision-makers assessed their awareness of the CSFs for Transformation investments then their organisation may become more mindful (Swanson & Ramiller, 2004) of their rationales for investing in ERP packages, and more importantly could be better prepared for the project implementation while achieving the actual outcomes expected from the project. This research provides managers with a CSF-based recipe for achieving Transformation investment outcomes (Figure 1) which will also increase the perceived usefulness of CSFs to managers in general. Our causal model illustrated in Figure 1 is constructed around the five CSFs identified as the most pertinent in this study and shows their interrelatedness, such that the absence of one of these CSFs does not have a well-defined isolated impact on the outcomes of an ERP project implementation, but will in fact compound implementation problems further, such that, in the end, Transformation investments produce Renewal investment outcomes.

While these CSFs appear generic in as of themselves, based on our research outputs it is the relationships between them and their combined impact which organisations who are striving to produce outcomes in-line with those expected from a Transformation investment must understand and focus upon. We argue that the causal sequence of the CSFs, with some CSFs being clear antecedents of the others, does represent the order in which the CSFs should be addressed. For example, while a strategic business need has to be defined upfront, the need for change must also be communicated throughout the organisation if a true Transformation investment is the desired outcome. Communicating this need for change from the outset of the project will help to manage the expectations of organisational personnel and also enforce the ‘priority one’ status of the project. A well defined strategic business need and the communication of the ‘priority one’ project status will, in turn, facilitate the prioritisation of the critical functional areas of the business to be supported by the implemented ERP system. Using these critical functional areas, the best internal business resources can then be allocated to the project team on a full-time basis and these
business resources will define the ‘must have’ business requirements for their respective areas. It is the definition of these ‘must have’ business requirements for the critical functional areas that facilitates defining a narrow project scope to meet requirements within a short timeframe and within budget. Also, expectations managed from the top will support efforts to allocate the best internal business resources in order to define a narrow project scope, as there is an accurate appreciation amongst organisational personnel as to what the project involves and what is being impacted by the Transformation investment.

Thus, this study has clear implications for practice, based on the understanding embedded in Figure 1: an organisation taking the time to undertake a self-assessment exercise on the presence or absence of CSFs, presented in Figure 1, will inevitably improve their preparations for the project implementation, as their level of awareness will be raised as to the importance of previously unknown factors (if absent) in their organisational context. This will lead to a greater understanding of how desired outcomes can be achieved, not by simply trying to follow cook book recipes based on laundry lists of CSFs, but by realising from the very beginning, how and why these five CSFs matter. In addition, this will provide a greater measure of the risk of undertaking such projects (Transformation investments) and the risk of failing to achieve, at least in part, some of their desired outcomes.

Whilst this study has contributed to our understanding of investing in ERP packages, it has its limitations and requires further investigations. While the CSFs for Transformation investments are encouraging and useful in practice, these findings cannot be generalised to all organisations undertaking ERP projects. Rather, they reflect the early adopters status of our case studies (Brown and Vessey, 2003) as illustrated by the need to do it again and do it right the second time scenario in three of our four cases; leading to the extreme time duration of their ERP projects. Therefore, the presence or absence of CSFs for ERP implementation should be examined in additional cases of ERP implementations and as a result it should become possible to provide managers with actionable scenarios which they can use as blueprints for their EPR projects, covering a wide range of organisational contexts and settings.
References


**Appendix A: A Selection of First Round Interview topics from our interview guide**

1. A certain problem existed for which a solution was required. How was the problem and the subsequent solution identified?
2. What was the business vision for the ERP project?
3. What were the technological (systems), organisational (process) and financial inefficiencies constraining the organisation, balanced against current and future business needs?
4. What type of systems and applications existed on the legacy systems? In what way were these applications deficient? What business requirements did these applications fulfil?
5. What amount of organisational change was envisaged?
6. What approach to investment evaluation/justification was undertaken?
7. What were the expected benefits from the introduction of the ERP?
8. In light of the fact that a decision was made to implement an ERP (problem identification), how was the package evaluation and selection process conducted?
9. In what way did any of the decisions made at this ‘problem identification’ stage affect the project’s implementation?
10. What were the expected benefits of the project?
11. How were expectations managed?
12. What type of benefits/expectations were realised from implementation?
13. What factors were critical to the successful implementation of the ERP project?
14. In what way were these factors critical to the ERP project implementation?
15. Why were these factors critical to the ERP project implementation?
16. In having implemented an ERP system, what would you do differently?